

1

Chapter Two

2

Description of Alternatives

This page intentionally left blank.

1 2.1 Development of Alternatives

2 Based on the information and comments received during the scoping process, the proposed
3 federal action has been designed to reflect, among others, three important considerations:

- 4 1) **Encouraging Conservation of Water:** Many comments submitted to Reclamation focused on
5 the importance of encouraging and utilizing water conservation as an important tool to
6 better manage limited water supplies and therefore minimize the likelihood and severity
7 of potential future shortages. Water conservation could occur through a number of
8 approaches such as fallowing of land, canal lining, financial incentives to maximize
9 conservation, dry-year options, and associated storage and recovery methodologies and
10 procedures to address conservation actions by particular parties.
- 11 2) **Consideration of Reservoir Operations at all Operational Levels:** Many comments submitted
12 to Reclamation urged Reclamation to consider and analyze management and operational
13 guidelines for the full range of operational levels at Lake Powell and Lake Mead. It was
14 suggested that this approach is integral to the prudent development of new low-reservoir
15 operational guidelines, as the approach and management of these reservoirs at higher
16 elevations has a direct impact on available storage, thereby affecting the likelihood and
17 severity of potential future shortages.
- 18 3) **Term of Operational Guidelines:** Many comments urged Reclamation to consider interim,
19 rather than permanent, additional operational guidelines. In this manner, Reclamation
20 would have the ability to use actual operating experience for a period of years, thereby
21 facilitating a better understanding of the operational effects of the new guidelines.
22 Modifications could then be made, if necessary, based on this operating experience.

23 As a result of the analyses of the comments and input received by Reclamation, the following
24 four operational elements of the proposed federal action were developed;

- 25 1) **Shortage Guidelines:** Adoption of guidelines that would identify those circumstances
26 under which the Secretary would reduce the annual amount of water available for
27 consumptive use from Lake Mead to the Lower Division states below 7.5 maf, pursuant
28 to the Consolidated Decree.

29 The primary purpose of this element is the orderly rationing of water supplies during
30 drought and low-reservoir conditions. While Lake Powell and Lake Mead have large
31 storage capacities, water supply demands are increasing and careful management of
32 existing water supplies will help ensure sufficient supplies are available to meet these
33 demands. The proposed shortage guidelines in the alternatives range from aggressive
34 shortages to no reduction of water supplies until the reservoirs are empty. Most of the
35 alternatives have discrete stepped levels of shortage associated with specific Lake Mead
36 reservoir elevations.

- 1 2) **Coordinated Reservoir Operations:** Adoption of guidelines for the coordinated operation of
2 Lake Powell and Lake Mead to provide improved operation of these two reservoirs,
3 particularly under low-reservoir conditions.

4 Lake Powell and Lake Mead operations are currently coordinated only under high
5 reservoir elevations through storage equalization. The action alternatives consider various
6 options designed to better utilize existing reservoir storage throughout the full range of
7 reservoir operations to enhance both water supply and other benefits of the reservoir
8 system for both basins.

- 9 3) **Storage and Delivery of Conserved Water:** Adoption of guidelines for the storage and
10 delivery of conserved Colorado River system and non-system water in Lake Mead,
11 pursuant to applicable federal law, to increase the flexibility of meeting water use needs
12 from Lake Mead, particularly under drought and low-reservoir conditions.

13 One way to increase water deliveries during drought is through the augmentation and
14 conservation of existing water supplies. The alternatives consider options for the creation
15 of a system of storage credits in Lake Mead whereby system and non-system water may
16 be conserved and stored in Lake Mead, with various limits on the maximum size, storage
17 and delivery of the credit water. The alternatives range from an operational scenario that
18 considers no new mechanism (status quo) to a maximum Lake Mead storage credit
19 volume of 4.2 maf.

20 Reclamation will establish guidelines for administration of this mechanism as part of this
21 public NEPA process. The guidelines will set forth Reclamation requirements for
22 verification of the conservation action and water accounting procedures. Although the
23 guidelines for this element are interim and will expire in 2026, some of the conservation
24 projects established under the guidelines could be permanent in duration.

- 25 4) **Interim Surplus Guidelines (ISG):** Adoption of guidelines that would identify the conditions
26 under which the Secretary may declare the availability of surplus water for use within the
27 Lower Division states. The proposed federal action would modify the substance of the
28 existing ISG and extend the term of the ISG from 2016 to 2026.

29 The ISG are due to expire in 2016. The alternatives range from termination of the
30 permissive provisions of the existing ISG in 2007 to extension of the current provisions
31 of the ISG through 2026. This element of the proposed federal action helps establish an
32 operational strategy for the full range of reservoir operations through 2026.

33 The alternatives considered and analyzed in this Draft EIS include some formulation of
34 each of these four operational elements.

