Appendix B

Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water

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Contents

Tables

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Acronyms and Abbreviations

Acronym or Abbreviation	Full Phrase
1944 Water Treaty	1944 United States-Mexico Treaty on Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande
2007 Interim Guidelines	2007 Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead
af	acre-feet
AZ	Arizona
BICS	Binational Intentionally Created Surplus
Brock	Warren H. Brock Reservoir
BWSCP	Binational Water Scarcity Contingency Plan
CA	California
CAP	Central Arizona Project
CAWCD	Central Arizona Water Conservation District
CCS	Continued Current Strategies
cfs	cubic feet per second
CRIT	Colorado River Indian Tribes
CRSS	Colorado River Simulation System
CVWD	Coachella Valley Water District
DCP	2019 Drought Contingency Plan
DCP-ICS	Drought Contingency Plan Intentionally Created Surplus
EC-ICS	extraordinary conservation
EIS	environmental impact statement
GRIC	Gila River Indian Community
IBWC	International Boundary and Water Commission
ICS	Intentionally Created Surplus
IID	Imperial Irrigation District
kaf	thousand acre-feet
LB Priority	Lower Basin Priority
LB Pro Rata	Lower Basin Pro Rata
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
maf	million acre-feet
Mexico	United Mexican States
MWD	Metropolitan Water District of Southern California

MWR	Mexico's Water Reserve
NWR	National Wildlife Refuge
Pub. L.	Public Law
Reclamation	Bureau of Reclamation
SNWA	Southern Nevada Water Authority
SRWYC	Sacramento River Water Year Classification
SRWYT	Sacramento River Water Year Type
U.S.	United States
YDP	Yuma Desalting Plant
Yuma County WUA	Water Users Association

Appendix B. Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water

B.1 Introduction

This appendix describes the Colorado River Simulation System (CRSS) modeling assumptions for the storage and delivery of conserved Colorado River system and non-system water in Lake Mead and Lake Powell pursuant to applicable federal Law, to increase flexibility in meeting water use needs while maintaining reservoir storage above critical elevations.

Extended drought, low reservoirs, and hydrologic variability from year to year create challenges when trying to plan for water supply and protect critical elevations. Conservation mechanisms that offer water users flexibility to conserve and/or augment water supplies can increase stability of the reservoirs, thereby reducing the need for and mitigating the impacts of large shortages. The alternatives represent a wide range of approaches to this element, ranging from no new conservation mechanism, to moderately sized pools in Lake Powell and Lake Mead open to users within the Upper and Lower Basins, respectively, to large, inclusive pools that may be flexibly stored in either reservoir to maximize their benefit to the system.

At this time, it is unknown which entities might participate in a Lake Mead or Lake Powell mechanism that allows the storage and delivery of conserved system and non-system water. Furthermore, the timing and magnitude of the storage and delivery of conserved water is unknown. These assumptions were developed to include the maximum amount of storage credits that may be created during any year, the maximum amount of storage credits that may be recovered during any year, and the maximum total amount of storage credits that may be available at any one time. Specific entities in CRSS had to be selected to model the storage and delivery mechanisms, including developing assumptions for their respective level of participation, to enable the evaluation of the mechanism and its potential effects on environmental resources. These assumptions are a reasonable and appropriate representation of potential conservation activities and the storage and delivery of water under the alternatives for purposes of environmental analyses, reflecting both the historical use of conservation programs and the need to bound the analysis by evaluating maximum potential impacts. The Bureau of Reclamation's (Reclamation) modeling assumptions are not intended to constitute a position on the use of the storage mechanisms by any specific water user nor are they an interpretation of the law, contracts or a legal position. Reclamation chose these modeling assumptions for a number of reasons, including the following: (1) a larger volume of potential storage in Lake Powell and Lake Mead is identified; (2) the maximum potential impacts on river flows downstream of Hoover Dam are identified; (3) concepts for the potential future use of a storage mechanism are represented; and (4) the modeling impacts of a program of potential future cooperation between the United States (U.S.) and the United Mexican States (Mexico) are identified.

The following sections of this appendix discuss general modeling assumptions, then individual conservation creation, storage, and delivery assumptions for each alternative and the comparative baseline evaluated in this Final Environmental Impact Statement (EIS). These mechanisms may be in either Lake Powell, Lake Mead, or both reservoirs, and cover a range of possible conservation structures, maximum accumulations, and delivery rules.

B.2 General Modeling Assumptions

Three alternatives (Enhanced Coordination, Maximum Operational Flexibilities, and Supply Driven [both Lower Basin Priority (LB Priority) and Lower Basin Pro Rata (LB Pro Rata) approaches]) include assumptions for new storage and delivery mechanisms for conserved water in Lake Powell and Lake Mead. The Continued Current Strategies (CCS) Comparative Baseline assumes that existing agreements, including the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (2007 Interim Guidelines), 2017 Minute 323, and 2019 Drought Contingency Plan (DCP) continue through the analysis period (2027-2060), which includes an assumed continuation of the storage and delivery mechanism in Lake Mead. The No Action and Basic Coordination Alternatives only include assumptions for the delivery of Intentionally Created Surplus (ICS) created and stored before January 1, 2027.

The following sections explain the general modeling assumptions for the Lake Powell and Lake Mead mechanisms regarding how storage credits are generated and delivered within the CRSS model. Examples of the accounting of storage credits within the model are also presented below.

B.2.1 Lake Powell Mechanism

When storage credits are created, the conserved water is modeled by injecting as a lumped volume above Lake Powell on a water year basis. As such, the Lake Powell mechanism does not account for state or water-user specific balances. It is assumed that all water users in the Upper Basin, including tribal and non-tribal entities, would be able to contribute to the conservation pool; no assumptions are made with respect to where contributions of conserved water are generated or what specific activities generated the water for the Enhanced Coordination, Maximum Operational Flexibility, and Supply Driven (both LB Priority and LB Pro Rata approaches) Alternatives. The Enhanced Coordination Alternative includes an assumption that in addition to conservation, a portion of the Upper Basin Tribes' unused water could be contributed to the Lake Powell storage mechanism (see **Section B.6**).

The model assumes that the accounting of storage credits occurs annually, at the end of the water year. The initial balance (January 1, 2027) of the Lake Powell conservation mechanism is 0 acre-feet (af). Storage credits in Lake Powell are assumed to be subject to the following rules:

- If the Lake Powell conservation pool reaches full capacity, annual conservation continues; however, the conserved volumes are assumed to be system water rather than being stored in the Lake Powell storage mechanism.
- If Lake Powell releases additional water to maintain safe operating capacity, Lake Powell storage credits are assumed to be released first. Except for the Maximum Operational Flexibility Alternative, the conservation pool is reduced by the volume equal to the safe operating capacity release. In the Maximum Operational Flexibility Alternative, it is assumed that the safe operating capacity release moves water from the pool in Lake Powell to the pool in Lake Mead (see **Section B.7** for more information). Safe operating capacity releases are calculated as the difference between the actual water year release and the annual target release, adjusted for applicable releases constraints.
- At low lake levels, the storage credits in Lake Powell may exceed the total available storage.

B.2.2 Lake Mead Mechanism

B.2.2.1 Pre-2027 ICS, Mexico's Water Reserve, Mexico's Recoverable Water Savings, and Interstate Banking Initial Balances

The Interim Guidelines incorporate a conservation mechanism called ICS. The ICS mechanism has been in place since the 2007 Interim Guidelines operations were implemented. Each alternative, except the CCS Comparative Baseline, assumes the 2007 Interim Guidelines expire at the end of December 2026, and have their own assumptions on how to handle storage credits in Lake Mead at the end of 2026.

In addition to ICS conservation, Nevada has water stored in Arizona and California stored via the Interstate Water Banking mechanism. Agreements on the storage and withdrawal of this water are independent of ICS and any new conservation mechanism, and interstate banked water may be delivered through 2057. It is modeled as a delivery to Nevada from Lake Mead with a subsequent decrease in delivery from the state in which the water was pulled from. Interstate banking is assumed to be available in all alternatives and assumed to continue through 2060 as a source of conserved water Nevada can use. The interstate banked water is included in these assumptions as it is one source of water Nevada can use, and as such it is a component of the assumed delivery logic for Nevada.

Initial balances for all ICS types, as well as Mexico's Water Reserve (MWR), Mexico's Recoverable Water Savings, created as a contribution to Mexico's Binational Water Scarcity Contingency Plan (BWSCP), and Nevada's interstate banked water are included in **Table B-1**. **Table B-1** provides the end of calendar year 2026 balances as simulated by the November 2024 Colorado River Midterm Modeling System simulated with Ensemble Streamflow Prediction forecasts. The end of calendar year 2026 volumes were used to initialize conservation balances in all alternatives and are the same for all three sets of initial conditions.

Table B-1
Initial Balances (af)

State/Country - Water User - ICS Type	End of calendar year 2026
Arizona	
Central Arizona Water Conservation District (CAWCD)	
Binational ICS (BICS)	51,024
Extraordinary Conservation ICS (EC-ICS)	165,539
DCP-ICS	87,720
System Efficiency – Warren H. Brock (Brock)	100,000
System Efficiency – Yuma Desalting Plant (YDP) Pilot Run	3,050
Colorado River Indian Tribe (CRIT-AZ)	
CRIT EC-ICS	9,009
Gila River Indian Community (GRIC)	
GRIC EC-ICS	286,708
Total of EC-ICS, BICS, and DCP-ICS	**600,000**
California	
Imperial Irrigation District (IID)	
BICS	51,025
EC-ICS	50,000
The Metropolitan Water District of Southern California (MWD)	
BICS	51,024
EC-ICS	1,497,951
DCP-ICS	-
System Efficiency – Brock	65,000
System Efficiency – YDP	24,397
Total of EC-ICS, BICS, and DCP-ICS	**1,650,000**
Nevada	
Southern Nevada Water Authority (SNWA)	
BICS	51,024
EC-ICS	398,976
DCP-ICS	-
System Efficiency – Brock	400,000
System Efficiency – YDP	3,050
Tributary Conservation[1]	-
Nevada-Arizona Interstate Bank[2]	613,846
Nevada-California Interstate Bank[3]	330,225
Total of EC-ICS, BICS, and DCP-ICS	**450,000**

State/Country - Water User - ICS Type	End of calendar year 2026
Mexico	
Mexico's Recoverable Water Savings	175,500
MWR	150,000
Total of Mexico's Recoverable Water Savings + MWR	**325,500**

[1] The modeled tributary conservation initial balance is zero because it is assumed that any remaining Tributary Conservation at the end of the year is converted and stored as EC-ICS, subject to maximum accumulation limits.
[2] Water stored in Arizona by the Arizona WBA for the benefit of SNWA, Nevada. Not a type of ICS; listed in this table as it is a component of the assumed delivery logic for Nevada in CRSS.
[3] Water stored in California by the MWD for the benefit of SNWA, Nevada. Not a type of ICS; listed in this table as it is a component of the assumed delivery logic for Nevada in CRSS.

B.2.2.2 Generation of Storage Credits

When storage credits are created, the model assumes either a delivery from Lake Mead is decreased or a new gain to the system is introduced, resulting in an increase to Lake Mead storage. If the reduced delivery is located downstream of Lake Mead, creation of the storage credit results in a reduction in the release from Lake Mead and river flow downstream.

At the beginning of each year, the model assumes that storage credits will be generated based on model logic that varies by state/water user and alternative; the amount does not change throughout the year unless Lake Mead declines below critical elevations. The ability to generate storage credits varies by alternative; for alternatives with an assumed new storage mechanism, conservation credits in Lake Mead are assumed to be generated for the entire model simulation period of 2027 to 2060.

A one-time system assessment is assumed to be dedicated to the system upon the creation of storage credits. The system assessment varies among alternatives and is described in the subsequent alternative specific sections. For example, if an entity wishes to receive credit for 100 thousand acre-feet (kaf), then the credits that must be generated become: 100 kaf / (1 - system assessment).

The model assumes that the accounting of storage credits occurs annually, at the end of the calendar year. For alternatives that include assumptions for a new storage mechanism, storage credits in Lake Mead are assumed to be subject to the following rules:

- Storage credits in the Lake Mead mechanism can be created under Surplus, Normal, and Shortage Conditions
- The amount of storage credits that may be generated in a single year is constrained by assumed maximum annual and maximum total limits. If maximum limits are reached, volumes are proportionally reduced until the limit is reached. These assumed limits vary by alternative and are presented in the *General Assumptions* section for each alternative.

- If Lake Mead is at or near dead pool, creation of storage credits is cancelled for the remainder of the year, except the following:
  - Nevada's Tributary Conservation – the full volume of tributary conservation still occurs and is stored or delivered to Southern Nevada Water Authority (SNWA).
- Specific to the CCS Comparative Baseline, DCP-ICS creation and Mexico's Recoverable Water Savings creation is assumed to continue, if occurring.

B.2.2.3 Delivery of Storage Credits

All alternatives include assumptions for the delivery of existing, pre-2027 storage credits and alternatives that include assumptions for a new storage mechanism. When storage credits are delivered from Lake Mead, the model assumes that the delivery from Lake Mead was increased for that year, resulting in a decrease in Lake Mead storage. If the increased delivery is located downstream of Lake Mead, delivery of the storage credits results in an increase in the release from Lake Mead and downstream river flows. To mitigate shortage, a user may take delivery of storage credits or convert storage credits into system water (i.e., the volume of water delivered to the user is the same in either case). If Lake Mead is experiencing dead pool-related reductions, the delivery of storage credits is canceled for the remainder of the year. If Lake Mead is operating in flood control, any spill is first attributed to storage credits in the Lake Mead mechanism. For the CCS Comparative Baseline, the No Action Alternative and the Basic Coordination Alternative, all ICS balances are set to zero. For the Enhanced Coordination Alternative, the Maximum Operational Flexibility Alternatives, and the Supply Driven Alternative (both LB Priority and LB Pro Rata approaches), individual water-user storage credits are reduced proportionally.

B.3 Continued Current Strategies Comparative Baseline

The CCS Comparative Baseline assumes that existing agreements, including the 2007 Interim Guidelines, 2017 Minute 323, and 2019 DCP continue through the analysis period (2027-2060). As part of this assumption, all types of ICS, MWR, and Mexico's Recoverable Water Savings are assumed to continue (creation and delivery) through the end of the analysis period.

B.3.1 Lake Powell Mechanism

No Lake Powell mechanism is modeled in the CCS Comparative Baseline.

B.3.2 Lake Mead Mechanism (ICS)

Storage credits can be delivered for objectives such as tribal firming obligations, augmenting water supplies during dry years, satisfy demands exceeding apportionment, or to satisfy DCP contributions (domestic water users) and BWSCP savings (Mexico) (see **Appendix A**, CRSS Model Documentation).

B.3.2.1 Treatment of Pre-2027 ICS

Pre-2027 ICS remains in their current ICS accounts and is immediately available for use, subject to existing rules, constraints, and assumptions.

B.3.2.2 General Assumptions

The maximum capacity of the ICS mechanism is 4.2 million acre-feet (maf), split between the Lower Division States and Mexico per the existing agreements. Each state/country has its own capacity and delivery limits, shown in **Table B-2**. Water users within a state may have agreed upon accumulation limits and/or modeling assumptions for the split of the state's accumulation limit, however, no creation or delivery limit exists for individual water users. For individual water user creation and delivery assumptions, see **Sections B.3.2.3 – B.3.2.6**.

Table B-2
Accumulation, Creation, and Delivery Limits by Entity in the Continued Current Strategies Comparative Baseline

State/Country	Arizona			California			Nevada	Mexico
Entity	CAWCD	Tribal	Total	IID	MWD	Total	Total	Total
Capacity (kaf)	250	250	**500**	50	1,650	**1,700**	**500**	**1,500**
Creation Limit (kaf)	-	-	**100**	-	-	**400**	**125**	**250**
Delivery Limit (kaf)	-	-	**300**	-	-	**400**	**300**	**200**

Assumptions for the creation and delivery of stored ICS water are designed to reflect the historical range of use of the ICS mechanism. ICS may be created through various mechanisms, including extraordinary conservation (EC-ICS), DCP contributions (DCP-ICS), Binational ICS (BICS), Tributary Conservation, system efficiency projects, and importation of non-Colorado River Water. Mexico has its own mechanism which can create conservation via MWR and Mexico's Recoverable Water Savings mechanism created as a contribution to Mexico's BWSCP. The following assumptions exist for the creation and delivery of the different ICS types, and are as follows:

- **EC-ICS/MWR**: Creation can occur at any pool elevation at Lake Mead. Delivery can occur when Lake Mead's pool elevation is above 1,025 feet at the start of the calendar year for all water users who are signatories to the DCP, while water users who are not signatories to the DCP can take delivery when Lake Mead's pool elevation is above 1,075 feet at the start of the calendar year.
- **DCP-ICS/BWSCP:** DCP-ICS can be created to satisfy required DCP contributions. It can be created by either (1) converting existing EC-ICS or (2) creating new EC-ICS and immediately converting to DCP-ICS. Delivery can occur when Lake Mead's pool elevation is greater than 1,110 feet at the start of the calendar year. The same assumptions are applied to Mexico's BWSCP contributions.
- **BICS:** BICS is credited to water users pursuant to agreements executed under Minutes 319 and 323. It is assumed that it can be delivered when Lake Mead's pool elevation is above 1,025 feet.
- **Tributary Conservation:** Creation from conservation on the Virgin and Muddy Rivers. Occurs annually and is converted and stored as EC-ICS if not used in the year it is created.

- **System Efficiency:** System Efficiency ICS creation occurs due to the implementation of system efficiency projects, such as building the Warren H. Brock Reservoir (Brock), and pilot operation of the Yuma Desalting Plant (YDP). No new creation of system efficiency ICS is modeled. Delivery is modeled to occur when Lake Mead's pool elevation is above 1,025 feet. Deliveries of Brock ICS are further constrained with maximum annual delivery volumes by water user, with a maximum of 25 kaf and 40 kaf for the Metropolitan Water District of Southern California (MWD) and Nevada, respectively, and a maximum of 65 kaf minus current year MWD and Nevada Brock ICS deliveries for Central Arizona Water Conservation District (CAWCD).
- **Imported ICS:** No imported ICS is modeled.

Accumulated ICS stored in Lake Mead is included in all operational determinations. The individual entities, or water users, assumed to use the storage and delivery mechanism are:

Table B-3
Existing ICS Water Users in the Continued Current Strategies Comparative Baseline

Water User	State
CAWCD	Arizona
CRIT-AZ	Arizona
GRIC	Arizona
IID	California
MWD	California
SNWA	Nevada
Mexico	Mexico

For all water users except Imperial Irrigation District (IID), in the year that EC-ICS, DCP-ICS, and Tributary Conservation is created and stored, a one-time system assessment of 10 percent is applied. For IID, because they are not a signatory to the DCP, in the year that ICS is created and stored, a one-time system assessment of 5 percent is applied, and a 3 percent evaporation assessment is applied to the stored volume (excluding current year's ICS creation) in every subsequent year.

B.3.2.3 Arizona Creation and Delivery Assumptions

In general, Arizona's creation and delivery logic was developed in coordination with Arizona Department of Water Resources and Central Arizona Project (CAP). Arizona is assumed to create ICS to help meet DCP contributions and take delivery of ICS to meet state and federal tribal firming obligations, mitigate shortages, and to recover all ICS by the end of the simulation horizon in most simulations.

Creation

Arizona is assumed to create and simultaneously convert 100 kaf of EC-ICS to DCP-ICS to contribute towards Arizona's DCP contribution, when required. The remaining required DCP contribution is assumed to be met through system water. There is no assumed additional creation of EC-ICS for any Arizona users.

Delivery

Generally, CAWCD is assumed to take delivery of conserved water when Arizona is experiencing shortage to mitigate shortages and to meet state and federal tribal firming obligations. The delivery volume is dependent on shortage volume.

CAWCD is assumed to take delivery of their EC-ICS, BICS, Brock and YDP ICS during Shortage Conditions to mitigate shortages. ICS is assumed to be delivered from CAWCD's stored EC-ICS credits first, followed by BICS, Brock, then YDP. ICS credits of one type will be completely withdrawn before moving to the next ICS type. Delivery volumes are dependent on the shortage volume and are shown in **Table B-4** below.

EC-ICS in the Arizona accumulation space is also assumed to be delivered to assist with satisfying state and federal tribal firming obligations. It is assumed that, of the Gila River Indian Community's (GRIC's) EC-ICS, (**Table B-1**) 16 kaf is modeled to be delivered for Arizona's firming obligations, while 160,708 af is modeled to be delivered for federal tribal firming obligations. This water is modeled to be delivered when the Lower Basin is in shortage and Lake Mead's pool elevation is less than or equal to 1,050 feet and greater than 1,025 feet. The firming volumes will be delivered from GRIC EC-ICS consistent with applicable agreements until the applicable GRIC EC-ICS runs out, after which deliveries will be made from remaining GRIC EC-ICS. The assumed delivery volumes are shown in **Table B-4**.[1]

Table B-4
Summary of CAWCD Delivery Volume Assumptions in the Continued Current Strategies Comparative Baseline

Lake Mead Pool Elevation (feet)	Arizona Shortage (kaf)	CAWCD (kaf)	GRIC EC-ICS for Arizona Firming (kaf)	GRIC EC-ICS for Federal Firming (kaf)	GRIC EC-ICS
<1,075 to ≥ 1,050	320	60	0	0	0
<1,050 to ≥ 1,025	400	100	15	10	15

Note: The non-Arizona non-federal government GRIC EC-ICS is only delivered after Arizona and the Federal Government's portion of GRIC's EC-ICS has been fully depleted.

If Lake Mead begins the calendar year above pool elevation 1,110 feet and DCP-ICS exists, CAWCD is assumed to take delivery of DCP-ICS up to the maximum annual ICS delivery limit (300 kaf; **Table B-2**) to recover DCP-ICS as quickly as possible.

There is no assumed delivery of Colorado River Indian Tribes' (CRIT's) EC-ICS.

[1] Please see the Arizona Water Settlements Act, Public Law (Pub. L.) 108-451, 118 Stat. 3478 (Dec. 10, 2004), section 105, for a general description of the firming program. All firming deliveries in any given year would be made in accordance with applicable law. This appendix is not a legal interpretation of the firming program or of federal obligations. Actual firming deliveries may vary from the modeling approximations contained in this appendix, and Reclamation retains discretion to include legally-required tribal deliveries in this priority mechanism.

B.3.2.4 California Creation and Delivery Assumptions

The ICS mechanism is assumed to be used by MWD and IID in California. MWD's ICS creation and delivery is based on the Sacramento River Water Year Type (SRWYT), while IID strives to maintain maximum ICS accumulation.

Creation

IID is assumed to maintain their maximum accumulation limit of 50 kaf. Approximately 1.5 kaf of EC-ICS is created when Lake Mead's pool elevation is above 1,075 feet (normal, ICS surplus, and domestic surplus years). This creation volume is the volume required to offset the annual 3 percent evaporation assessment applied annually, thus keeping their ICS at its maximum accumulation limit. If IID's ICS balance goes to 0 due to flood control conditions, IID is assumed to create up to 25 kaf of EC-ICS annually until the maximum accumulation limit is achieved. The following formula is used to determine IID's total EC-ICS creation:

$$IID\ EC - ICS\ Creaion\ (kaf) = Minimum(CA\ ICS\ Creation\ Limit\ (kaf) - \text{MWD ICS Creation}\ (kaf), 25\ kaf)$$

MWD's EC-ICS creation volumes are based on the annual Sacramento River Water Year Classification (SRWYC) index,[2,3] and are shown in **Table B-5** below.

Table B-5
MWD EC-ICS Creation Volumes by SRWYC in the Continued Current Strategies Comparative Baseline

SRWYC	Creation (kaf)
Critical (C)	0
Dry (D)	50
Below Normal (BN)	275
Above Normal (AN)	400
Wet (W)	400

DCP contributions for California are assumed to be contributed by MWD (93 percent) and Coachella Valley Water District (CVWD) (7 percent). MWD's portion of the DCP contribution volume is assumed to be made by converting existing EC-ICS, if available. If existing EC-ICS is insufficient to meet required DCP contributions, MWD will create EC-ICS and convert it to DCP-ICS to satisfy their contributions. If MWD's EC-ICS creation as per **Table B-5** is less than MWD's required DCP contribution volume, then additional EC-ICS will need to be created and converted to DCP-ICS to fully satisfy MWD's DCP contribution. CVWD's portion of the DCP contribution volume is supplied as an EC-ICS creation that is added to MWD's EC-ICS accumulation and converted to DCP-ICS. If MWD's maximum accumulation limit has been reached and there is

[2] Obtained at https://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST

[3] Historical SRWYC is resampled using the index sequential method for hydrologic traces developed from resampling the Natural Flow record. For paleo data, the index is created from the Sacramento Valley 4 river index volume as reconstructed in Meko et al. (2014). For all other hydrology sequences, annual SRWYC values are generated using a trained decision tree model that was developed from the historical relationship between intervening natural flows and observed SRWYC, applied year-by-year to each sequence.

insufficient EC-ICS to convert to meet the DCP contribution, system water will be created to satisfy the outstanding DCP contribution volume.

Delivery

IID is not assumed to take delivery of their BICS or EC-ICS.

MWD's delivery volumes are based on the SRWYC index and are shown in **Table B-6** below. ICS deliveries will first be satisfied from DCP-ICS (if allowed, i.e., Lake Mead above 1,110 feet), then from EC-ICS, BICS, Brock, and YDP, respectively. Deliveries will completely recover stored ICS from one ICS category before moving on to the next.

Table B-6
MWD EC-ICS Creation Volumes by SRWYC in the Continued Current Strategies Comparative Baseline

SRWYC	Creation (kaf)
C	150
D	0
BN	0
AN	0
W	0

Additional ICS deliveries will be made to offset deliveries reductions due to Nevada's withdrawal from the California portion of the Interstate Water Bank. See **Section B.3.2.5**, Nevada Creation and Delivery Assumptions below for further information.

B.3.2.5 Nevada Creation and Delivery Assumptions

In Nevada, ICS is assumed to be created and delivered by SNWA. SNWA is assumed to try to fully satisfy their annual depletion schedule plus any demands that exceed apportionment.

Creation

There are two ICS types with modeled creation by SNWA: EC-ICS and Tributary Conservation. SNWA is assumed to create EC-ICS from conserved water under SNWA's exhibit for EC-ICS as long as Nevada has not achieved their total accumulation limit (**Table B-2**).

SNWA's annual EC-ICS creation is calculated using the following equation:

$$Annual\ Creation = Maximum(\ 300{,}000\ af - \ Annual\ Shortage_{NV} - Annual\ Demand_{NV}, 0\ af)$$

Based on the assumed depletion schedules, SNWA attempts to create ICS until 2047, at which point demands equal full apportionment (see **Appendix M**, Lower Division States Depletion Schedules).

Tributary conservation occurs annually and represents conservation on the Virgin and Muddy Rivers, generating an assumed 35 kaf per year, which is converted to EC-ICS if not delivered in the year it is created. If Nevada is at their maximum total accumulation limit, or Lake Mead is experiencing dead pool-related reductions, Tributary Conservation will still be created and will be delivered to SNWA the same year.

If there is a required DCP contribution, SNWA is assumed to convert EC-ICS to DCP-ICS to satisfy their DCP contribution. If there is not enough EC-ICS available to meet the full DCP contribution, SNWA will create additional EC-ICS and convert it to DCP-ICS to satisfy the DCP contribution. If Nevada has reached their maximum accumulation limit, SNWA will make the DCP contribution via system water.

Delivery
SNWA is assumed to take delivery of ICS and/or Interstate Banked Water to satisfy demands exceeding apportionment and/or offset Nevada's annual shortage and DCP contributions, and can be calculated using the following equation, subject to the maximum delivery constraint of 300 kaf (**Table B-2)**:

$$\mathit{Annual\ Delivery} = \mathit{Maximum}\left(\begin{array}{c} \mathit{Annual\ Depletion\ Schedule}_{NV} + \mathit{Demands\ Exceeding\ Apportionment}_{NV} \\ -(\,300{,}000\ af - \mathit{Annual\ Shortage}_{NV} - \mathit{ECICS\ or\ System\ Water\ creation\ for\ DCP\ contribution}_{NV}), \\ 0\ af \end{array}\right)$$

The modeled demands do not exceed apportionment until 2047, after which they increase through 2060 as shown in **Table B-7**.

Table B-7
Nevada Demands Above Apportionment

Year	Demands Above Apportionment (af)
2027-2046	0
2047	2,339
2048	5,460
2049	8,554
2050	11,410
2051	14,447
2052	17,455
2053	20,433
2054	23,381
2055	26,310
2056	29,194
2057	32,047
2058	34,979
2059	37,764
2060	40,415

If available, surplus water is used first to meet the calculated annual delivery during surplus years. Then, different categories of ICS and Interstate Banked Water are used to meet the calculated annual delivery. Nevada is assumed to take delivery of ICS and Interstate Banked Water in the following order, with one ICS category being completely exhausted or delivered to its annual delivery limit before progressing to the next:

1. DCP-ICS
2. Tributary Conservation
3. Brock ICS
4. YDP ICS
5. BICS
6. Nevada-Arizona Interstate Water Bank
7. Nevada-California Interstate Water Bank
8. EC-ICS

If Lake Mead starts the year with a pool elevation below 1,025 feet, EC-ICS, BICS, and System Efficiency ICS (Brock and YDP) are assumed to not be delivered; however, current year Tributary Conservation ICS and Interstate Water Bank deliveries can be made. In this case, the model would skip all EC-ICS, BICS, and System Efficiency ICS categories and try to satisfy the annual delivery from Tributary Conservation and Interstate Water Banking balances.

The Interstate Water Bank represents water stored in California and Arizona for the benefit of SNWA. Deliveries from the Interstate Water Bank are modeled by increasing SNWA's delivery and reducing CAP and/or MWD's delivery by the same volume, depending on whether it is a delivery from the Arizona or California Interstate Water Bank, respectively.

Deliveries from the Interstate Water Bank include assumed constraints on the maximum delivery that can be withdrawn from the bank each year. Specifically, in the first-year water from the Arizona bank is needed, SNWA can withdraw up to 20 kaf, followed by 30 kaf in the following consecutive year, and 40 kaf in the remaining consecutive years. Delivery from the Nevada-Arizona bank is further constrained if it is a shortage year. The maximum delivery from the Nevada-Arizona bank is reduced proportional to the reduction in CAP's municipal and industrial delivery due to shortages.

The maximum SNWA can withdraw from the Nevada-California Interstate Water Bank is assumed to 30 kaf per year. In years when SNWA withdraws from the Nevada-California bank, MWD first tries to offset their delivery reduction by taking delivery of their ICS. In years when MWD is unable to offset the bank delivery with ICS, their delivery is reduced by a like amount delivered to SNWA.

B.3.2.6 Mexico Creation and Delivery Assumptions[4]

Mexico is assumed to create and deliver MWR on a three-year cycle. Mexico is assumed to satisfy their BWSCP savings via creating Mexico's Recoverable Water Savings (BWSCP).

4 Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

Creation

Mexico is assumed to create 60 kaf of MWR every three years starting in 2027.

Mexico is assumed to create Recoverable Water Savings to satisfy their BWSCP savings if Mexico has not reached their total accumulation limit (**Table B-2**). If no space is available, BWSCP savings are met as system water.

Delivery

Mexico is assumed to take delivery of up to 27 kaf in years that they are not creating MWR.

Mexico is assumed to take delivery of 25 kaf of Recoverable Water Savings when allowed, i.e., Lake Mead is above 1,110 feet.

The total annual delivery of MWR and Recoverable Water Savings is assumed to not exceed 27 kaf, with Recoverable Water Savings deliveries taking precedence over MWR deliveries.

B.4 No Action Alternative

The No Action Alternative assumes that there is no new conservation mechanism to proactively conserve and store water in Lake Powell or Lake Mead, therefore the existing conservation mechanism will operate as per the current agreements, which expire at the end of 2026. Water users have through the end of 2036 to remove all ICS types except DCP-ICS, which can be delivered through the end of 2057. All ICS remaining in Lake Mead after the respective expiration dates is assumed to become system water.

B.4.1 Lake Powell Mechanism

No Lake Powell mechanism is modeled in the No Action Alternative.

B.4.2 Lake Mead Mechanism

The No Action Alternative assumes that the ICS mechanism expires at the end of 2026, and water users may take delivery of existing ICS in accordance with the dates specified in the respective agreements, but no new creation and storage is allowed, with one exception described in the following sections. Water users can take delivery of EC-ICS and System Efficiency ICS through 2036 and DCP-ICS through 2057; if ICS storage credits remain in Lake Mead on January 1, 2037 (or 2057 for DCP-ICS), they are assumed to become system water. As a result, the No Action Alternative assumptions reflect water users' efforts to take delivery of ICS storage credits prior to this deadline.