1 Reclamation has developed four action alternatives for analysis in this EIS. These
2 alternatives reflect input from Reclamation staff, the cooperating agencies, stakeholders,
3 and other interested parties. Reclamation received two written proposals for alternatives
4 that met the purpose and need of the proposed federal action, one from the Basin States
5 and another from a consortium of environmental organizations. These proposals were
6 used by Reclamation to formulate two of the alternatives considered and analyzed in this
7 Draft EIS. A third alternative (Water Supply Alternative) was developed by Reclamation
8 and a fourth alternative (Reservoir Storage Alternative) was developed in coordination
9 with the NPS and Western. The alternatives were posted on Reclamation's website
10 (<http://www.usbr.gov/lc/region/programs/strategies.html>) on June 30, 2006.

11 Reclamation has not identified a preferred alternative in this Draft EIS. The preferred
12 alternative will be identified following public comments on the Draft EIS and will be
13 expressed in the Final EIS. The preferred alternative may be one of the specific
14 alternatives described below or it may incorporate elements or variations of these
15 alternatives.

16 **2.2 No Action Alternative**

17 The No Action Alternative provides a baseline against which action alternatives can be
18 compared. The No Action Alternative represents a projection of current conditions to the most
19 reasonable future responses or conditions that could occur during the life of the proposed federal
20 action without any action alternative being implemented.

21 Pursuant to the LROC, the Secretary makes a number of determinations at the beginning of each
22 operating year through the development and execution of the AOP, including the water supply
23 available to users in the Lower Basin and the annual release from Lake Powell. The LROC do
24 not include specific guidelines for such determinations. Furthermore, there is no actual operating
25 experience under very low reservoir conditions, e.g., there has never been a shortage
26 determination in the Lower Basin. Therefore, in the absence of specific guidelines, the outcome
27 of the annual determination in any particular year in the future cannot be precisely known.
28 However, a reasonable representation of future conditions under the No Action Alternative is
29 needed for comparison to each action alternative. The modeling assumptions used for this
30 representation are consistent with assumptions used in previous environmental compliance
31 documents for the ISG, the Colorado River Water Delivery Agreement, and the LCR MSCP
32 (Section 1.8). However, the assumptions used in the No Action Alternative are not intended to
33 limit or predetermine the action decision in any future AOP determination.

1 The formulation of the four elements for the No Action Alternative follows.

2 **2.2.1 Shortage Guidelines**

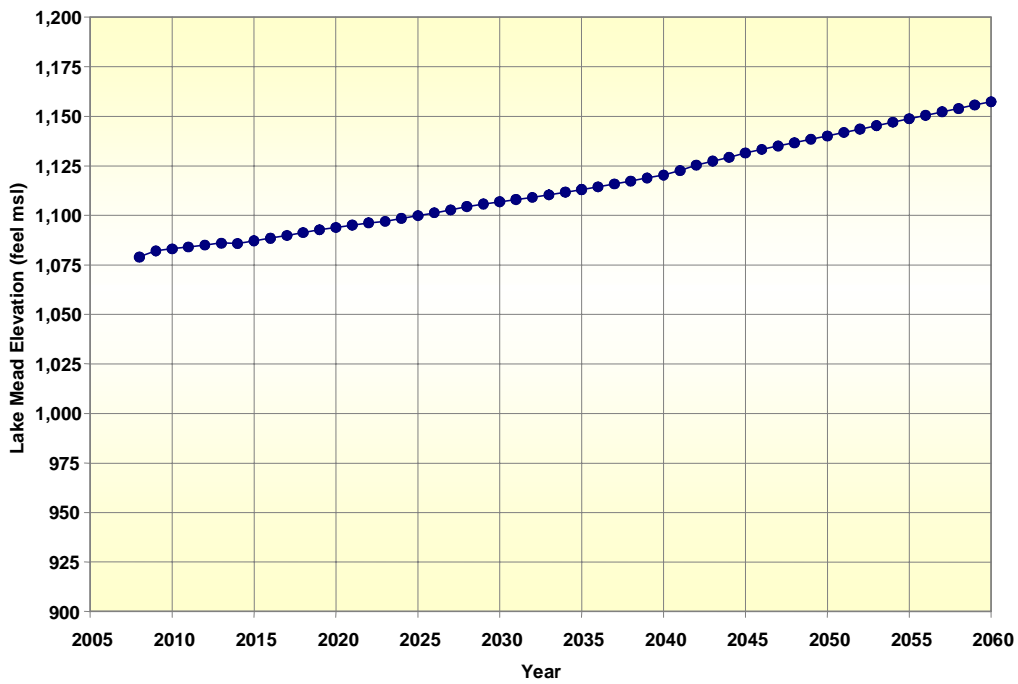
3 Each year, the Secretary makes a determination as to whether the consumptive use
4 requirements of mainstream users in the Lower Division states will be met under a Normal,
5 Surplus, or Shortage condition, in accordance with the Consolidated Decree and the LROC.
6 The LROC specify that the Secretary will consider all relevant factors in making a shortage
7 determination and list some of the factors to be considered. However, there is no specific
8 guidance as to exactly when, how, or to whom reductions in deliveries would be made.
9 Therefore, it is impossible to know exactly how the Secretary might make a shortage
10 determination in the future. Furthermore, conditions in the Colorado River Basin have been
11 such that there has not been a need to declare a Shortage condition and there is no actual
12 operating experience with regard to shortage determinations.