Exceptions to this include Tributary Conservation ICS and Interstate Water Banking, which are assumed to continue through 2057.

B.4.2.1 Treatment of Pre-2027 ICS

Pre-2027 ICS is modeled based on the existing ICS types and respective rules for delivery beyond 2026.

B.4.2.2 General Assumptions

The No Action Alternative utilizes the same Lake Mead ICS mechanism as is described in **Section B.3**, Continued Current Strategies Comparative Baseline, with the additional assumption that Interim Guidelines ICS and 2019 DCP conservation agreements have expired, and the creation of EC-ICS, DCP-ICS, BICS and System Efficiency ICS may no longer occur after the end of calendar year 2026.

Tributary Conservation and Imported ICS can be created and delivered through the end of calendar year 2057, but cannot be stored, i.e., they are assumed to be created and delivered in the same year. Any creation of these ICS types is modeled to incur a 5 percent assessment upon creation. Because the 2019 DCP has expired, all ICS balances are assessed a 3 percent evaporation assessment.

For further modeling assumptions, please see **Section B.3.2.2**, General Assumptions from the CCS Comparative Baseline.

B.4.2.3 Arizona Delivery Assumptions

Arizona is assumed to try and take delivery of all conserved ICS water before it expires at the end of 2036 for EC-ICS, BICS, and System Efficiency ICS, and at the end of 2057 for DCP-ICS.

Delivery

CAWCD is modeled to take delivery of their remaining EC, Binational, Brock, and YDP ICS by 2036 by taking delivery of 150 kaf per year through 2029, then by taking delivery up to Arizona's maximum annual delivery of 300 kaf from 2030-2036, until all CAWCD ICS has been delivered. CAWCD's EC-ICS credits are delivered first, followed by BICS, Brock, then YDP.

CRIT is assumed to take delivery of all their EC-ICS the first year they are able to do so.

It is assumed that of GRIC's EC-ICS (**Table B-1**) 16 kaf is modeled to be delivered for Arizona's firming obligations, while 160,708 af is modeled to be delivered for federal tribal firming obligations. The firming volumes will be delivered from GRIC EC-ICS consistent with applicable agreements until the applicable GRIC EC-ICS runs out. The portion of GRIC's EC-ICS that is modeled for federal firming is assumed to be delivered during Shortage Conditions to meet federal firming obligations, with the modeled delivery volumes shown in **Table B-8**.[5] In 2036, if there is still GRIC EC-ICS for federal firming, the entire available volume is assumed to be delivered, if possible, based on other constraints.

[5] Please see the Arizona Water Settlements Act, Pub. L. 108-451, 118 Stat. 3478 (Dec. 10, 2004), section 105, for a general description of the firming program. All firming deliveries in any given year would be made in accordance with applicable law. This appendix is not a legal interpretation of the firming program or of federal obligations. Actual firming deliveries may vary from the modeling approximations contained in this appendix, and Reclamation retains discretion to include legally-required tribal deliveries in this priority mechanism.

Table B-8
GRIC EC-ICS for Federal Firming - Assumed ICS Delivery by Lake Mead Pool Elevation in the No Action Alternative

Pool Elevation	Delivery Volume (af)
<1,075 to ≥ 1,050	24,325
<1,050 to ≥ 1,025	36,924

15 kaf/year of the GRIC EC-ICS that is for Arizona firming is assumed to be delivered during Shortage Conditions when Lake Mead's pool elevation is less than 1,050 feet and greater than or equal to 1,025 feet until supplies are depleted.

GRIC is assumed to attempt to take delivery of their remaining EC-ICS that is not for Arizona or federal firming by 2036. The modeled annual delivery volume is computed as the GRIC EC-ICS balance divided by the number of years remaining through the end of 2036.

DCP-ICS is assumed to be recovered as fast as possible when Lake Mead's pool elevation is above 1,110 feet. (i.e., all existing DCP-ICS is recovered up to the maximum annual ICS delivery limit).

B.4.2.4 California Delivery Assumptions

The ICS mechanism is assumed to be used by MWD and IID in California as they are the users in California with existing ICS.

Delivery

IID is modeled to take delivery of as much of their EC-ICS as possible when Lake Mead's pool elevation is greater than 1,075 feet. MWD's ICS delivery is prioritized above IID's ICS delivery. IID's ICS delivery can be calculated using the equation:

$$IID\ ICS\ Delivery\ (kaf) = Maximum(CA\ ICS\ Delivery\ Limit\ (kaf) - \text{MWD ICS Delivery}\ (kaf), 0\ kaf)$$

MWD's ICS delivery volumes are based on the annual Sacramento River Water Year Classification (SRWYC) (see **Section B.3.2.4**, *California Creation and Delivery Assumptions*). ICS deliveries will first be satisfied from DCP-ICS (if allowed), then from EC-ICS, BICS, Brock, and YDP, respectively. Deliveries will completely recover ICS from one ICS type before moving on to the next. **Table B-9** below shows MWD's assumed delivery volume by SRWYC.

Table B-9
MWD ICS Assumed Delivery Volumes by SRWYC in the No Action Alternative

SRWYC	Delivery (af)
W	25,000
AN	25,000
BN	100,000
D	225,000
C	400,000

Additional ICS deliveries may also occur to offset delivery reductions due to Nevada's withdrawal from the California portion of the Interstate Water Bank. See **Section B.4.2.5**, *Nevada Creation and Delivery Assumptions* below for further information.

B.4.2.5 Nevada Creation and Delivery Assumptions

In Nevada, ICS is assumed to be created and delivered by SNWA. SNWA is assumed to try to fully satisfy their annual depletion schedule plus any demands that exceed apportionment.

Creation

At the start of 2027, SNWA is still able to create Tributary Conservation water, and is assumed to do so to a volume of 35 kaf per year until 2057 when the Tributary Conservation agreements expire. Based on the No Action Alternative assumption of no new storage and delivery mechanism, Tributary Conservation is no longer able to be converted to EC-ICS and stored in the Lake Mead ICS mechanism. A 5 percent assessment is applied to the Tributary Conservation ICS, and the remaining volume is delivered to SNWA.

Delivery

It is assumed that SNWA will attempt to recover their ICS that expires in 2036 using the following equation:

$$Full\ ICS\ Recovery_{year} = \frac{\sum Expiring\ ICS\ Type\ balances}{nYears\ until\ 2036 + 1}$$

where:

> $\sum$*Expiring ICS Categories balances* = sum of balance of all ICS types that are set to expire at the end of 2036 (EC-ICS, BICS, Brock, YDP)
>
> *nYears until 2036* = number of years until 2036 including the current year; 1 is added because recovery can occur through the end of 2036
>
> *year* = current year

"Full ICS Recovery" is modeled to be recovered in the following order, with one ICS category being completely recovered before progressing to the next:

1. Brock ICS
2. YDP ICS
3. BICS ICS
4. EC-ICS

Additional ICS can be used to satisfy Nevada's scheduled demand if the above computed delivery is not enough. This additional delivery is calculated as:

$$\begin{aligned} &\mathit{Additional\ ICS\ Delivery} \\ &\quad = \mathit{Maximum}(\,300{,}000\ af - \mathit{Annual\ Shortage}_{NV} - \mathit{Annual\ Depletion\ Schedule}_{NV} \\ &\quad + \mathit{Annual\ ICS\ Delivery}_{Full\ ICS\ Recovery}, 0\ af) \end{aligned}$$

If an additional ICS delivery is required, ICS will be delivered from different categories of ICS in the order laid out in **Section B.3.2.5**, *Nevada Creation and Delivery Assumptions*, recovering one type either completely or to its annual delivery limit before progressing to the next.

Tributary conservation will be delivered in the same year as it was created.

After 2037, SNWA is assumed to take delivery of interstate bank water to satisfy demands exceeding apportionment or when Nevada's shortage reduces Nevada's use below their scheduled use by more than SNWA's annual tributary conservation, and is calculated using the following equation:

$$\begin{aligned} &\mathit{Interstate\ Water\ Bank\ Requested\ Delivery} \\ &\quad = \mathit{Maximum}\left(\begin{matrix} \mathit{Annual\ Depletion\ Schedule}_{NV} + \mathit{Demands\ Exceeding\ Apportionment}_{NV} \\ -(\,300{,}000\ af - \mathit{Annual\ Shortage}_{NV}) - 35\ kaf_{Tributary\ Conservation}, \\ 0\ af \end{matrix} \right) \end{aligned}$$

Interstate banked water is recovered from the water stored in Arizona first, followed by the water stored in California. Assumed delivery limits for each Interstate Water Bank are the same as the limits in the CCS Comparative Baseline and can be found in **Section B.3.2.5**, *Nevada Creation and Delivery Assumptions*.

B.4.2.6 Mexico Delivery Assumptions[6]

Mexico is assumed to try and take delivery of all MWR and Recoverable Water Savings through the end of 2060.

Delivery

Mexico is assumed to take delivery of 25 kaf of MWR water in years where Lake Mead's pool elevation is greater than 1,075 feet at the start of the calendar year. MWR deliveries are assumed to be able to occur through the end of 2060.

Mexico is assumed to take delivery of 25 kaf of its Recoverable Water Savings when Lake Mead's pool elevation is above 1,110 feet at the start of the calendar year. Recoverable Water Savings are assumed to be able to be delivered through the end of 2057.

6 Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

In years when the delivery of both MWR and Recoverable Water Savings is possible, the total delivery is assumed to be constrained to a maximum of 25 kaf and priority will be given to the delivery of Recoverable Water Savings.

B.5 Basic Coordination Alternative

The Basic Coordination Alternative assumes that there is no new conservation mechanism to proactively conserve and store water in Lake Powell or Lake Mead, therefore the existing conservation mechanism will operate as per the current agreements, which expire at the end of 2026. Water users have through the end of 2036 to remove all ICS types except DCP-ICS, which can be delivered through the end of 2057. All ICS remaining in Lake Mead after the respective expiration dates is assumed to become system water.

The Basic Coordination Alternative uses the same conservation logic as the No Action Alternative. For details on the modeling assumptions, refer to **Section B.4**, No Action Alternative.

B.6 Enhanced Coordination Alternative

The Enhanced Coordination Alternative includes three pools to store, convert and deliver water for the benefit of water users and the system: the Lake Powell mechanism, the water user-controlled Lake Mead mechanism, and the Lake Mead Protection Pool, which was informed by a group of Basin Tribes and would be controlled by Reclamation for Lower Basin-wide benefits. The design of these mechanisms supports proactive conservation and water user flexibility while the relatively lower accumulation limits represent a goal of ensuring that system storage is not overtaken by user-controlled conservation.

Details on modeling assumptions for each mechanism including creation, delivery, and associated constraints are provided below.

B.6.1 Lake Powell Mechanism

As described in **Appendix S,** water conserved by Upper Basin users would be stored in a pool in Lake Powell that can reach a maximum volume of 2.0 maf. Upper Division States and Upper Basin Tribes would have equal access to contribute to the conservation pool and to use their conserved water in intra- and interstate transactions with other Upper Basin users; however, no modeling assumptions were developed to model those specific transactions in the Enhanced Coordination Alternative. Additionally, water held in the Lake Powell conservation pool would be converted to system water and combined with Lower Basin shortages to provide system benefits based on the shortages specified in the Enhanced Coordination Alternative; assumptions regarding this conversion are detailed below.

B.6.1.1 General Assumptions

The volume of water in the Lake Powell conservation pool affects the determination of Lake Powell's water year release, as the calculation for the release accounts for the physical storage in

Lake Powell and Lake Mead, but it does not affect the Lower Basin/Lake Mead operations as they are determined using a combination of the effective storage[7] at Lake Powell coupled with the physical storage at Lake Mead. There is a maximum capacity of 2.0 maf. There are no assumed state-specific limitations on the maximum accumulation, nor are there state-specific annual creation and delivery limits, as conservation creation for the Lake Powell mechanism is modeled as a total Upper Basin volume.

There is an annual deduction for evaporation equal to the conservation pool's proportional share of total evaporation from Lake Powell. The evaporation deduction is applied annually in October based on the previous year's evaporation computed using the RiverWare™ Periodic Net Evaporation method and the total volume in the conservation pool at the end of the previous water year. Additionally, it is assumed a one-time system assessment of 7 percent is applied in the year the water is conserved and stored.

B.6.1.2 Creation

Storage credits are assumed to be created and stored in the Lake Powell conservation pool in two different ways: Upper Basin conservation and storage of a portion of unused Upper Basin tribal water. While the conservation is modeled as a single lumped gain to Lake Powell and no assumptions are made with respect to contributions from different entities, or via specific activities, it is contemplated that both the Upper Division States and Upper Basin Tribes would have equal access to contribute to the conservation pool.

For modeling purposes, unused Upper Basin tribal water is calculated as the difference between each tribe's depletion entitlement (or depletion equivalent) and its corresponding annual baseline depletion demand. Between 5 to 15 percent of the unused Upper Basin tribal water is assumed to be available for storage in the Lake Powell mechanism. The specific percentage, which varies with hydrologic conditions, is determined by comparing the modeled water year Lees Ferry natural flow to the 1991–2020 historical average (**Table B-10**). Linear interpolation is used to determine the specific percentage when the modeled (water year) Lees Ferry natural flow falls between 13.49 and 20.24 maf—with contributions increasing proportionally from 5 percent to 15 percent as natural flow increases across this range. The volume computed based on this relationship is assumed to be stored in the Lake Powell pool, without changing the inflow to Lake Powell.

Appendix H, Sensitivity Analysis - Modeled Unused Tribal Water Available for Storage in the Enhanced Coordination Alternative, provides information on the methodology used to estimate the Upper Basin unused tribal water, which was needed to model this concept and documents other relevant assumptions and caveats related to these assumptions.

[7] "Effective" elevation or storage is calculated as physical elevation (storage) minus any conserved volume that is held in the respective reservoir(s).

Table B-10
Upper Basin Tribal Water Available for Storage in the Lake Powell Conservation Pool (Enhanced Coordination Alternative) Relative to Historical Lees Ferry Natural Flow Thresholds

Current Water Year Lees Ferry Natural Flow (maf)	Annual Upper Basin Unused Tribal Contribution (%)
≥ 20.24[8]	15
Between 20.24 and 13.49[9]	5 to 15 (linear interpolation)
= 13.49	5
< 13.49	0

Exact volumes of Upper Basin conservation over time are uncertain, but for modeling purposes, conservation volumes up to a specified annual maximum may be added in any given year, depending on hydrologic conditions. The modeled conservation volume is determined by comparing the modeled water year Lees Ferry natural flow to the historical 1991–2020 25th and 75th percentile thresholds shown in **Table B-11**. Linear interpolation is used when the modeled Lees Ferry natural flow falls between 10.6 and 16.5 maf—with conservation increasing from 0 to the maximum volume as natural flow increases across this range.

Table B-11
Upper Basin Modeled Annual Conservation Volumes in the Enhanced Coordination Alternative

Current Water Year Lees Ferry Natural Flow (maf)	Annual (Water Year) Upper Basin Conservation (kaf)		
	2027-2031	2032-2036	2037-2060
> 16.50[10]	200	275	350
Between 16.50 and 10.60[11]	200 to 0 (linear interpolation)	275 to 0 (linear interpolation)	350 to 0 (linear interpolation)
≤ 10.60	0	0	0

Annual conservation volumes are disaggregated to the monthly scale using the average monthly Upper Basin agricultural demand distribution shown in **Table B-12**. These monthly volumes are then modeled as an inflow above Lake Powell.

[8] 150 percent of the historical average Lees Ferry natural flow from 1991-2020.
[9] Historical average Lees Ferry natural flow from 1991-2020.
[10] Historical 1991–2020 75th percentile Lees Ferry natural flow value.
[11] Historical 1991–2020 25th percentile Lees Ferry natural flow value.

Table B-12
Average Monthly Upper Basin Agricultural Demand Distribution

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Percent	0%	0%	1%	4%	15%	25%	27%	17%	8%	3%	0%	0%	100%

B.6.1.3 Delivery/Conversion

Storage credits in the Lake Powell conservation pool are assumed to be converted to system water and combined with Lower Basin shortages to provide system benefits based on the shortage. When Lower Basin calendar year shortages are greater than 1.5 maf, a volume equal to one-third of the volume above 1.5 maf would be converted from the Lake Powell pool into system water such that the total of Lower Basin shortages and conversion of Upper Basin water equals the required total shortage volume (i.e., above 1.5 maf, there is a 2-to-1 Lower Basin shortage-to-Upper Basin conversion ratio). If the prescribed 2-to-1 volume is not available in the Lake Powell conservation pool, 100 percent of the available volume would be converted, and the Lower Basin would take the balance of shortages.

Water created for storage in the Lake Powell mechanism is not available for conversion in the year in which it is created.

B.6.2 Lake Mead Mechanism

As described in **Appendix S**, this pool represents the water user-controlled Lake Mead mechanism. Lower Colorado River entitlement holders, including Lower Basin Tribes, consistent with applicable implementation agreements, would be able to contribute to the conservation pool and to use their conserved water for delivery and/or in intra- and interstate transactions with other Lower Basin users. Water conserved by Lower Basin users would be stored in a pool in Lake Mead that can reach a maximum volume of 5.0 maf, which includes the storage of pre-2027 ICS. Water users could contribute and convert or deliver water previously stored under this new mechanism at their discretion within the annual volume constraints related to the pool. All conserved storage credits in Lake Mead would be included in determinations of Lake Powell releases and shortage volumes.

The subsequent sections provide a detailed description of the modeling assumptions and associated constraints.

B.6.2.1 Treatment of Pre-2027 ICS

For modeling purposes only, ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 is converted to the Post-2026 Lake Mead water user-controlled mechanism on January 1, 2027.[12]

B.6.2.2 General Assumptions

The maximum capacity of the Lake Mead mechanism, along with individual annual creation and delivery limits, is provided in **Table B-13** below. The Lake Mead mechanism operates on a calendar

[12] The modeling erroneously excludes the conversion of system efficiency ICS to the Lake Mead mechanism.

year to align with reservoir operations. Delivery/conversion from the Lake Mead mechanism is prohibited if Lake Mead starts the year with a physical pool elevation below 1,025 feet.[13]

Table B-13
Lake Mead Mechanism Limitations of Storage of Conserved Water in the Enhanced Coordination Alternative

Entity	Maximum Annual Contribution (kaf)	Maximum Cumulative Storage (kaf)	Maximum Annual Conversion or Delivery (kaf)
Arizona	466.667	700	620
California	733.333	1,900	980
Nevada	50	700	70
Mexico[1]	250	1,700	330[2]
Total	**1,500**	**5,000**	**2,000**

1) Volumes include modeling assumptions for Mexico's storage and delivery limits. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 United States-Mexico Treaty on Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande (1944 Water Treaty) or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the International Boundary and Water Commission (IBWC) in consultation with the Department of State.
2) According to the modeling assumption for Mexico, storage credits in the bank may only be used to mitigate Mexico's reductions exceeding 250 kaf. This activity is considered a "delivery" (i.e., conversion) from the bank. As a result, banking activity will not cause Mexico's delivery to exceed 1.7 maf. The 1944 Water Treaty authorizes scheduled delivery of up to 200 kaf in excess of the 1.5 maf annual allotment to Mexico.

The conservation activity is modeled using the following water users:

Table B-14
Lake Mead Mechanism Water Users in the Enhanced Coordination Alternative

Water User	Entity
CAP	Arizona
Colorado River Indian Tribe (CRIT-AZ)	Arizona
MWD	California
IID	California
Colorado River Indian Tribe (CRIT-CA)	California
SNWA	Nevada
Mexico	Mexico

It is assumed that a one-time system assessment of 7 percent is applied in the year the water is conserved and stored. This volume of water is assumed to be stored in the Protection Pool as "System Assessment" storage credits, subject to the Protection Pool's constraints and associated modeling assumptions (**See Section B.6.3.3**, *System Assessment Creation*). Additionally, there is an

[13] The logic included in CRSS erroneously did not apply this constraint to the delivery/conversion of California's storage credits.

annual deduction for evaporation equal to the conservation pool's proportional share of total evaporation from Lake Mead. The evaporation deduction is applied annually in January based on the previous year's evaporation computed using the RiverWare™ Input Evaporation method and the total volume in the conservation pool at the end of the previous calendar year.

B.6.2.3 Arizona Creation and Conversion/Delivery Assumptions

In general, Arizona's creation and delivery of conserved water is inversely related to the combined storage of Lake Mead (physical) and Lake Powell (effective) and the state shortage volume.

For modeling purposes, Arizona's conservation activity is modeled using CAP and CRIT-Arizona (AZ).

Creation

Arizona can create up to 466.667 kaf per year, depending on the state's total shortage volume. An overview of the logic is provided below, followed by a summary in **Table B-15**.

- If the combined storage of Lake Mead (physical) and Lake Powell (effective) exceeds 85 percent, both Arizona's shortage and creation volume are 0 kaf.
- If the combined storage of Lake Mead (physical) and Lake Powell (effective) is between 85 percent and 60 percent, Arizona's shortage is 0 kaf and its creation volume is 466.667 kaf.
- If the combined storage of Lake Mead (physical) and Lake Powell (effective) is between 60 percent and 39.83 percent, Arizona's shortage increases from 466.667 kaf to 760 kaf. As the shortage increases, Arizona's creation decreases from 293.333 kaf to 0 kaf. As a result, the sum of Arizona's shortage and creation equals 760 kaf.
- If the combined storage of Lake Mead (physical) and Lake Powell (effective) is less than 39.83 percent, Arizona's shortage is greater than 760 kaf and their creation is 0 kaf.

Table B-15
Summary of Arizona's Assumed Creation Volumes Relative to Shortage in the Enhanced Coordination Alternative

Lake Mead (physical) & Lake Powell (effective) Combined Storage (%)	Arizona Shortage (kaf)	Arizona Annual Creation(kaf)
> 85%	0	0
≤ 85% to > 60%	0	466.667
≤ 60% to ≥ 39.83%	466.667 to 760.000	293.333 to 0
< 39.83%	> 760.000	0

For modeling purposes, CAP and CRIT-AZ create storage credits in the Lake Mead mechanism. The creation volume for each water user is proportional to their annual depletion schedule minus their annual shortage. The following equation is used to calculate each water user's portion of Arizona's total annual creation volume:

$$Creation\ Volume_A = AZ\ Total\ Creation\ Volume\ (af) \times \frac{(Annual\ Depletion\ Schedule_A - Annual\ Shortage_A)}{\sum Annual\ Depletion\ Schedule_{CAP+CRIT\ AZ} - \sum Annual\ Shortage_{CAP+CRIT\ AZ}}$$

where "A" is either the CAP or CRIT-AZ water-user. For both water users, an initial portion of the creation volume is first stored in the Protection Pool, subject to the constraints of the Protection Pool and the associated modeling assumptions (see **Section B.6.3.4**), and the remaining volume is stored in the Lake Mead mechanism.

Delivery/Conversion

Arizona is assumed to take delivery of storage credits in the Lake Mead mechanism to mitigate shortages greater than 760 kaf. The following formula is used to determine Arizona's total delivery volume from the Lake Mead mechanism, subject to available storage credits:

$$AZ\ Total\ Delivery\ Volume\ (af) = Maximum(AZ\ Total\ Annual\ Policy\ Shortage\ (af) - 760{,}000\ (af), 0\ (af))$$

The total Arizona delivery is then distributed to CAP and CRIT-AZ, proportional to each water user's annual shortage:

$$Delivery\ Volume_A = AZ\ Total\ Delivery\ Volume\ (af) \times \frac{Annual\ Shortage_A}{\sum Annual\ Shortage_{CAP+CRIT\ AZ}}$$

where "A" is either the CAP or CRIT-AZ water-user.

For modeling purposes only, if CAP is unable to mitigate their portion of the statewide shortage exceeding 760 kaf using their own storage credits, then it is assumed that CRIT-AZ storage credits, followed by IID's storage credits (see **Section B.6.2.4**, *Delivery/Conversion*) are delivered to CAP. The volume of the CRIT-AZ's storage credits that are modeled as deliveries to CAP is limited to the lesser of the storage credits available in CRIT-AZ's account and CAP's remaining unmitigated shortage.

For GRIC's Pre-2027 ICS that is converted to the Lake Mead mechanism on January 1, 2027, the delivery of this water—subject to availability—is modeled using the following logic. While the water is physically delivered to CAP in the model, this approach ensures that the delivery is properly accounted for using GRIC's existing storage credits:

$$\left(AZ\ Total\ Delivery\ Volume \times \frac{Annual\ Shortage_{CAP}}{\sum Annual\ Shortage_{CAP+CRIT\ AZ}}\right) X \left(\frac{200{,}760\ af}{Annual\ Depletion\ Schedule_{CAP}}\right)$$

B.6.2.4 California Creation and Conversion/Delivery Assumptions

For modeling purposes, California's conservation activity is modeled using IID, MWD, and CRIT-California (CA).

Creation

Both MWD and IID's annual conservation volumes are based on the SRWYT, described in **Section B.3.2.4**, California Creation and Delivery Assumptions. **Table B-16** below shows the assumed conservation for MWD and IID:

Table B-16
Summary of MWD and IID Assumed Conservation Volumes in the Enhanced Coordination Alternative

SRWYT	MWD (kaf)	IID (kaf)	Total (kaf)
C	0.000	0.000	0
D	41.667	0.000	41.667
BN	229.167	125.000	354.167
AN	416.666	166.667	583.333
W	483.333	250.000	733.333

Conservation first goes towards meeting any shortages in the same year it occurs. Any remaining conserved water is stored in the Lake Mead mechanism.

Every three years, CRIT-CA is assumed to store 10 percent of its depletion schedule. The creation volume is reduced by any annual shortage, which depends on the shortage distribution method and the total shortage volume.

Delivery/Conversion

MWD and IID are assumed to convert storage credits in the Lake Mead mechanism to meet shortages that are not met by same-year conservation. They also are assumed to take additional deliveries from their pools, independent of shortage, as shown in the **Table B-17**; both subject to the maximum annual delivery/conversion limit.

Table B-17
Summary of MWD and IID Assumed Delivery Volumes in the Enhanced Coordination Alternative

SRWYT	MWD (kaf)	IID (kaf)	Total (kaf)
C	125.000	125.000	250.000
D	0.000	62.500	62.500
BN	0.000	0.000	0.000
AN	0.000	0.000	0.000
W	0.000	0.000	0.000

Additionally, for modeling purposes only, it is assumed IID storage credits are delivered to MWD, CAP and/or SNWA if the total Lower Basin shortage exceeds 1.5 maf and there is at least 150 kaf in IID's account after accounting for current-year deliveries/conversions (as described above). These storage credits are assumed to only be used to mitigate each water user's respective shortage attributable to total Lower Basin shortages greater than 1.5 maf. It is assumed that MWD may take delivery of all IID storage credits, if needed, to fully mitigate their portion of the Lower Basin shortage above 1.5 maf. Any remaining IID storage credits are assumed to be distributed between CAP (90 percent) and SNWA (10 percent). Deliveries of IID's storage credits to MWD, CAP, and/or SNWA are modeled to occur after the following assumed, respective, operations are insufficient to mitigate this portion of each water user's shortage:

- MWD storage credits;
- CAP storage credits and the delivery of CRIT-AZ storage credits to CAP; and
- SNWA storage credits and Interstate Water Banking.

CRIT-CA does not take direct delivery of their storage credits in the Lake Mead mechanism. Rather, this water is transferred to CRIT-AZ when CRIT-AZ is unable to mitigate its shortage usings its own storage credits, subject to the following constraints:

- The water may be used only to mitigate CRIT-AZ's shortage; however, mitigation is limited to the portion of CRIT-AZ's shortage associated with total Lower Basin shortages exceeding 1.5 maf.
- Arizona's total shortage exceeds 760 kaf (i.e., total Lower Basin shortage exceeds 1.5 maf)
- Maximum delivery volume is limited to 25 kaf/year.

B.6.2.5 Nevada Creation and Conversion/Delivery Assumptions

Creation

SNWA is modeled to store two types of water in the Lake Mead mechanism: conserved water and Tributary Conservation. With respect to Tributary Conservation, which represents conservation on the Virgin and Muddy Rivers, 35 kaf per year is created. This water is stored in the Lake Mead mechanism if space is available, after the applicable system assessment is applied. In CRSS, this is modeled as a gain to Lake Mead.

For conserved water, SNWA's annual creation is calculated using the following equation:

$$Annual\ Creation = Maximum(\ 300{,}000\ af - Annual\ Shortage_{NV} - Annual\ Demand_{NV}, 0\ af)$$

Based on the assumed depletion schedules, SNWA creates conservation water until 2047, at which point demands equal full apportionment (see **Appendix M**, Lower Division States Depletion Schedules).

Delivery

Water stored in the Lake Mead mechanism is assumed to first mitigate shortages and, if available, then delivered to meet Nevada's demands exceeding apportionment, which starts in 2047. These additional demands range from 2,339 af in 2047 to 40,415 af in 2060 (**Table B-7**).

If there are insufficient storage credits in the Lake Mead mechanism to fully mitigate SNWA's shortages or to satisfy demands exceeding apportionment, SNWA is modeled to take delivery of water stored in the Interstate Water Banks, located in Arizona and California. This mechanism is independent of the Lake Mead mechanism; however, the model contains logic to account for this delivery (**see Section B.3.2.2**). As part of these modeling assumptions, SNWA withdraws from the Arizona bank followed by the California bank subject to the constraints described in **Section B.3.2.2**.

Additionally, if Nevada's account in the mechanism is full or dead pool related reductions occur, SNWA is assumed to take full delivery of its Tributary Conservation.

B.6.2.6 Mexico Creation and Conversion/Delivery Assumptions

Reclamation developed modeling assumptions for the storage and delivery of deferred water by Mexico to evaluate possible impacts of this activity on flow and other resources for this Final EIS.[14] Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 U.S.-Mexico Treaty on Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande (1944 Water Treaty) or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the International Boundary and Water Commission (IBWC) in consultation with the Department of State.

Creation

Mexico is assumed to create up to 250 kaf per year, depending on its total reduction volume. An overview of the general creation logic is provided below, followed by a summary in **Table B-18**.

- If the combined storage of Lake Mead (physical) and Lake Powell (effective) exceeds 85 percent, both Mexico's reduction and creation volumes are 0 kaf.
- If the combined storage of Lake Mead (physical) and Lake Powell (effective) is between 85 percent and 60 percent, Mexico's reduction is 0 kaf and their creation volume is 250 kaf.
- If the combined storage of Lake Mead (physical) and Lake Powell (effective) is less than 60 percent, Mexico's reduction is greater than or equal to 250 kaf and their creation is 0 kaf.

[14] Assuming activity in Mexico is beneficial for National Environmental Policy Act purposes because it maximizes the effects on river flows as it occurs at the most downstream point in CRSS.

Table B-18
Summary of Mexico's Assumed Creation Volume Relative to Reductions in the Enhanced Coordination Alternative

Lake Mead (physical) & Lake Powell (effective) Combined Storage (%)	Mexico Reduction[A] (kaf)	Mexico Annual Contribution [A] (kaf)
> 85%	0	0
≤ 85% to > 60%	0	250
≤ 60%	≥ 250	0

[A] Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico

Delivery/Conversion

Mexico is assumed to convert storage credits to meet assumed delivery reductions that exceed 250 kaf, which occur when the combined storage of Lake Mead (physical) and Lake Powell (effective) is less than or equal to 60 percent. The conversion volume is limited by the available stored credits, the maximum annual delivery/conversion, and are assumed to only occur when Lake Mead's physical elevation is above 1,025 feet.

B.6.3 Lake Mead Mechanism (Protection Pool)

As described in **Appendix S**, the Protection Pool—designed with significant input from representatives of Basin Tribes—would be a pool of water controlled by Reclamation that can reach a maximum volume of 2.0 maf. It would acquire water through multiple mechanisms, including but not limited to system assessments on water user-created conservation, potentially compensated Lower Basin tribal water (conserved consumptive use and unused), system efficiency projects and potentially compensated nontribal conservation. Contents of the Protection Pool would be included in determinations of Lake Powell releases and shortage volumes.

The Protection Pool could be used for a range of purposes, including, but not limited to, meeting federal firming obligations,[15] other federal delivery obligations, protecting Lower Basin water supplies, protecting infrastructure, and providing environmental benefits.

The subsequent sections provide a detailed description of the modeling assumptions and associated constraints.

B.6.3.1 Treatment of Pre-2027 ICS

For modeling purposes, it was intended that GRIC's pre-2027 EC-ICS that was assumed to exist on December 31, 2026 (**Table B-1**) would be converted to the Protection Pool on January 1, 2027. In the Enhanced Coordination Alternative, the existing GRIC EC-ICS (286,708 af) and CRIT-AZ EC-ICS (9,009 af) were erroneously transferred to the Lake Mead mechanism.