13 To obtain a reasonable representation of future conditions under no action (while not
14 representing official policy of the Department with regard to future determinations), the
15 following assumptions were made;

- 16 ◆ As used in modeling assumptions for previous environmental compliance documents,
17 shortage trigger elevations (Figure 2.2-1) were used to prevent Lake Mead's water
18 level from declining below elevation 1,050 feet msl with approximately an 80 percent
19 probability (known as a "Level 1 Shortage", Appendix A). In a given year, a shortage
20 (or reduction in deliveries) that ranges from approximately 350 to 500 kaf would be
21 imposed when the projected January 1 Lake Mead elevation is below the trigger
22 elevation for that year; and
- 23 ◆ If Lake Mead's elevation were to continue to decline, additional reductions would be
24 imposed to keep Lake Mead above 1,000 feet msl. This approach essentially provides
25 absolute protection of SNWA's lower intake (elevation 1,000 feet msl) at Lake Mead
26 and would reduce deliveries to water users (including SNWA) by amounts required to
27 maintain the Lake Mead water level at or above 1,000 feet msl.

28 In accordance with the Consolidated Decree, the CRBPA, and other key provisions of the
29 Law of the River, the Secretary has the authority to declare and allocate shortages to the
30 Lower Division states. Although some guidance exists with regard to how shortages would
31 be allocated (e.g., PPR deliveries must be met without regard to state lines, California does
32 not incur shortages until Arizona post-1968 contracts are reduced completely), there are no
33 specific guidelines in place to further inform the Secretary's decision with respect to how
34 shortages might be shared by the water users in Arizona, California and Nevada. In addition,
35 the determination of deliveries to Mexico is not a part of the proposed federal action. Any
36 such determination would be made in accordance with the 1944 Treaty (Section 1.7).

Figure 2.2-1
Level 1 Shortage Trigger Elevations Under No Action Alternative



1

2 Nevertheless, modeling assumptions with respect to the distribution of shortages for the
 3 Lower Division states and Mexico are necessary in order to analyze potential impacts to
 4 hydrologic and other environmental resources. These modeling assumptions were applied to
 5 the No Action Alternative as well as the action alternatives, i.e., the modeling assumptions
 6 with regard to the distribution of shortages are identical in all alternatives.

7 It was assumed that shortages would be allocated to each Lower Division state and Mexico
 8 based on percentages of the total shortage being applied. The modeling assumptions for
 9 distribution of shortages used in this Draft EIS are presented in Table 2.2-1. More detailed
 10 descriptions of these modeling assumptions are provided in Appendix A.

Table 2.2-1
Modeling Assumptions for Distribution of Shortages¹

Entity	Percentage of Total Shortage, Stage 1	Percentage of Additional Shortage, Stage 2 ²
Arizona	80.00	15 to 20
California	0.00	60 to 65
Nevada	3.33	3.33
Mexico	16.67	16.67
Total	100.00	100.00

1. These modeling assumptions do not reflect policy decisions and are not intended to constitute an interpretation or application of the 1944 Treaty. They have been developed for comparison of the alternatives.
 2. Shortage amounts presented in the Stage 2 column are incremental over the amount of shortages that would have already been allocated

under Stage 1.

1 Shortages are first imposed under Stage 1 and would be applied to the most junior users
2 within Arizona (those with post-1968 water rights, i.e., 4th and 5th priority rights within
3 Arizona) and Nevada (primarily the SNWA). Stage 1 shortages continue until the deliveries
4 to the post-1968 water rights holders in Arizona (including the CAP) are reduced to zero. The
5 maximum amount of Stage 1 shortages during the period of analysis is dependent on the
6 scheduled depletions for the post-1968 water rights holders and decreases over time from
7 approximately 1.8 maf in 2008 to 1.7 maf in 2060.

8 After deliveries to the 4th and 5th priority rights within Arizona are reduced to zero, additional
9 reductions are applied to Arizona, California, and Nevada. These shortages, referred to as
10 Stage 2 shortages, continue to the maximum necessary to keep Lake Mead elevation above
11 1,000 feet msl.

12 **2.2.2 Coordinated Reservoir Operations**

13 The No Action Alternative assumes Lake Powell's operation would follow the current
14 operating criteria as specified by the LROC and as implemented through the AOP process.
15 The three possible factors affecting the annual releases from Lake Powell are: 1) minimum
16 objective release; 2) storage equalization; and 3) spill avoidance.

17 Pursuant to the LROC, the objective under current operational conditions is to maintain a
18 minimum release of water from Lake Powell of 8.23 maf for the water year. Under the No
19 Action Alternative, a minimum release of 8.23 maf is assumed to be made each water year
20 unless storage equalization or spill avoidance determinations are in effect.

21 Annual releases from Lake Powell greater than the minimum objective release occur when
22 Upper Basin storage is greater than the storage required by 602(a) storage, and the storage in
23 Lake Powell is forecast to be greater than the storage in Lake Mead by the end of that water
24 year. Under these conditions, additional releases are made from Lake Powell to equalize the
25 storage in Lake Mead with the storage in Lake Powell by the end of the water year.

26 The 602(a) storage requirement specifies the amount of storage in Upper Basin reservoirs
27 necessary to assure deliveries to the Lower Basin in compliance with the Compact without
28 impairment to the annual consumptive use in the Upper Basin. If the 602(a) storage
29 requirement is not met, equalization does not occur. The LROC specifies that all relevant
30 factors including historic stream flows, the most critical period of record, the probabilities of
31 water supply, and estimated future depletions be considered when determining the 602(a)
32 storage amount.

33 In 2004, an Interim 602(a) Storage Guideline was adopted that specifies that through 2016,
34 the 602(a) storage requirement shall utilize a storage amount of not less than 14.85 maf
35 which corresponds to 3,630 feet msl for Lake Powell. Under the No Action Alternative, the
36 determination of 602(a) storage is consistent with the storage criterion and the provisions of
37 the Interim 602(a) Storage Guideline. The algorithm used to calculate the 602(a) storage
38 requirement is presented in Appendix A.

1 Annual release volumes from Lake Powell greater than the minimum objective of 8.23 maf
2 may also be made to avoid anticipated spills. An objective in the operation of Glen Canyon
3 Dam is to attempt to safely fill Lake Powell each summer. When carryover storage from the
4 previous year in combination with forecasted inflow is projected to exceed Lake Powell's
5 storage capacity, Reclamation schedules the release of the volumes of water needed to avoid
6 spills. Subject to actual inflows, Lake Powell is operated to reach storage of about 23.8 maf
7 in July (0.5 maf from full pool). In years when Lake Powell fills or nearly fills during the
8 summer, additional releases in the late summer and early winter are made to draw the
9 reservoir level down, so that there is at least 2.4 maf of vacant space in Lake Powell on
10 September 30 for flood protection. Under the No Action Alternative, it is assumed that spill
11 avoidance releases are made when necessary.

12 **2.2.3 Storage and Delivery of Conserved Water**

13 There is currently no mechanism in place for the storage and delivery of conserved system
14 and non-system waters in Lake Mead; therefore, the No Action Alternative assumes that
15 none will exist during the interim period.

16 **2.2.4 Interim Surplus Guidelines**

17 The ISG specify ranges of Lake Mead elevations and operational conditions that are used to
18 determine the availability of surplus water for each year during their effective term. The
19 elevation ranges are coupled with specific uses of surplus water so that if Lake Mead's
20 elevation declines, the amount of surplus water is reduced. The different surplus conditions
21 are described below:

22 **2.2.4.1 Flood Control Surplus**

23 If flood control releases are anticipated to be required given the current inflow forecast,
24 the Secretary declares Flood Control Surplus conditions for that year. The estimated
25 annual amount of surplus water available for pumping and release from Lake Mead (in
26 addition to the 7.5 maf normal apportionment) varies over time (2002 to 2016) and
27 ranges between 1.20 to 1.58 mafy. Under current practice, Mexico is allowed to schedule
28 up to an additional 200 thousand acre-feet (kaf) pursuant to the 1944 Treaty during flood
29 control years when water supplies exceed those required for use in the United States.

30 **2.2.4.2 Quantified Surplus (70R Strategy)**

31 If flood control releases are anticipated to be required assuming the 70th percentile inflow
32 (the inflow value from the historical record that has not been exceeded more than 30
33 percent of the time), the Secretary declares Quantified Surplus conditions for that year.
34 The estimated annual amount of surplus water available for pumping and release from
35 Lake Mead (in addition to the 7.5 maf normal apportionment) varies over time (2002 to
36 2016) and ranges between 1.02 to 1.45 mafy.

37 **2.2.4.3 Full Domestic Surplus (Lake Mead at or above Elevation 1,145 feet msl)**

38 If the projected January 1 Lake Mead elevation is at or above 1,145 feet msl but below
39 the elevation calculated by the 70R Strategy, the Secretary declares a Full Domestic
40 Surplus condition for that year. The projected annual amounts of surplus water available
41 for pumping and release from Lake Mead (in addition to the 7.5 maf normal

1 apportionment) vary over time (2002 to 2016) and range between 340 to 535 thousand
2 acre-feet per year (kafy).

3 **2.2.4.4 Partial Domestic Surplus (Lake Mead at or above Elevation 1,125 feet** 4 **msl)**

5 If the projected January 1 Lake Mead elevation is at or above 1,125 feet msl and below
6 1,145 feet msl, the Secretary declares Partial Domestic Surplus conditions for that year.
7 The estimated annual amounts of surplus water available for pumping and release from
8 Lake Mead (in addition to the 7.5 maf normal apportionment) vary over time (2002 to
9 2016) and range between 90 to 375 kafy.

10 **2.2.4.5 Normal and Shortage Conditions (Lake Mead below Elevation 1,125 feet** 11 **msl)**

12 If the projected January 1 Lake Mead elevation is at or below 1,125 feet msl, the
13 Secretary declares Normal conditions or Shortage conditions for that year.