[15] The Secretary is obligated to firm certain volumes of CAP non-Indian agricultural water provided as part of Indian water rights settlements to specific tribes in Arizona, under Section 105(a) of the Arizona Water Settlements Act of 2004, Pub. L. 108-451, 118 Stat. 3478.

B.6.3.2 General Assumptions

The maximum capacity of the Protection Pool is 2.0 maf. Annual limits on creation and delivery are not explicitly modeled. The Protection Pool operates on a calendar year to align with reservoir operations. Delivery/conversion from the Lake Mead mechanism – Protection Pool is prohibited if Lake Mead starts the year with a physical pool elevation below 1,025 feet.

Protection Pool conservation activity is modeled using water generated from the following, prioritized, mechanisms:

1. Unused Water from the Lower Division Tribes with Mainstream Entitlements;
2. Lower Basin Tribal Conserved Consumptive Use;
3. System Efficiency;
4. System Assessment; and
5. Non-Tribal Conservation.

It is assumed that when the total conservation volume exceeds the Protection Pool capacity, higher-priority creation mechanisms generate conservation until the Protection Pool reaches full capacity. Additional details on each mechanism and the associated model assumptions are provided in the subsequent sections below.

For all mechanisms, except for water created via System Assessment, it is assumed a one-time system assessment of 7 percent is applied in the year the water is conserved and stored in the Protection Pool. Additionally, there is an annual deduction for evaporation equal to the Protection Pool's proportional share of total evaporation from Lake Mead. The evaporation deduction is applied annually in January based on the previous year's evaporation computed using the RiverWare™ Input Evaporation method and the total volume in the conservation pool at the end of the previous calendar year.

Similarly, conversion/delivery from the Protection Pool is modeled using the following, prioritized, mechanisms:

1. Federal Tribal Firming
2. Lower Basin Shortage Mitigation
3. Deliveries to benefit Lower Colorado River Multi-Species Conservation Program (LCR MSCP) sites

Additional details on the modeling assumptions for the creation and delivery/conversion of storage credits from the Protection Pool are provided below.

B.6.3.3 Contribution

Unused Water from the Lower Division Tribes with Mainstream Entitlements - Creation Assumptions

As noted above, Protection Pool conservation activity is modeled using water generated from five prioritized mechanisms. It is assumed that storing unused water associated with the Lower Division Tribes is the top priority, i.e., if there is limited available space, this water is stored first. Such storage would be voluntary. A table of the explicitly modeled Lower Division Tribes that are assumed to be able to create unused tribal water for storage in the Protection Pool is shown below (**Table B-19**):

These tribes hold diversion entitlements; therefore, for modeling purposes, unused water is calculated as the difference between the depletion equivalent of each of the tribe's entitlement and the assumed depletion schedule for the current year (see **Appendix M**, Lower Division State Depletion Schedules). Additionally, for modeling purposes, it is assumed 10 percent of the unused Lower Basin tribal water can be stored in the Protection Pool. As a result, this water would not be available for diversion and use by lower priority water users—specifically, MWD, CAP and SNWA—and the corresponding volumes are deducted from their modeled demands. **Appendix H**, Sensitivity Analysis - Modeled Unused Tribal Water Available for Storage in the Enhanced Coordination Alternative, provides information on the methodology used to estimate the Lower Division States unused tribal water, which was needed to model this concept.

Table B-19
Explicitly Modeled Lower Division Tribes that are Assumed to Create Unused Tribal Water for Storage in the Protection Pool – Enhanced Coordination Alternative.

CRSS Water User	State
Chemehuevi Indian Reservation	California
Cocopah Indian Reservation	Arizona
Colorado River Indian Reservation	Arizona
Colorado River Indian Reservation	California
Fort Mojave Indian Reservation	Arizona
Fort Mojave Indian Reservation	California
Fort Mojave Indian Reservation	Nevada
Fort Yuma Indian Reservation	Arizona
Fort Yuma Indian Reservation	California
Indian Water Rights Settlements[16]	Arizona

Pending available capacity in the Protection Pool, the assumed annual volume of unused tribal water available for storage in the Protection Pool ranges from 7.66 kaf in 2027 to 0 kaf per year in 2040-2060.[17]

[16] Please see **Appendix H** for a description of this line item.
[17] This modeling erroneously includes unused tribal water associated with the Hopi Tribe. As such, the range here does not match 10 percent of the total shown in **Appendix H, Table H-4**. The maximum magnitude of the discrepancy is 868 af in 2039-2060.

Tribal Conserved Consumptive Use Creation

For modeling purposes, tribal conserved consumptive use storage credits are assumed to be generated by the CAP Tribes and CRIT-AZ. In CRSS, CAP's entire Colorado River diversion, with the exception of the Salt River Pima-Maricopa Indian Community and Ak-Chin Indian Community portion of the diversion that is Arizona Priority 3, is represented as a single diversion. As such, this diversion is reduced to model the storage credits that are assumed to be generated by CAP Tribes. Such conservation would be voluntary.

For modeling purposes, it is assumed CAP and CRIT-AZ's tribal conserved consumptive use is an initial portion of each water user's creation volume described in **Section B.6.2.3**, *Creation*. Specifically**,** given the pro rata shortage distribution[18] included in the Enhanced Coordination Alternative, it is assumed CRIT-AZ can create up to 50 kaf per year of tribal conserved consumptive use, and the CAP Tribes can create up to 100 kaf per year of tribal conserved consumptive use. Note, in the modeling, this water was added to the Lake Mead mechanisms but was not properly subtracted from the respective water user's requested depletion schedule. Additionally, a discrepancy in the modeling exists in the calculation of each water user's Tribal Conserved Consumptive Use contribution when the Protection Pool is at capacity. Rather than proportionally reducing contributions based on each user's calculated desired contribution, the model calculates the actual contribution based on each user's proportional creation for the Lake Mead mechanism.

System Efficiency Creation

For modeling purposes, it is assumed that voluntary system efficiency projects generate the System Efficiency storage credits. The creation of this mechanism is phased-in over a three-year period, with 25 kaf in 2027, 50 kaf in 2028, and 75 kaf per year for the remainder of the simulation period (2030-2060). The conservation for this mechanism is modeled by reducing the scheduled demands on the water user that represents the water bypassed pursuant to IBWC Minute 242.

System Assessment Creation

It is assumed a one-time system assessment of 7 percent is applied in the year water is conserved and stored in the Lake Mead mechanism and the Protection Pool. The assessed volume is stored in the Protection Pool as a contribution generated through "System Assessment" activity. Water generated via this activity is not subject to a subsequent system assessment. Any assessed volume that cannot be stored in the Protection Pool becomes system water.

Non-Tribal Creation

It is assumed non-tribal contributions are generated when the Lake Mead water user-controlled pools are at capacity and the respective water users cannot store their full desired annual contribution volume (**see Section B.6.2.2**). Subject to availability in the Protection Pool, a maximum of 300 kaf of non-tribal contributions may be stored in the Protection Pool annually. Each state's share of the 300 kaf annual contribution limit is assumed to be proportional to the

[18] It is assumed these maximum creation limits could change under a priority-based shortage distribution, which is not modeled in the Enhanced Coordination Alternative.

assumed cumulative storage limits modeled for the Lake Mead mechanism and are shown below in **Table B-20**.

Table B-20
Constraints for the Non-Tribal Annual Contributions in the Enhanced Coordination Alternative

Entity	Maximum Annual Contribution (kaf)
Arizona	42
California	114
Nevada	42
Mexico	102
Total	**300**

B.6.3.4 Delivery/Conversion

Federal Tribal Firming Delivery/Conversion Assumptions

As noted above, taking delivery/conversion of storage credits from the Protection Pool is modeled using three prioritized mechanisms. For modeling purposes, it is assumed the highest priority mechanism is the delivery/conversion of storage credits to meet federal tribal firming obligations.

For modeling purposes only, CAP is assumed to take delivery of storage credits in the Protection Pool when shortages exceed specified thresholds as a modeling approximation of federal tribal firming obligations.[19] The modeled maximum annual delivery/conversion volume relative to these shortage thresholds are provided below in **Table B-21**.

Table B-21
CAP Shortage Thresholds Relative to Delivery/Conversion of Storage Credits in the Enhanced Coordination Alternative

Current Year Shortage for CAP (kaf)	Maximum Annual Delivery/Conversion Volume (kaf)
≥ 592	36.924
< 592 to ≥ 512	24.325

[19] Please see the Arizona Water Settlements Act, Pub. L. 108-451, 118 Stat. 3478 (Dec. 10, 2004), section 105, for a general description of the firming program. All firming deliveries in any given year would be made in accordance with applicable law. This appendix is not a legal interpretation of the firming program or of federal obligations. Actual firming deliveries may vary from the modeling approximations contained in this appendix, and Reclamation retains discretion to include legally-required tribal deliveries in this priority mechanism.

Lower Basin Shortage Mitigation Delivery/Conversion Assumptions

Following federal tribal firming, storage credits in the Protection Pool are assumed to be delivered/converted to mitigate Lower Basin shortage. For modeling purposes, this delivery/conversion is assumed to occur, subject to availability, when the annual Lower Basin shortage exceeds 1.8 maf for three consecutive years, at which point up to 300 kaf of storage credits in the Protection Pool are delivered/converted to mitigate Lower Basin shortage. This shortage mitigation is modeled by reducing the annual Lower Basin shortage volume by a quantity equal to the volume delivered/conserved under this mechanism resulting in all Lower Basin users receiving a proportional benefit of the reduced shortage.

LCR MSCP Delivery/Conversion Assumptions

One of the stated uses of the Protection Pool is to provide environmental benefits. As a modeling simplification to represent this in CRSS, storage credits are assumed to be delivered to the Cibola National Wildlife Refuge (NWR). Cibola NWR was chosen as a modeling simplification and approximation as a representative LCR MSCP site. Subject to available storage credits in the Protection Pool, this delivery is modeled as a 40 kaf delivery to the Cibola NWR water user every three years.

B.7 Maximum Operational Flexibility Alternative

The Maximum Operational Flexibility Alternative includes a conservation mechanism that operates differently from those in the other alternatives. The conservation mechanism – referred to as the Conservation Reserve – is a pool that would store water conserved by Colorado River water users in either Basin (including Mexico) and would be distributed strategically across Lake Powell and Lake Mead to protect infrastructure and benefit a range of resources including the Colorado River Delta, LCR MSCP, and Grand Canyon. Reclamation would determine how to allocate the Conservation Reserve volume between reservoirs and could increase or decrease Lake Powell's basic water year release volume to meet infrastructure needs or resource goals. Operation of the Conservation Reserve would not affect tracking of Lee Ferry flows.

B.7.1 Lake Powell and Lake Mead Mechanism

B.7.1.1 General Assumptions

The Conservation Reserve volume in Lake Powell and Lake Mead does not affect the determination of Lake Powell's water year release or Lower Basin/Lake Mead operations, as they are based on effective storage and three-year preceding average natural flow at Lees Ferry. The Conservation Reserve has a maximum volume of 8.0 maf split between Upper and Lower Basin users, with 3.0 maf of space allocated to Upper Basin users and 5.0 maf allocated to Lower Basin users, which includes the storage of pre-2027 ICS. There is no maximum volume in Lake Powell or Lake Mead nor a maximum total storage for any single user or state, though there are Basin-specific total annual creation and delivery limits described in the following sections.

For modeling purposes, the storage credits are stored in Lake Powell or Lake Mead and are exchanged between the two reservoirs. Upper Basin and Lower Basin storage credits are tracked separately as described in the following sections. Each Basin's storage credits do not sit in one reservoir and are allowed to be exchanged between Lake Powell and Lake Mead. The location of storage credits does not impact any individual water user's ability to take delivery of their conserved water. The following objectives are assumed to govern the exchange of storage credits between Lake Powell and Lake Mead, listed in order of priority, and define how exchange volumes are calculated to achieve each objective:

1. **Protection of critical elevations at Lake Powell (3,510 feet) and Lake Mead (1,000 feet).**

   In January, if Lake Powell or Lake Mead are projected to end the water year below their respective critical elevations, storage credits may be exchanged between the two reservoirs by adjusting the Lake Powell release to protect critical elevations.

2. **Delivery of storage credits to users, including Upper and Lower Basin users, LCR MSCP sites, and the Colorado River Delta.**

   If Lower Basin storage credits are requested for delivery but exceed the Conservation Reserve volume available in Lake Mead, additional storage credits are added to the Lake Powell release to meet the shortfall.

3. **Protection of Grand Canyon resources to support native fish populations, mitigate invasive species, and improve opportunities for high-flow experiments by maintaining Lake Powell elevations between 3,530 and 3,600 feet.**

   In January, the exchange volume is calculated as the difference between the projected end of water year Lake Powell storage and the equivalent storage at elevation 3,570 feet (the modeling target elevation). This exchange volume is then added to the Lake Powell release. Due to uncertainty in projected end of water year storage, the target elevation range may not be fully achieved.

If objectives conflict, the highest-priority objective governs adjustments to the Lake Powell release. Exchanges are assumed to be subject to the following conditions:

- Exchanges from Lake Mead to Lake Powell are constrained to ensure that Lake Powell's minimum daily release does not drop below 6,150 cubic feet per second (cfs)[20] and the basic water year release remains at or above 5.0 maf.
- No exchanges occur if beginning-of-year reservoir elevations are below their respective critical elevations.
- If Lake Powell declines below 3,510 feet any time during the water year, run-of-river operations will govern the Lake Powell release. If this occurs, Conservation Reserve activities affecting the Lake Powell release are suspended for the remainder of the year, and Conservation Reserve balances are reset to their prior end of calendar year values.

[20] A minimum daily release of approximately 7,000 cfs was preferred to support recreation resources; however, the minimum daily release was set at 6,150 cfs in CRSS to avoid conflict with the minimum basic water year release of 5 maf.

B.7.1.2 Upper Basin Mechanism

General Assumptions

The maximum capacity of Upper Basin's Conservation Reserve is 3.0 maf. The conservation creation for the Lake Powell mechanism is modeled as a total Upper Basin volume and not specific to any state or user. At the time of creation, a one-time 10-percent assessment is deducted from the volume.

Creation

Exact volumes of Upper Basin conservation over time are uncertain, but for the purposes of modeling, conservation up to 500 kaf per year is included, with variable annual volumes based on hydrologic conditions. The specific conservation volume is determined by comparing the modeled water year Lees Ferry natural flow to the historical 1991–2020 10th, 40th, and 80th percentile thresholds (**Table B-22**). Linear interpolation is used when the modeled Lees Ferry natural flow falls between percentile thresholds.

Table B-22
Upper Basin Modeled Annual Conservation Volumes in the Maximum Operational Flexibility Alternative

Current Water Year Natural Flow Relative to Historical Flows (1991-2020)	Annual (Water Year) Upper Basin Conservation (kaf)
Current Yr Natural Flow > 80th percentile	500
80th percentile ≥ Current Yr Natural Flow > 40th percentile	300
40th percentile ≥ Current Yr Natural Flow > 10th percentile	200
10th percentile ≥ Current Yr Natural Flow	0

Annual conservation volumes are disaggregated to the monthly scale using the average monthly Upper Basin agricultural demand distribution shown in **Table B-12** (**Section B.6.1.2**). These monthly volumes are then modeled as an inflow above Lake Powell.

Delivery/Conversion

Upper Basin users' conserved water is assumed to be converted to system water based on the shortage curve described in **Appendix S**. When Lower Basin shortages are greater than 2.0 maf, the volume above 2.0 maf is assumed to be converted from Upper Basin users' Conservation Reserve water to system water, subject to availability in the Conservation Reserve. The required Lower Basin shortage volume would be reduced by whatever volume of previously conserved Upper Basin water is converted. Conservation is assumed to not be available for conversion in the year in which it is created.

B.7.1.3 Lower Basin Mechanism

Treatment of Pre-2027 ICS

As described in **Appendix S**, ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 would be used or converted to the Post-2026 mechanism using a phased approach over 5 years.[21] Once transferred to the new mechanism, it is modeled as being subject to all provisions described herein.

As a modeling simplification, ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 (Pre-2027 ICS; **Table B-1**) is converted to the Post-2026 Lower Basin mechanism on January 1, 2027, and phased into the exclusion of operational determinations (i.e., operational neutrality) over 5 years. Other than the immediate exclusion from operational determinations, the new mechanism provisions—described herein—are modeled as immediately applying to Pre-2027 ICS. Additionally, the Pre-2027 ICS included in operational determinations (i.e., non-operationally neutral), is assumed to be delivered/used before the Pre-2027 ICS that is excluded from operational determinations (i.e., operationally neutral). This may result in the Pre-2027 ICS being fully exhausted before the end of the 5-year transition period.

General Assumptions

The maximum capacity of the Lower Basin mechanism is 5.0 maf,[22] with an annual maximum creation calculated as 3.0 maf minus the total Lower Basin shortage for the year. The maximum delivery is 3.0 maf. The Lower Basin mechanism operates on a calendaryear to align with reservoir operations. There is no delivery of storage credits modeled if Lake Powell or Lake Mead starts the water year below critical elevations, 3,510 feet and 1,000 feet, respectively. Creation volumes are assumed to not be exchanged between Lake Powell and Lake Mead in the year of creation. It is assumed a one-time system assessment of 10-percent is applied in the year the water is conserved and stored.

For modeling purposes, the conservation activity is modeled using the water users in **Table B-23.**

Table B-23
Lower Basin Mechanism Water Users in the Maximum Operational Flexibility Alternative

Water User	Entity
CAP	Arizona
Cibola NWR	Arizona
CRIT-AZ	Arizona
Yuma County Water Users Association (Yuma County WUA)	Arizona
MWD	California
IID	California

[21] The modeling erroneously excludes the conversion of system efficiency ICS to the Lake Mead mechanism.
[22] The 5.4 maf maximum capacity shown in **Table TA 4-13** for the Critically Dry flow category appears to be a modeling error.

Water User	Entity
CRIT-CA	California
SNWA	Nevada
Mexico	Mexico

Arizona Creation and Conversion/Delivery Assumptions

In general, Arizona's creation and delivery of conserved water is inversely related to the state's shortage volume.

Creation

Arizona is assumed to create up to 880 kaf per year, depending on the state's total shortage volume. An overview of the logic is provided below.

- If Arizona's shortage is zero, the creation volume is 0 kaf.
- If Arizona's shortage is 0 to 880 kaf, Arizona's creation linearly decreases from 880 kaf to 0 kaf as Arizona's shortage increases from 0 kaf to 880 kaf.
- If Arizona's shortage is greater than 880 kaf, the creation volume is 0 kaf.

The computed state creation volume is then split to the CAP and CRIT-AZ water-users using the methodology described in the Enhanced Coordination Alternative (see **Section B.6.2.3**, *Creation*). The computed state creation volume is then split to the CAP and CRIT-AZ water-users using the methodology described in the Enhanced Coordination Alternative (see **Section B.6.2.3**, *Creation*).

Delivery/Conversion

Arizona is assumed to take delivery of storage credits to mitigate shortages greater than 880 kaf, subject to delivery constraints. The water-user delivery logic is identical to the methodology described in Enhanced Coordination Alternative (see **Section B.6.2.3**, *Delivery/Conversion*). Additionally, if CAP is unable to mitigate the portion of shortage that may be offset with storage credits, it is assumed that CAP takes delivery of CRIT-AZ storage credits, followed by an assumed delivery from IID using the methodology described in Enhanced Coordination Alternative (see **Section B.6.2.4**, *Delivery/Conversion*).

California Creation and Conversion/Delivery Assumptions

For modeling purposes, California's conservation activity is modeled using IID, MWD, and CRIT-CA.

Creation

Both MWD and IID's annual conservation volumes are based on the SRWYT, described in **Section B.3.2.4**. **Table B-24** shows the assumed conservation for MWD and IID. **Table B-24** shows the assumed conservation for MWD and IID.

Table B-24
Summary of MWD and IID Assumed Conservation Volumes in the Maximum Operational Flexibility Alternative

SRWYT	MWD (kaf)	IID (kaf)	Total (kaf)
C	0	0	0
D	50	0	50
BN	275	150	425
AN	500	200	700
W	580	300	880

Conservation is assumed to first go towards meeting any shortages in the same year it occurs. Any remaining conserved water is stored in the Lower Basin mechanism.

Every three years, CRIT-CA is assumed to store 10 percent of its depletion schedule. The creation volume is reduced by any annual shortage.

Delivery/Conversion
MWD and IID are assumed to convert storage credits in the Lake Mead mechanism to meet shortages that are not met by same-year conservation. They also are assumed to take additional deliveries from their pools, independent of shortage, as shown in **Table B-25**; both subject to the maximum annual delivery/conversion limit.

Table B-25
Summary of MWD and IID Assumed Delivery Volumes in the Maximum Operational Flexibility Alternative

SRWYT	MWD (kaf)	IID (kaf)	Total (kaf)
C	150	150	300
D	0	75	75
BN	0	0	0
AN	0	0	0
W	0	0	0

CRIT-CA's delivery assumptions are identical to those described in the Enhanced Coordination Alternative (see **Section B.6.2.4**, *Delivery/Creation*). Additionally, it is assumed IID storage credits are delivered to MWD, CAP and SNWA using the same methodology as those described in the Enhanced Coordination Alternative (see **Section B.6.2.4**, *Delivery/Conversion*).

Nevada Creation and Conversion/Delivery Assumptions
Nevada's creation and delivery logic is identical to the methodology described in the Enhanced Coordination Alternative (see **Section B.6.2.5**).

Mexico Creation and Conversion/Delivery Assumptions

Reclamation developed modeling assumptions for the storage and delivery of deferred water by Mexico to evaluate possible impacts of this activity on flow and other resources for this Final EIS.[23] Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

Creation

Mexico is assumed to create up to 275 kaf per year, depending on its total reduction volume. An overview of the general creation logic is provided below.

- If Mexico's reduction is zero, the creation volume is 0 kaf.
- If Mexico's reduction is 0 to 275 kaf, Mexico's creation linearly decreases from 275 kaf to 0 kaf as Mexico's reduction increases from 0 kaf to 275 kaf.
- If Mexico's reduction is greater than 275 kaf, the creation volume is 0 kaf.

Delivery/Conversion

Mexico is assumed to convert storage credits to meet assumed delivery reductions that exceed 275 kaf. The conversion volume is limited by the available stored credits and the maximum annual total delivery/conversion and other delivery constraints.

LCR MSCP Creation and Conversion/Delivery Assumptions

One of the stated goals of the Conservation Reserve is to benefit a range of resources including the LCR MSCP. As a modeling simplification to represent this in CRSS, it is assumed that one user in each state creates storage credits in the Conservation Reserve, and then these storage credits are delivered to the Cibola NWR. Cibola NWR was chosen as a modeling simplification and approximation as a representative LCR MSCP site. Conservation Reserve water is assumed to be created and delivered on a three-year creation and delivery cycle, with Conservation Reserve water being created in years one and two and delivered in year three. For modeling purposes, storage credits are generated by the Yuma County Water Users Association (Yuma County WUA) in Arizona, CVWD in California, and SNWA in Nevada.

Creation

Participating water users are assumed to create 22.22 kaf annually for 2 years. Creation will not occur on year three of the creation and delivery cycle, when deliveries are assumed to be made to support the MSCP sites. This creation will allow the delivery of 40 kaf of Conservation Reserve storage credits to be made in year three and accounts for the system assessment applied to the creation of Conservation Reserve storage credits in years one and two.

[23] Assuming activity in Mexico is beneficial for National Environmental Policy Act purposes because it maximizes the effects on river flows as it occurs at the most downstream point in CRSS.

Creation by each water user (Yuma County WUA, CVWD, or SNWA) is proportional to their use in the current year, adjusted for the water user's shortage. It can be computed using the equation:

$$Creation_A = \frac{SDepl_A - Shortage_{Water\ User\ A}}{\sum SDepl_{Yuma\ County\ WUA\ ,Coachella,SNWA} - \sum Shortage_{Yuma\ County\ WUA,Coachella,SNWA}}$$

where:

$Creation_A$ = water user's creation volume

$SDepl_A$ = water user's depletion schedule for the current year

$Shortage_{Water\ User\ A}$ = The water user's shortage for the current year

$\sum SDepl_{Yuma\ County\ WUA,\ CVWD,\ SNWA}$ = sum of Yuma County WUA, CVWD, and SNWA's depletion schedules for the current year

$\sum Shortage_{Yuma\ County\ WUA,\ CVWD,\ SNWA}$ = sum of Yuma County WUA, CVWD, and SNWA's shortage for the current year

Delivery/Conversion

On year three of the three-year creation and delivery cycle, 40 kaf of Conservation Reserve storage credits are assumed to be delivered to the Cibola NWR.

Colorado River Delta Creation and Conversion/Delivery Assumptions

One of the stated goals of the Conservation Reserve is to benefit a range of resources including the Colorado River Delta. For modeling purposes, the conservation activity to benefit the Colorado River Delta is modeled using Mexico.[24] The creation and deliveries to benefit the Colorado River Delta are modeled on a three-year cycle, with creation occurring every year and deliveries occurring every third year.

Creation/Conversion

Mexico is assumed to create 48,214.3 af annually to support a 135 kaf delivery to the delta every three years. On year three of the three-year creation and delivery cycle, Mexico creates water for the delta but is not charged the system assessment as the volumes is taken as a delivery in the same year. The annual creation volume is 1/3 of the desired Conservation Reserve delivery to the delta, adjusted for the system assessment in 2 out of 3 years.

[24] Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussion regarding the proposed federal action and implementation of the 1944 Treaty with Mexico through the IBWC in consultation with the Department of State.

Delivery

Delivery of 135 kaf is assumed to occur every three years. This delivery is distributed equally over the months of June and July, with 67.5 kaf being delivered each month.

B.8 Supply Driven Alternative

The Supply Driven Alternative (both LB Priority and LB Pro Rata approaches) includes a Lake Powell mechanism and a Lake Mead mechanism. Details on each mechanism including creation, delivery, and constraints are provided below.

B.8.1 Lake Powell Mechanism

As described in **Appendix S**, water conserved by Upper Basin users would be stored in a pool in Lake Powell that could reach a maximum volume of 3.0 maf. Upper Division States and Upper Basin Tribes would be able to contribute to the conservation pool and could use their conserved water in intra- and interstate transactions with other Upper Basin users. Water in the Lake Powell conservation pool could be released if needed to meet the determined water year volume. No modeling assumptions were developed to represent these specific uses of water in the Lake Powell conservation pool in the Supply Driven Alternative (both LB Priority and LB Pro Rata approaches).

B.8.1.1 General Assumptions

The volume of water in the Lake Powell conservation pool does not affect the determination of Lake Powell's water year release, as the release is computed solely based on the preceding three-year average natural flow at Lees Ferry, nor does it affect Lower Basin/Lake Mead operations as they are based on Lake Mead elevation. There is a maximum capacity of 3.0 maf. There are no assumed state-specific limitations on the maximum accumulation, nor are there state-specific annual creation or delivery limits, as conservation creation for the Lake Powell mechanism is modeled as a total Upper Basin volume.

There is an annual deduction for evaporation equal to the conservation pool's proportional share of total evaporation from Lake Powell. The evaporation deduction is modeled annually in October based on the previous year's evaporation computed using the RiverWare™ Periodic Net Evaporation method and the total volume in the conservation pool at the end of the previous water year.

B.8.1.2 Creation

Exact volumes of Upper Basin conservation over time are uncertain, but for the modeling purposes, conservation volumes up to 200 kaf may be added in any given year, depending on hydrologic conditions. The modeled conservation volume is determined by comparing the modeled water year Lees Ferry natural flow to the historical 1991–2020 25th and 75th percentile thresholds (**Table B-26**). Linear interpolation is used when the modeled Lees Ferry natural flow falls between 10.60 and 16.5 maf—with conservation increasing from 0 to 200 kaf as natural flow increases across this range.

Table B-26
Upper Basin Modeled Annual Conservation Volumes in the Supply Driven Alternative

Current Water Year Lees Ferry Natural Flow (maf)	Annual (Water Year) Upper Basin Conservation (kaf)
> 16.50[25]	200
Between 16.50 and 10.60[26]	200 to 0 (linear interpolation)
≤ 10.60	0

Annual conservation volumes are disaggregated to the monthly scale using the average monthly Upper Basin agricultural demand distribution shown in **Table B-12** (**Section B.6.1.2**). These monthly volumes are then modeled as inflow above Lake Powell.

If the Lake Powell mechanism reaches full capacity, annual conservation continues; however, the conserved volumes are assumed to be system water rather than being accounted for within the Lake Powell mechanism.

B.8.1.3 Delivery/Conversion

There is no assumed conversion or delivery of storage credits in the Lake Powell mechanism, but water in the Lake Powell conservation pool can be released if needed to meet the determined water year volume.

B.8.2 Lake Mead Mechanism

Water conserved by Lower Basin users would be stored in Lake Mead in a pool that could reach a maximum volume of 8.0 maf (including Pre-2027 ICS). Water users could contribute, convert or deliver water previously stored under this new mechanism at their discretion, within the mechanism's applicable constraints. All storage credits in the Lake Mead conservation mechanism would be excluded from determinations of shortage volumes. The subsequent sections provide a detailed description of the modeling assumptions and associated constraints.

B.8.2.1 Treatment of Pre-2027 ICS

The conversion of pre-2027 ICS to the Post-2026 Lake Mead mechanism is identical to the methodology described in the Maximum Operational Flexibility Alternative except the pre-2027 ICS is phased to the new mechanism over 10 years (see **Section B.7.1.3**, *Treatment of Pre-2027 ICS*).[27]

B.8.2.2 General Assumptions

The maximum capacity of the Lake Mead mechanism, along with individual annual creation and delivery limits, is provided in **Table B-27** below. The Lake Mead mechanism operates on a calendar year to align with reservoir operations. Delivery/conversion from the Lake Mead mechanism is

[25] Historical 1991–2020 75th percentile Lees Ferry natural flow value.
[26] Historical 1991–2020 25th percentile Lees Ferry natural flow value.
[27] The modeling erroneously excludes the conversion of system efficiency ICS to the Lake Mead mechanism.

assumed to be prohibited if Lake Mead starts the year with a physical pool elevation below 1,025 feet.[28]

Table B-27
Lake Mead Mechanism Modeled Limitations of Storage of Conserved Water in Supply Driven Alternative

Entity	Maximum Annual Contribution (kaf)	Maximum Cumulative Storage (kaf)	Maximum Annual Conversion or Delivery (kaf)
Arizona	880	3,000	465
California	880	3,000	745
Nevada	225	1,000	90
Mexico[1]	500	1,000	100
TOTAL	**2,485**	**8,000**	**1,400**

[1] Volumes include modeling assumptions for Mexico's storage and delivery limits. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

The conservation activity is modeled using the water users in **Table B-28**.

Table B-28
Lake Mead Mechanism Water Users in the Supply Driven Alternative

Water User	Entity
CAP	Arizona
CRIT-AZ	Arizona
MWD	California
IID	California
CRIT-CA	California
SNWA	Nevada
Mexico	Mexico

It is assumed a one-time system assessment of 5 percent is applied in the year the water is conserved and stored. In every subsequent year, the evaporation assessment is assumed to be 3 percent of the stored volume. If water is created and delivered in the same calendar year, no assessments are applied.

[28] The logic included in CRSS erroneously did not apply this constraint to the delivery/conversion of California's storage credits.

B.8.2.3 Arizona Creation and Conversion/Delivery Assumptions

In general, Arizona's delivery of conserved water is inversely related to the effective elevation at Lake Mead and the state shortage volume.

For modeling purposes, Arizona's conservation activity is modeled using CAP and CRIT-AZ.

Creation

Arizona is modeled to create up to 880 kaf per year, depending on the state's total shortage volume. An overview of the logic is provided below, followed by a summary in **Table B-29**.

- If Lake Mead effective elevation is greater than or equal to 1,165 feet, both Arizona's shortage and creation volume are 0 kaf.
- If the Lake Mead effective elevation is between 1,165 feet and 1,145 feet (inclusive), Arizona's shortage is 0 kaf. However, their creation volume increases from 0 kaf to 880 kaf as the effective elevation decreases within this range.
- If the Lake Mead effective elevation is between 1,145 feet and 1,125 feet (inclusive), Arizona's shortage increases from 0 kaf to 760 kaf. As the shortage increases, Arizona's creation decreases from 880 kaf to 440 kaf. As a result, the sum of Arizona's shortage and creation increases linearly from 880 kaf to 1,200 kaf.
- If the Lake Mead effective elevation is between 1,125 feet and 1,050 feet (inclusive), Arizona's creation remains static at 440 kaf. As a result, the sum of Arizona's shortage (760 kaf) and creation (440 kaf) equals 1,200 kaf.
- If the Lake Mead effective elevation is less than 1,050 feet, Arizona's creation decreases from 440 kaf to 0 kaf as shortages increase.