14 Under the No Action Alternative, surplus determinations through 2016 would be as
15 described above. After 2016, it is assumed that surplus determinations would only be
16 based on the more conservative Quantified Surplus (70R Strategy) and Flood Control
17 Surplus conditions. Further details of these modeling assumptions to represent the ISG
18 are presented in Appendix A.

19 **2.3 Basin States Alternative**

20 The Basin States Alternative proposes a coordinated operation of Lake Powell and Lake Mead
21 that would minimize shortages in the Lower Basin and avoid risk of curtailments of use in the
22 Upper Basin. This alternative also provides a mechanism for promoting water conservation in the
23 Lower Basin. The formulation of the four elements for the Basin States Alternative follows.

24 **2.3.1 Shortage Guidelines**

25 The Basin States Alternative provides discrete stepped levels of shortage associated with
26 specific Lake Mead elevations as presented below. This alternative provides criteria for
27 shortages of up to a maximum of 600 kaf at Lake Mead elevation of 1,025 feet msl and
28 suggests that consultations between the Basin States and Reclamation would be undertaken
29 to define additional shortages below that elevation. The possible outcomes of such a
30 consultation process are unknown; therefore, for modeling purposes it was assumed that
31 shortages of 600 kaf would continue to be applied at Lake Mead elevations below 1,025 feet
32 msl. The stepped shortages modeled under the Basin States Alternative are as follows:

- 33 ♦ When Lake Mead is projected to be below elevation 1,075 feet msl and at or above
34 1,050 feet msl on January 1, a shortage of 400 kaf shall be declared for that year;
- 35 ♦ When Lake Mead is projected to be below elevation 1,050 feet msl and at or above
36 1,025 feet msl on January 1, a shortage of 500 kaf shall be declared for that year;

- 1 ♦ When Lake Mead is projected to be below elevation 1,025 feet msl on January 1, a
2 shortage of 600 kaf shall be declared for that year; and
- 3 ♦ When Lake Mead elevation approaches the top of the dead pool (895 feet msl), the
4 deliveries from Lake Mead are reduced to the amount of water available.

5 **2.3.2 Coordinated Reservoir Operations**

6 Under the Basin States Alternative, the annual Lake Powell release is based on a volume
7 of water in storage or corresponding elevation in Lake Powell and Lake Mead as
8 described below.

9 **2.3.2.1 Equalization**

10 The Basin States Alternative provides an elevation schedule (Table 2.3-1) that would be
11 used in determining when equalization releases would be made.

Table 2.3-1
Basin States Alternative
Lake Powell Equalization Elevations

Year	Reservoir Elevation (feet msl)
2008	3,636
2009	3,639
2010	3,642
2011	3,643
2012	3,645
2013	3,646
2014	3,648
2015	3,649
2016	3,651
2017	3,652
2018	3,654
2019	3,655
2020	3,657
2021	3,659
2022	3,660
2023	3,662
2024	3,663
2025	3,664
2026	3,666

12

13 When Lake Powell is at or above these specified elevations and when the volume of
14 Lake Powell is projected to be greater than the volume of Lake Mead at the end of the
15 water year, Lake Powell would release greater than 8.23 mafy to equalize its volume
16 with Lake Mead. Otherwise, 8.23 maf is released from Lake Powell.

2.3.2.2 Upper Elevation Balancing

When Lake Powell is below the elevations stated in Table 2.3-1 and is projected to be at or above 3,575 feet msl at the end of the water year, a release in the amount of 8.23 maf from Lake Powell would be made if the projected elevation of Lake Mead is at or above 1,075 feet msl at the end of the water year. If the projected end of water year elevation of Lake Mead is below 1,075 feet msl, the volumes of Lake Mead and Lake Powell would be balanced if possible, within the constraint that the release from Lake Powell would not be more than 9.0 maf and no less than 7.0 maf.

2.3.2.3 Mid-Elevation Releases

When Lake Powell elevation is projected to be below 3,575 feet msl and at or above 3,525 feet msl at the end of the water year, a release in the amount of 7.48 maf would be made if the projected end of water year elevation of Lake Mead is at or above 1,025 feet msl. If the projected end of water year elevation of Lake Mead is below 1,025 feet msl, a release of 8.23 maf from Lake Powell would be made.

2.3.2.4 Lower Elevation Balancing

When the projected end of water year elevation of Lake Powell is below 3,525 feet msl, Lake Mead and Lake Powell would be balanced if possible, within the constraint that the release from Lake Powell would not be more than 9.5 maf and no less than 7.0 maf.

2.3.3 Storage and Delivery of Conserved Water

The Basin States Alternative includes the adoption of a mechanism to encourage and account for augmentation and conservation of water supplies, e.g., fallowing of land, canal lining and other system efficiency improvements, and introduction of non-system water in the Lower Basin. The mechanism, referred to as Intentionally Created Surplus (ICS), provides for creating and delivering the credit water.