Table B-29
Summary of Arizona's Assumed Creation Volumes Relative to Shortage in the Supply Driven Alternative

Lake Mead Effective Elevation (feet)	Arizona Shortage (kaf)	Arizona Annual Creation (kaf)
≥ 1,165	0	0
< 1,165 to ≥ 1,145	0	0 to 880
< 1,145 to ≥ 1,125	0 to 760	880 to 440
< 1,125 to ≥ 1,050	760	440
< 1,050	> 760	440 to 0

The computed state creation volume is then split to the CAP and CRIT-AZ water users using the methodology described in the Enhanced Coordination Alternative (see **Section B.6.2.3**, *Creation*).

Delivery/Conversion

Arizona is assumed to take delivery of storage credits to mitigate shortages greater than 760 kaf, subject to delivery constraints. The water-user delivery logic is identical to the methodology described in the Enhanced Coordination Alternative (see **Section B.6.2.3**, *Delivery/Conversion*).

B.8.2.4 California Creation and Conversion/Delivery Assumptions

For modeling purposes, California's conservation activity is modeled using IID, MWD, and CRIT CA.

Creation

Both MWD and IID's annual conservation volumes are based on the SRWYT, described in **Section B.3.2.4**. The assumed conservation for MWD and IID is the same as the Maximum Operational Flexibility Alternative (**Table B-24**). Conservation is assumed to first go towards meeting any shortages in the same year it occurs. Any remaining conserved water is stored in the Lake Mead pool.

Every three years, CRIT-CA is assumed to store 10 percent of its depletion schedule. The creation volume is reduced by any annual shortage, which depends on the shortage distribution method and Lake Mead elevation.

Delivery/Conversion

MWD and IID are assumed to convert storage credits in the Lake Mead mechanism to meet shortages that are not met by same-year conservation. They are also assumed to take additional deliveries from their pools, independent of shortage; both are subject to the maximum annual delivery/conversion limit. Delivery volumes are the same as the Maximum Operational Flexibility Alternative (**Table B-25**).

CRIT-CA's delivery assumptions are identical to those described in Enhanced Coordination Alternative (see **Section B.6.2.4**, *Delivery/Conversion*).

B.8.2.5 Nevada Creation and Conversion/Delivery Assumptions

Nevada's creation and delivery logic is identical to the methodology described in Enhanced Coordination Alternative (see **Section B.6.2.5**, *Delivery*).

B.8.2.6 Mexico Creation and Conversion/Delivery Assumptions

Reclamation developed modeling assumptions for the storage and delivery of deferred water by Mexico to evaluate possible impacts of this activity on flow and other resources for this Final EIS.[29] Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

In general, the volumes of creation and delivery depend on the assumed annual delivery reductions to Mexico, and the storage credits are used to mitigate these delivery reductions.

[29] Assuming activity in Mexico maximizes the effects on river flows as it occurs at the most downstream point in CRSS.

Creation

Mexico is assumed to create up to 500 kaf per year, depending on its total reduction volume. An overview of the general creation logic is provided below, followed by a summary in **Table B-30**.

- If Lake Mead effective elevation is greater than or equal to 1,145 feet, both Mexico's reductions and creation volume are 0 kaf.
- If the Lake Mead effective elevation is between 1,145 feet and 1,125 feet, Mexico's reductions increase from 0 kaf to 250 kaf. As the reductions increase, Mexico's creation decreases from 250 kaf to 0 kaf. As a result, the sum of Mexico's reductions and creation equals 250 kaf.
- If the Lake Mead effective elevation is less than 1,125 feet, Mexico's creation is 0 kaf.

Table B-30
Summary of Mexico's Assumed Creation Volume Relative to Reductions in the Supply Driven Alternative

Lake Mead Effective Elevation (feet)	Mexico Reduction[B] (kaf)	Mexico Annual Contribution[B] (kaf)
≥ 1,145[A]	0	0
< 1,145 to ≥ 1,125	0 to 250	250 to 0
< 1,125	> 250	0

[A] Mexico is assumed to create 500 kaf in the first year following flood control, and this can occur only once per trace.
[B] Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico.

Additionally, Mexico is assumed to create 500 kaf in the first year following flood control surplus, and this can occur only once per trace.

Delivery/Conversion

Mexico is assumed to convert storage credits to meet assumed delivery reductions that exceed 250 kaf (which occur when Lake Mead's effective elevation is below 1,050 feet). The conversion volume is limited by the available stored credits, the maximum annual delivery/conversion, and are assumed to only occur when Lake Mead's physical elevation is above 1,025 feet.

B.9 Representative Preferred Alternative

The Representative Preferred Alternative includes three pools to store, convert and deliver water for the benefit of water users and the system: the Lake Powell mechanism, the water user-controlled Lake Mead mechanism, and the Lake Mead Federally Managed Water Resources Pool, which was informed by a group of Basin Tribes and would be controlled by Reclamation for Lower Basin-wide benefits. The design of these mechanisms supports proactive conservation and water user flexibility.

Details on modeling assumptions for each mechanism including contribution, delivery, and associated constraints are provided below.

B.9.1 Lake Powell Mechanism

As described in **Chapter 2**, water conserved by Upper Basin users would be stored in a pool in Lake Powell that could reach a maximum volume of 3.0 maf. Upper Division States and Upper Basin Tribes would have equal access to contribute to the conservation pool and to use their conserved water in intra- and interstate transactions with other Upper Basin users; however, no modeling assumptions were developed to model those specific transactions in the Representative Preferred Alternative. Additionally, no modeling assumptions were developed to represent specific uses of water in the Lake Powell conservation pool in the Representative Preferred Alternative.

B.9.1.1 General Assumptions

The volume of water in the Lake Powell conservation pool is included in the determination of Lake Powell's water year release, which is based on the physical pool elevation at Lake Powell. There is a maximum capacity of 3.0 maf. There are no assumed state-specific limitations on the maximum accumulation, nor are there state-specific annual contribution or delivery limits, as conservation contribution for the Lake Powell mechanism is modeled as a total Upper Basin volume.

An annual evaporation assessment of 3 percent is applied to the volume of water remaining in the conservation pool at the end of each water year. The assessment is deducted in October based on the total volume stored at the end of the preceding water year. Additionally, a one-time assessment of 10 percent is applied in the year the water is initially conserved and stored.

B.9.1.2 Contribution

Exact volumes of Upper Basin conservation over time are uncertain, but for the modeling purposes, conservation volumes up to 200 kaf may be added in any given year, depending on hydrologic conditions. The modeled conservation volume is determined by comparing the modeled water year Lees Ferry natural flow to the historical 1991–2020 25th and 75th percentile thresholds (**Table B-31**). Linear interpolation is used when the modeled Lees Ferry natural flow falls between 10.6 and 16.5 maf—with conservation increasing from 0 to 200 kaf as natural flow increases across this range.

Table B-31
Upper Basin Modeled Annual Conservation Volumes in the Representative Preferred Alternative

Current Water Year Lees Ferry Natural Flow (maf)	Annual (Water Year) Upper Basin Conservation (kaf)
> 16.50[30]	200
Between 16.50 and 10.60[31]	200 to 0 (linear interpolation)
≤ 10.60	0

[30] Historical 1991–2020 75th percentile Lees Ferry natural flow value.
[31] Historical 1991–2020 25th percentile Lees Ferry natural flow value.

Annual conservation volumes are disaggregated to the monthly scale using the average monthly Upper Basin agricultural demand distribution shown in **Table B-12** (**Section B.6.1.2**). These monthly volumes are then modeled as inflow above Lake Powell.

If the Lake Powell mechanism reaches full capacity, annual conservation continues; however, the conserved volumes are assumed to be system water rather than being accounted for within the Lake Powell mechanism.

Note, this is the same approach implemented in the Supply Driven Alternative (both LB Priority and LB Pro Rata approaches).

B.9.1.3 Delivery/Conversion

The same approach is implemented as the Supply Driven Alternative (both LB Priority and LB Pro Rata approaches): there is no assumed conversion or delivery of storage credits from the Lake Powell mechanism, but water in the Lake Powell conservation pool can be released if needed to meet the determined water year volume.

B.9.2 Lake Mead Mechanism

As described in **Chapter 2**, this pool represents the water user-controlled Lake Mead mechanism. Lower Colorado River entitlement holders, including Lower Basin Tribes, consistent with applicable implementation agreements, would be able to contribute to the conservation pool and to use their conserved water for delivery and/or in intra- and interstate transactions with other Lower Basin users. Water conserved by Lower Basin users would be stored in a pool in Lake Mead that can reach a maximum volume of 7.0 maf, which includes the storage of pre-2027 ICS. Water users could contribute and convert or deliver water previously stored under this new mechanism at their discretion within the annual volume constraints related to the pool. All conserved storage credits in Lake Mead would be included in determination of Lower Basin surplus and shortage volumes and equalization releases from Lake Powell.

The subsequent sections provide a detailed description of the modeling assumptions and associated constraints.

B.9.2.1 Treatment of Pre-2027 ICS

For modeling purposes only, ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 is converted to the Post-2026 Lake Mead water-user controlled mechanism on January 1, 2027.

B.9.2.2 General Assumptions

The Lake Mead mechanism operates on a calendar year to align with reservoir operations. The maximum capacity of the Lake Mead mechanism and the individual annual contribution and delivery limits are provided in **Table B-32** below.

Table B-32
Lake Mead Mechanism Modeled Limitations of Storage of Conserved Water in the Representative Preferred Alternative

Entity	Maximum Annual Contribution (kaf)	Maximum Cumulative Storage (kaf)	Maximum Annual Conversion or Delivery[2] (kaf)
Arizona	880	2,300	430
California	880	2,300	430
Nevada	100	900	140
Mexico[1]	500	1,500	200[3]
TOTAL	**2,360**	**7,000**	**1,200**

1) Volumes include modeling assumptions for Mexico's storage and delivery limits. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.
2) The Representative Preferred Alternative maintained the total U.S. annual delivery of 1.0 maf from the 2007 Interim Guidelines. For modeling purposes, to maximize reach impacts, and to integrate with other modeling assumptions, e.g., demand schedules, the state specific maximums were modified from those in the 2007 Interim Guidelines; this modeling assumption is not intended to determine any future state maximum delivery constraints.
3) The 1944 Water Treaty authorizes scheduled delivery of up to 200 kaf in excess of the 1.5 annual allotment to Mexico.

For modeling purposes only, additional general delivery/conversion constraints include the following:

- Delivery/conversion from the Lake Mead mechanism is prohibited when Lake Mead begins the year with a physical pool elevation below 1,000 feet and is limited to 50 percent of the maximum annual delivery/conversion volume (**Table B-32**) when Lake Mead begins the year with a physical pool elevation between 1,000 and 1,025 feet.
- Delivery/conversion of stored water from the Lake Mead mechanism is limited such that a state's annual apportionment or Mexico's annual allotment is not exceeded when the Lower Basin shortage is greater than or equal to 1.5 maf (i.e., when Lake Mead's physical pool elevation is less than or equal to 1,125 feet). The delivery/conversion is not subject to those constraints when the Lower Basin shortage is less than 1.5 maf (i.e., when Lake Mead's physical pool elevation exceeds 1,125 feet).
- Delivery/conversion of existing DCP ICS (Arizona) and BWSCP credits (Mexico) is allowed when Lake Mead's physical pool elevation exceeds 1,110 feet.

The conservation activity is modeled using the following water users:

Table B-33
Lake Mead Mechanism Water Users in the Representative Preferred Alternative

Water User	Entity
CAP	Arizona
CRIT-AZ	Arizona
MWD	California
IID	California
CRIT-CA	California
SNWA	Nevada
Mexico	Mexico

At the time the water is conserved, a one-time three percent system assessment, along with a one-time seven percent assessment allocated to the Federally Managed Water Resources Pool, for a total assessment of 10 percent are assumed to be applied. The volume allocated to the Federally Managed Water Resources Pool as "System Assessment" storage credits is subject to the Federally Managed Water Resources Pool's constraints and associated modeling assumptions (**See Section B.9.3.3**). If water is created and delivered in the same calendar year, no system assessment is applied.

Additionally, an annual evaporation deduction of 3 percent is applied in January based on the volume of water remaining in the conservation pool at the end of the preceding calendar year.

B.9.2.3 Arizona Contribution and Conversion/Delivery Assumptions

In general, Arizona's contribution and delivery of conserved water is inversely related to the physical elevation at Lake Mead and the state shortage volume.

For modeling purposes, Arizona's conservation activity is modeled using CAP and CRIT-AZ.

Contribution

Arizona is modeled to create up to 880 kaf per year, depending on the state's total shortage volume. An overview of the logic is provided below, followed by a summary in **Table B-34**.

- If Lake Mead physical pool elevation is greater than or equal to 1,165 feet, both Arizona's shortage and contribution volume are 0 kaf.
- If the Lake Mead physical pool elevation is between 1,165 feet and 1,145 feet (inclusive), Arizona's shortage is 0 kaf. However, their contribution volume linearly increases from 0 kaf to 880 kaf as the physical elevation decreases within this range.
- If the Lake Mead physical pool elevation is less than 1,145 feet, the contribution equals 1,200 kaf minus Arizona's Policy Shortage, resulting in decreasing contribution volumes as the shortage increases from zero. The maximum annual contribution is 880 kaf.

Table B-34
Summary of Arizona's Assumed Contribution Volumes Relative to Shortage in the Representative Preferred Alternative

Lake Mead Physical Elevation (feet)	Arizona Shortage (kaf)	Arizona Annual Contribution (kaf)
≥ 1,165	0	0
< 1,165 to ≥ 1,145	0	0 to 880
< 1,145	> 0	880 to 0

The computed state contribution volume is then split to the CAP and CRIT-AZ water users using the methodology described in the Enhanced Coordination Alternative (see **Section B.6.2.3**, *Creation*). For modeling purposes, it is assumed that the first 50 kaf of conserved water generated by CAP and the first 100 kaf of conserved water generated by CRIT-AZ are stored in the Lake Mead mechanism – Federally Managed Water Resources Pool and accounted for as tribal conserved consumptive use (see **Section B.9.3.3**, *Lower Basin Tribal Conserved Consumptive Use Contribution*).

Delivery/Conversion

Arizona is assumed to take delivery of storage credits in the Lake Mead mechanism to mitigate shortages greater than 760 kaf. The following formula is used to determine Arizona's total delivery volume from the Lake Mead mechanism, subject to available storage credits:

$$AZ\ Total\ Delivery\ Volume\ (af) = Maximum(AZ\ Total\ Annual\ Policy\ Shortage\ (af) - 760{,}000\ (af), 0\ (af))$$

The total Arizona delivery is then distributed to CAP and CRIT-AZ, proportional to each water user's annual shortage:

$$Delivery\ Volume_A = AZ\ Total\ Delivery\ Volume\ (af) \times \frac{Annual\ Shortage_A}{\sum Annual\ Shortage_{CAP+CRIT\ AZ}}$$

where "A" is either the CAP or CRIT-AZ water-user.

For modeling purposes only, if CAP is unable to mitigate their portion of the statewide shortage exceeding 760 kaf using their own storage credits, then it is assumed that CRIT-AZ storage credits, followed IID's storage credits (see **Section B.9.2.4**, *Delivery/Conversion*) are delivered to CAP. The volume of the CRIT-AZ's storage credits that are modeled as deliveries to CAP is limited to the lesser of the storage credits available in CRIT-AZ's account and CAP's remaining unmitigated shortage.

To analyze the maximum impact of the total maximum delivery constraints (**Table B-32**) CAP is assumed to take delivery of 430 kaf of storage credits, if the following conditions are all met:

- The previous year total Lower Basin shortage was 1.5 maf, i.e., Lake Mead was below 1,125 feet
- Lake Mead's elevation is above 1,125 feet at the beginning of the current year

- Arizona, Nevada and Mexico's pools within the Lake Mead mechanism all contain sufficient water to meet their respective maximum annual deliveries (**Table B-32**). Note that California's maximum annual delivery is determined using different logic based on the SRWYT, as described in **Section B.3.2.4**. As such, this logic does not apply to California.
- The maximum delivery has not previously occurred, i.e., this maximum delivery may occur at most once per trace.

B.9.2.4 California Contribution and Conversion/Delivery Assumptions

For modeling purposes, California's conservation activity is modeled using IID, MWD, and CRIT-CA.

Contribution

Both MWD and IID's annual conservation volumes are based on the SRWYT, described in **Section B.3.2.4**. **Table B-35** shows the assumed conservation for MWD and IID.

Table B-35
Summary of MWD and IID Assumed Conservation Volumes in the Representative Preferred Alternative

SRWYT	MWD (kaf)	IID (kaf)	Total (kaf)
C	0	0	0
D	50	0	50
BN	275	150	425
AN	500	200	700
W	580	300	880

Conservation is assumed to first go towards meeting any shortages in the same year it occurs. Any remaining conserved water is stored in the Lake Mead mechanism.

Every three years, CRIT-CA is assumed to store 10 percent of its depletion schedule. The contribution volume is reduced by any annual shortage.

Delivery/Conversion

MWD and IID are assumed to convert storage credits in the Lake Mead mechanism to meet shortages that are not met by same-year conservation. They also are assumed to take additional deliveries from their pools, independent of shortage, as shown in **Table B-36**; both subject to the maximum annual delivery/conversion limit.

Table B-36
Summary of MWD and IID Assumed Delivery Volumes in the Representative Preferred Alternative

SRWYT	MWD (kaf)	IID (kaf)	Total (kaf)
C	215	215	430
D	0	75	75
BN	0	0	0
AN	0	0	0
W	0	0	0

Additionally, for modeling purposes only, it is assumed IID storage credits are delivered to MWD, CAP and/or SNWA if the total Lower Basin shortage exceeds 1.5 maf and there is at least 150 kaf in IID's pool after accounting for current-year deliveries/conversions (as described above). These deliveries are assumed to only be used to mitigate each water user's respective shortage attributable to total Lower Basin shortages greater than 1.5 maf. It is assumed that MWD may take delivery of all IID storage credits, if needed, to fully mitigate their portion of the Lower Basin shortage above 1.5 maf. Any remaining IID storage credits are assumed to be distributed between CAP (90 percent) and SNWA (10 percent). Deliveries of IID's storage credits to MWD, CAP, and/or SNWA are modeled to occur after the following assumed, respective, deliveries are insufficient to mitigate this portion of each water user's shortage:

- MWD storage credits;
- CAP storage credits and the delivery of CRIT-AZ storage credits to CAP; and
- SNWA storage credits and Interstate Water Banking.

CRIT-CA's is assumed to not take direct delivery of their storage credits from the Lake Mead mechanism. Rather, this water is delivered to CRIT-AZ when CRIT-AZ is unable to mitigate its shortage usings its own storage credits, subject to the following constraints:

- The water may be used only to mitigate CRIT-AZ's shortage; however, mitigation is limited to the portion of CRIT-AZ's shortage associated with total Lower Basin shortages exceeding 1.5 maf.
- Maximum delivery volume is limited to 25 kaf/year.

B.9.2.5 Nevada Contribution and Conversion/Delivery Assumptions

Contribution

SNWA is modeled to store two types of water in the Lake Mead mechanism: conserved water and Tributary Conservation. With respect to Tributary Conservation, which represents conservation on the Virgin and Muddy Rivers, 35 kaf per year is created. This water is stored in the Lake Mead mechanism if space is available, after the applicable system assessment is applied. In CRSS, this is modeled as a gain to Lake Mead.

For conserved water, SNWA's annual contribution is calculated using the following equation:

$$Annual\ Creation = Maximum(\ 300{,}000\ af - Annual\ Shortage_{NV} - Annual\ Demand_{NV}, 0\ af)$$

Based on the assumed depletion schedules, SNWA may create conservation water until 2047 depending on the annual shortage volume, at which point demands equal full apportionment (see **Appendix M**, Lower Division States Depletion Schedules).

Delivery
In general, water stored in the Lake Mead mechanism is assumed to first mitigate shortages and, if available, then delivered to meet Nevada's demands exceeding apportionment, which starts in 2047. These additional demands range from 2,339 af in 2047 to 40,415 af in 2060 (**Table B-7**).

If there are insufficient storage credits in the Lake Mead mechanism to fully mitigate SNWA's shortages or to satisfy demands exceeding apportionment, SNWA is modeled to take delivery of water stored in the Interstate Water Banks, located in Arizona and California. This mechanism is independent of the Lake Mead mechanism; however, the model contains logic to account for this delivery (**see Section B.3.2.2**). As part of these modeling assumptions, SNWA withdraws from the Arizona bank followed by the California bank subject to the constraints described in **Section B.3.2.2**.

Additionally, if Nevada's account in the mechanism is full or dead pool related reductions occur, SNWA is assumed to take full delivery of its Tributary Conservation.

To analyze the maximum impact of the total maximum delivery constraints (**Table B-32**) SNWA is assumed to take delivery of 140 kaf of storage credits, if the following conditions are all met:

- The previous year total Lower Basin shortage was 1.5 maf, i.e., Lake Mead was below 1,125 feet
- Lake Mead's elevation is above 1,125 feet at the beginning of the current year
- Arizona, Nevada and Mexico's pools within the Lake Mead mechanism all contain sufficient water to meet their respective maximum annual deliveries (**Table B-32**). Note that California's maximum annual delivery is determined using different logic based on the SRWYT, as described in **Section B.3.2.4.** As such, this logic does not apply to California.
- The maximum delivery has not previously occurred, i.e., this maximum delivery may occur at most once per trace.

B.9.2.6 Mexico Contribution and Conversion/Delivery Assumptions
Reclamation developed modeling assumptions for the storage and delivery of deferred water by Mexico to evaluate possible impacts of this activity on flow and other resources for this EIS.[32] Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. will conduct all necessary and appropriate discussions

[32] Assuming activity in Mexico maximizes the effects on river flows as it occurs at the most downstream point in CRSS.

regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

In general, the volumes of contribution and delivery depend on the assumed annual delivery reductions to Mexico, and the storage credits are used to mitigate these delivery reductions.

Contribution

Mexico is assumed to create up to 500 kaf per year, depending on its total reduction volume. An overview of the general contribution logic is provided below, followed by a summary in **Table B-37**.

- If the Lake Mead physical pool elevation is greater than 1,165 feet, Mexico's reduction and contribution volume are 0 kaf.
- If the Lake Mead physical pool elevation is between 1,165 feet and 1,145 feet (inclusive), Mexico's reduction is 0 kaf and their contribution volume is 250 kaf.
- If the Lake Mead physical pool elevation is less than 1,145 feet, the contribution equals 250 kaf minus Mexico's reduction, resulting in decreasing contribution volumes as the reduction increases from zero.

Table B-37
Summary of Mexico's Assumed Contribution Volume Relative to Reductions in the Representative Preferred Alternative

Lake Mead Physical Elevation (feet)	Mexico Reduction[B] (kaf)	Mexico Annual Contribution[B] (kaf)
> 1,165[A]	0	0
≤ 1,165 to ≥ 1,145	0	250
< 1,145	0 to 250	250 to 0

[A] Mexico is assumed to create 500 kaf in the first year following flood control, and this can occur only once per trace.
[B] Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico.

Additionally, Mexico is assumed to create 500 kaf in the first year following flood control surplus, and this can occur only once per trace.

Delivery/Conversion

In general, Mexico is assumed to take delivery of storage credits from the Lake Mead mechanism to mitigate assumed delivery reductions greater than 250 kaf.

To analyze the maximum impact of the total maximum delivery constraints (**Table B-32**) Mexico is assumed to take delivery of 200 kaf of storage credits, if the following conditions are all met:

- The previous year total Lower Basin shortage was 1.5 maf, i.e., Lake Mead was below 1,125 feet
- Lake Mead's elevation is above 1,125 feet at the beginning of the current year

- Arizona, Nevada and Mexico's pools within the Lake Mead mechanism all contain sufficient water to meet their respective maximum annual deliveries (**Table B-32**). Note that California's maximum annual delivery is determined using different logic based on the SRWYT, as described in **Section B.3.2.4.** As such, this logic does not apply to California.
- The maximum delivery has not previously occurred, i.e., this maximum delivery may occur at most once per trace.

B.9.3 Lake Mead Mechanism (Federally Managed Water Resources Pool)

As described in **Chapter 2**, the Federally Managed Water Resources Pool is a pool of water in Lake Mead established by Reclamation that is anticipated to be around 450 kaf, but could reach a maximum volume of 1.0 maf[33]; for modeling purposes it was assumed the maximum capacity was 1.0 maf. It could acquire water through multiple mechanisms involving acquisition of conserved consumptive use water including but not limited to ICS. Contents of the Pool would be included in determinations of Lake Powell equalization releases and Lower Basin surplus and shortage volumes.

Chapter 2 provides a description of the range of purposes contemplated for the Federally Managed Water Resources Pool. The subsequent sections provide a detailed description of the modeling assumptions and associated constraints used to represent the Federally Managed Water Resources Pool in the Representative Preferred Alternative.

B.9.3.1 Treatment of Pre-2027 ICS

For modeling purposes, GRIC's and CRIT-AZ's pre-2027 EC-ICS that were assumed to exist on December 31, 2026 (**Table B-1**) was converted to the Federally Managed Water Resources Pool on January 1, 2027.

B.9.3.2 General Assumptions

The maximum capacity of the Federally Managed Water Resources Pool is 1.0 maf. Annual limits on contribution and delivery are not explicitly modeled. The Federally Managed Water Resources Pool operates on a calendar year to align with reservoir operations. Delivery/conversion from the Lake Mead mechanism – Federally Managed Water Resources Pool are prohibited if Lake Mead starts the year with a physical pool elevation below 1,000 feet.

Federally Managed Water Resources Pool conservation activity is modeled using water generated from the following, prioritized, mechanisms:

1. Lower Basin Tribal Conserved Consumptive Use;
2. System Efficiency;
3. System Assessment; and
4. Non-Tribal Conserved Consumptive Use.

It is assumed that when the total conservation volume exceeds the Federally Managed Water Resources Pool capacity, conservation generated through higher-priority contribution mechanisms is

[33] This volume has been proposed to accommodate future water use arrangements, which could include but would not be limited to conservation programs, contracts, and potential Indian water rights settlements.

stored in the Federally Managed Water Resources Pool until it reaches full capacity. Additional details on each mechanism and the associated modeling assumptions are provided in the subsequent sections below.

For all mechanisms, except for water created via System Assessment, it is assumed a one-time system assessment of 10 percent is applied in the year the water is conserved and stored in the Federally Managed Water Resources Pool. Additionally, an annual evaporation deduction of 3 percent is applied in January based on the volume of water remaining in the conservation pool at the end of the preceding calendar year.

Similarly, conversion/delivery from the Federally Managed Water Resources Pool is modeled using the following, prioritized, mechanisms:

1. Federal Tribal Firming
2. Lower Basin Shortage Mitigation
3. Deliveries to benefit LCR MSCP sites

Additional details on the modeling assumptions for the contribution and delivery/conversion of storage credits from the Federally Managed Water Resources Pool are provided below.

B.9.3.3 Contribution

Lower Basin Tribal Conserved Consumptive Use Contribution
For modeling purposes, tribal conserved consumptive use storage credits are assumed to be generated by the CAP Tribes and CRIT-AZ. In CRSS, CAP's entire Colorado River diversion, with the exception of the Salt River Pima-Maricopa Indian Community and Ak-Chin Indian Community portion of the diversion that is Arizona Priority 3, is represented as a single diversion. As such, this diversion is reduced to model the storage credits that are assumed to be generated by CAP Tribes. Such conservation would be voluntary.

For modeling purposes, it is assumed CAP and CRIT-AZ's tribal conserved consumptive use is an initial portion of each water user's contribution volume described in **Section B.9.2.3**, *Contribution*. Specifically**,** given the priority shortage distribution included in the Representative Preferred Alternative, it is assumed CRIT-AZ can create up to 100 kaf per year of tribal conserved consumptive use, and the CAP Tribes can create up to 50 kaf per year of tribal conserved consumptive use.

System Efficiency Contribution
For modeling purposes, it is assumed that voluntary system efficiency projects generate the System Efficiency storage credits. The contribution of this mechanism is phased-in over a three-year period, with 25 kaf in 2027, 50 kaf in 2028, and 75 kaf per year for the remainder of the simulation period (2029-2060). The conservation for this mechanism is modeled by reducing the scheduled demands on the water user that represents the water bypassed pursuant to IBWC Minute 242.

System Assessment Contribution

It is assumed that at the time water is conserved and stored in the Lake Mead mechanism (water user-controlled pools or Federally Managed Water Resources Pool), a one-time three percent system assessment would be applied, along with a one-time seven percent assessment allocated to the Federally Managed Water Resources Pool, for a total assessment of 10 percent. The portion of the assessment allocated to the Federally Managed Water Resources Pool is this "System Assessment Contribution." Water generated via this activity is not subject to a subsequent system assessment. Any assessed volume that cannot be stored in the Federally Managed Water Resources Pool becomes system water.

Non-Tribal Contribution

It is assumed non-tribal contributions are generated when the Lake Mead water user-controlled pools are at capacity, and the respective water users cannot store their full desired annual contribution volume (see **Section B.9.2.2**). Subject to availability in the Federally Managed Water Resources Pool, a maximum of 300 kaf of non-tribal contributions may be stored in the Federally Managed Water Resources Pool annually. Each state's share of the 300 kaf annual contribution limit is assumed to be proportional to the assumed cumulative storage limits modeled for the Lake Mead mechanism and is shown below in **Table B-38**.

Table B-38
Constraints for the Non-Tribal Annual Contributions in the Representative Preferred Alternative

Entity	Maximum Annual Contribution (kaf)
Arizona	42
California	114
Nevada	42
Mexico	102
Total	**300**

B.9.3.4 Delivery/Conversion

Federal Tribal Firming Delivery/Conversion

As noted above, taking delivery/conversion of storage credits from the Federally Managed Water Resources Pool is modeled using three prioritized mechanisms. For modeling purposes, it is assumed the highest priority mechanism is the delivery/conversion of storage credits to meet federal tribal firming obligations.

For modeling purposes only, CAP is assumed to take delivery of storage credits in the Federally Managed Water Resources Pool when shortages exceed specified thresholds as a modeling approximation of federal tribal firming obligations.[34] The modeled maximum annual delivery/conversion volume relative to these shortage thresholds is provided below in **Table B-39**.

Table B-39
CAP Shortage Thresholds Relative to Delivery/Conversion of Storage Credits in the Representative Preferred Alternative

Current Year Shortage for CAP (kaf)	Maximum Annual Delivery/Conversion Volume (kaf)
≥ 592	36.924
< 592 to ≥ 512	24.325

Lower Basin Shortage Mitigation Delivery/Conversion

Following federal tribal firming, storage credits in the Federally Managed Water Resources Pool are assumed to be delivered/converted to mitigate Lower Basin shortage. For modeling purposes, this delivery/conversion is assumed to occur, subject to availability, when the annual Lower Basin shortage exceeds 1.8 maf for three consecutive years, at which point up to 300 kaf of storage credits in the Federally Managed Water Resources Pool are delivered/converted to mitigate Lower Basin shortage. This shortage mitigation is modeled by reducing the annual Lower Basin shortage volume by a quantity equal to the volume delivered under this mechanism.

LCR MSCP Delivery/Conversion

One of the stated uses of the Federally Managed Water Resources Pool is to provide environmental benefits. As a modeling simplification to represent this in CRSS, storage credits are assumed to be delivered to the Cibola NWR. Cibola NWR was chosen as a modeling simplification and approximation as a representative LCR MSCP site. Subject to available storage credits in the Federally Managed Water Resources Pool, this delivery is modeled as a 40 kaf delivery to the Cibola NWR water user every three years.

[34] Please see the Arizona Water Settlements Act, Pub. L. 108-451, 118 Stat. 3478 (Dec. 10, 2004), section 105, for a general description of the firming program. All firming deliveries in any given year would be made in accordance with applicable law. This appendix is not a legal interpretation of the firming program or of federal obligations. Actual firming deliveries may vary from the modeling approximations contained in this appendix, and Reclamation retains discretion to include legally-required tribal deliveries in this priority mechanism.

B.10 References

Meko, D. M., Woodhouse, C. A., & Touchan, R. (2014). Klamath/San Joaquin/Sacramento Hydroclimatic Reconstructions from Tree Rings, Final Report to California Department of Water Resources, Agreement 4600008850. (California Department of Water Resources, P.O. Box 942836, Sacramento, CA 94236-0001; digital copy of report available at: https://bpb-us-e2.wpmucdn.com/sites.arizona.edu/dist/0/59/files/2024/03/FinalCAWDRreport-5eb3fa6b0a9681d2.pdf
sites/cwoodhouse.faculty.arizona.edu/files/FinalCAWDRreport.pdf

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