In addition to increasing the flexibility of meeting water use needs from Lake Mead, the ICS mechanism would benefit the system through Lake Mead storage credits. At the time the ICS credits are created, five percent of the ICS credits would be dedicated to the system on a one-time basis. Additionally, ICS credits stored in Lake Mead longer than one year would be subject to annual evaporation losses of three percent per year. If flood control releases occur, ICS credits would be reduced on a pro-rata basis among all holders of ICS credits until no credits remain, i.e., ICS credit water would be released first.

The maximum amount of ICS credits that can be created during any year, the maximum cumulative amount of ICS credits that can be available at any one time, and the maximum amount of ICS credits that may be recovered by each Basin State in any one year under this alternative are presented in Table 2.3-2.

Table 2.3-2
Basin States Alternative
Volume Limitations of Storage and Delivery Mechanism

Entity	Maximum Annual Storage of Conserved System or Non-system Water (kaf)	Maximum Total Storage of Conserved System or Non-system Water (kaf)	Maximum Annual Delivery of Conserved System or Non-system Water (kaf)
Arizona	100	300	300
California	400	1,500	400
Nevada	125	300	300
Total	625	2,100	1,000

1

2 **2.3.4 Interim Surplus Guidelines**

3 The Basin States Alternative includes both a modification and an extension of the ISG. The
4 ISG would be extended through 2026 and be modified by eliminating the Partial Domestic
5 Surplus condition, beginning in 2008, and limiting the amount of water available under the
6 Full Domestic Surplus condition during the period 2017 through 2026.¹ The elimination of
7 the Partial Domestic Surplus condition reduces the amount of surplus water that could be
8 made available and leaves more water in storage to reduce the severity of future shortages.

9 **2.4 Conservation Before Shortage Alternative**

10 The Conservation Before Shortage Alternative was developed by a coalition of NGOs, including
11 Defenders of Wildlife, Environmental Defense, National Wildlife Federation, Pacific Institute,
12 Sierra Club, Sonoran Institute, The Nature Conservancy, and the Rivers Foundation of the
13 Americas. The Conservation Before Shortage Alternative includes voluntary, compensated
14 reductions in water use to minimize involuntary shortages in the Lower Basin and avoid risk of
15 curtailments of use in the Upper Basin. This alternative also provides a mechanism for
16 promoting water conservation in the Lower Basin by expanding the ICS mechanism. The
17 formulation of the four elements for the Conservation Before Shortage Alternative follows.

18 **2.4.1 Shortage Guidelines**

19 Although the Conservation Before Shortage Alternative does not include stepped,
20 involuntary shortages, it does include voluntary conservation levels similar to the Basin
21 States Alternative shortage levels described in Section 2.3. These voluntary conservation
22 levels are described below.

¹ During 2017 through 2026, the distribution of Domestic Surplus water would be limited as follows: 1) for use by MWD, 250 kafy in addition to the amount of California's basic apportionment available to MWD; 2) for use by SNWA, 100 kafy in addition to the amount of Nevada's basic apportionment available to SNWA; and 3) for use in Arizona, 100 kafy in addition to the amount of Arizona's basic apportionment available to Arizona contractors.

1 This alternative provides a shortage strategy that would absolutely protect Lake Mead
 2 elevation of 1,000 feet msl whereby water deliveries would be reduced by the amount
 3 required to maintain Lake Mead elevations at or above 1,000 feet msl.

4 **2.4.2 Coordinated Reservoir Operations**

5 The Conservation Before Shortage Alternative assumes the same coordinated reservoir
 6 operations as the Basin States Alternative described in Section 2.3.

7 **2.4.3 Storage and Delivery of Conserved Water**

8 The conservation triggers proposed under this alternative are as follows:

- 9 ◆ When Lake Mead is projected to be below elevation 1,075 feet msl and at or above
 10 1,050 feet msl on January 1, the Secretary will seek the conservation of 400 kaf of
 11 water;
- 12 ◆ When Lake Mead is projected to be below elevation 1,050 feet msl and at or above
 13 1,025 feet msl on January 1, the Secretary will seek the conservation of 500 kaf of
 14 water; and
- 15 ◆ When Lake Mead is projected to be below 1,025 feet msl on January 1, the Secretary
 16 will seek the conservation of 600 kaf of water.

17 The ICS credits would be generated by activities similar to those described in the Basin
 18 States Alternative (Section 2.3). In addition, participation in the ICS program would be
 19 expanded to include other entities as shown in Table 2.4-1.

20 The maximum amount of ICS credits that can be created during any year, the maximum
 21 cumulative amount of ICS credits that can be available at any one time, and the maximum
 22 amount of ICS credits that may be recovered by each entity in any one year under this
 23 alternative are presented in Table 2.4-1.

Table 2.4-1
 Conservation Before Shortage Alternative
 Volume Limitations of Storage and Delivery Mechanism

Entity	Maximum Annual Storage of Conserved System or Non-system Water (kaf)	Maximum Total Storage of Conserved System or Non-system Water (kaf)	Maximum Annual Delivery of Conserved System or Non-system Water (kaf)
Arizona	100	300	300
California	400	1,500	400
Nevada	125	300	300
Unassigned	825	2,100	600
Total	1,450	4,200	1,600

24

2.4.4 Interim Surplus Guidelines

The Conservation Before Shortage Alternative assumes the same modifications to and extension of the term of the ISG as described under the Basin States Alternative (Section 2.3).

2.4.5 Funding Mechanisms

There are two other aspects of the Conservation Before Shortage Proposal that are unique to the Conservation Before Shortage Proposal: a proposed funding mechanism for the voluntary conservation program and a recommendation that a portion of the conserved water be used to benefit the environment. The details of the modeling assumptions used to simulate the storage and delivery of conserved water, including water for environmental purposes, are presented in Appendix M.

The proposal described potential funding sources that include a Federal government contribution for the cost of all conservation agreements up to the volume of the bypass flow that the Secretary has not otherwise replaced in the year that a conservation trigger becomes effective and responsibility for half of the cost of any additional agreements required to generate the proposed voluntary, conserved water. A second component of the funding mechanism would be a “Power Pool Protection Fund” which proposes that a percentage of the funding for the proposed voluntary conservation program be derived from a conditional surcharge on power rates under existing or renewed contracts for hydropower produced at Hoover Dam, depending upon the storage in Lake Mead. A third component of the funding mechanism would be “Temporary Cost Recovery/Delivery Surcharges”, requiring that the cost of some portion of the conservation agreements, including those with Colorado River users in Mexico, be funded through a conservation surcharge imposed on a per-acre-foot basis on water deliveries to all Lower Basin contractors.

The viability of Conservation Before Shortage program funding proposal is not known at this time. The Department currently does not have the authority to implement all facets of this proposal and additional legislation would be necessary to gain such authority.

2.5 Water Supply Alternative

The Water Supply Alternative is intended to maximize water deliveries at the expense of retaining water in storage in the reservoirs for future use. This alternative would implement shortages only when insufficient water to meet entitlements is available in Lake Mead. The formulation of the four elements for the Water Supply Alternative follows.

2.5.1 Shortage Guidelines

Under the Water Supply Alternative, shortages would not be imposed until Lake Mead nears elevation 895 feet msl (top of the dead pool). Near that elevation, releases would be limited to the amount of water available. However, when Lake Mead elevation drops below 1,000 feet msl SNWA would be unable to take water through its lower intake.

2.5.2 Coordinated Reservoir Operations

When Lake Powell elevation is projected to be above 3,575 feet msl at the end of the water year, the operation of Lake Powell is the same as the No Action Alternative unless Lake Mead elevation is below 1075 feet msl. When Lake Powell elevation is projected to be below 3,575 feet msl at the end of the water year or Lake Mead elevation is projected to be below 1,075 feet msl at the end of the water year, the volumes of Lake Powell and Lake Mead would be balanced if possible, within the constraint that the release from Lake Powell would not be more than 9.5 maf and no less than 7.0 maf.

2.5.3 Storage and Delivery of Conserved Water

The Water Supply Alternative does not include a mechanism for the storage and delivery of conserved system and non-system water in Lake Mead.

2.5.4 Interim Surplus Guidelines

Under this alternative, the existing ISG would be extended through 2026.

2.6 Reservoir Storage Alternative

The Reservoir Storage Alternative was developed in coordination with the cooperating agencies and other stakeholders, primarily Western and the NPS. This alternative would keep more water in storage in Lake Powell and Lake Mead by reducing water deliveries and increasing shortages to benefit power and recreational interests. This alternative also provides a mechanism for promoting water conservation in the Lower Basin. The formulation of the four elements for the Reservoir Storage Alternative follows.

2.6.1 Shortage Guidelines

The Reservoir Storage Alternative is similar to the Basin States Alternative in that it provides discrete stepped levels of shortage associated with specific Lake Mead reservoir elevations (Section 2.3). However, shortages in this alternative begin at a higher Lake Mead elevation and the stepped shortages are larger so that more water would be retained in storage and higher Lake Powell and Lake Mead elevations would be maintained. The Reservoir Storage Alternative does not contain provisions that would protect the Lake Mead elevation of 1,000 feet msl.

The stepped shortages under this alternative are as follows:

- ◆ When Lake Mead is projected to be below elevation 1,100 feet msl and at or above 1,075 feet msl on January 1, a shortage of 600 kaf would be imposed for that year;
- ◆ When Lake Mead is projected to be below elevation 1,075 feet msl and at or above 1,050 feet msl on January 1, a shortage of 800 kaf would be imposed for that year;
- ◆ When Lake Mead is projected to be below elevation 1,050 feet msl and at or above 1,025 feet msl on January 1, a shortage of 1,000 kaf would be imposed for that year; and

- 1 ♦ When Lake Mead is projected to be below 1,025 feet msl on January 1, a shortage of
2 1,200 kaf would be imposed for that year.

3 **2.6.2 Coordinated Reservoir Operations**

4 When Lake Powell elevation is projected to be above 3,595 feet msl at the end of the water
5 year, the operation of Lake Powell would be the same as under the No Action Alternative.
6 Elevations at Lake Powell that trigger releases that are less than the minimum objective
7 release of 8.23 maf are tied to critical recreation elevations at Lake Powell as follows:

- 8 ♦ When Lake Powell elevation is projected to be below 3,595 feet msl and above 3,560
9 feet msl at the end of the water year, a release in the amount of 7.80 maf from Lake
10 Powell would be made; and
- 11 ♦ When Lake Powell elevation is projected to be below 3,560 feet msl at the end of the
12 water year, the volumes of Lake Powell and Lake Mead would be balanced if
13 possible, within the constraint that the release from Lake Powell would not be more
14 than 9.5 maf and no less than 7.8 maf.

15 **2.6.3 Storage and Delivery of Conserved Water**

16 Under the Reservoir Storage Alternative, storage credits would be generated by activities
17 similar to those described under the Basin States Alternative (Section 2.3). Participation in
18 the storage mechanism would include the entities as shown in Table 2.6-1.

19 The maximum amount of ICS credits that can be created during any year, the maximum
20 cumulative amount of ICS credits that can be available at any one time, and the maximum
21 amount of ICS credits that may be recovered by each entity in any one year under this
22 alternative are presented in Table 2.6-1.

Table 2.6-1
Reservoir Storage Alternative
Volume Limitations of Storage and Delivery Mechanism

Entity	Maximum Annual Storage of Conserved System or Non-system Water (kaf)	Maximum Total Storage of Conserved System or Non-system Water (kaf)	Maximum Annual Delivery of Conserved System or Non-system Water (kaf)
Arizona	100	300	300
California	400	1,500	400
Nevada	125	300	300
Unassigned	475	950	950
Total	1,100	3,050	1,950

24 **2.6.4 Interim Surplus Guidelines**

25 Under the Reservoir Storage Alternative, the permissive provisions of the existing ISG are
26 terminated in 2007 and surplus determinations revert to the Quantified Surplus and Flood
27 Control Surplus conditions during the period beginning in 2008 and ending in 2026.

1 **2.7 Summary Comparison of Alternatives**

2 A summary comparison of the alternatives identified and analyzed is provided in Table 2.7-1
3 through Table 2.7-3 for Lake Powell and Lake Mead.

4

5

6

Table 2.7-1
Matrix of Alternatives

Alternatives	Shortage Guidelines to reduce deliveries from Lake Mead (elevations in feet msl)	Coordinated Reservoir Operations (Lake Mead & Lake Powell) (elevations in feet msl)	Lake Mead Storage and Delivery of Conserved System or Non-system Water	Interim Surplus Guidelines for deliveries/releases from Lake Mead
No Action	<ul style="list-style-type: none"> Determination made through the AOP process, absent shortage guidelines Reasonably represented by a two-level shortage strategy - probabilistic protection of Lake Mead elevation 1,050 and absolute protection of Lake Mead elevation 1,000 	<ul style="list-style-type: none"> Minimum objective release of 8.23 maf from Lake Powell unless storage equalization releases are required Operation at low reservoir levels reasonably represented by a 8.23 maf release from Lake Powell down to Lake Powell dead pool 	<ul style="list-style-type: none"> No water management mechanism for storage and delivery of conserved system and/or non-system water 	<ul style="list-style-type: none"> No modification or extension of the ISG which end in 2016 After 2016, determination made through the AOP process, absent surplus guidelines; reasonably represented by the spill avoidance (referred to as the 70R Strategy)
Basin States	<ul style="list-style-type: none"> Shortages (i.e., reduced deliveries) of 400, 500, and 600 kaf from Lake Mead at elevations 1,075, 1,050, and 1,025 respectively Initiate efforts to develop additional guidelines for shortages if Lake Mead falls below elevation 1,025 (Note: includes reconsultation with Basin States) 	<ul style="list-style-type: none"> Under high reservoir conditions, minimum objective release of 8.23 maf from Lake Powell unless storage equalization releases are required Under lower reservoir conditions, either reduce Lake Powell release or balance volumes depending upon elevations at Lake Powell and Lake Mead 	<ul style="list-style-type: none"> Storage and delivery of conserved system and/or non-system water Maximum total storage for conserved system and/or non-system water in Lake Mead of 2.1 maf System assessment of 5 percent of stored conserved system and/or non-system water 	<ul style="list-style-type: none"> Modification of ISG to eliminate Partial Domestic Surplus condition Extension of the modified guidelines through 2026
Conservation Before Shortage	<ul style="list-style-type: none"> Shortages are implemented in any given year when necessary to keep Lake Mead above SNWA's lower intake at elevation 1,000 (absolute protection of elevation 1,000) 	<ul style="list-style-type: none"> Under high reservoir conditions, minimum objective release of 8.23 maf from Lake Powell unless storage equalization releases are required Under lower reservoir conditions, either reduce Lake Powell release or balance volumes depending upon elevation at Lake Powell and Lake Mead 	<ul style="list-style-type: none"> Prior to shortage, conservation of different volumes of water tied to Lake Mead elevation Storage and delivery of conserved system and/or non-system water Water for environmental uses Maximum total storage of conserved system and/or non-system water greater than 4.2 maf System assessment of 5 percent of stored conserved system and/or non-system water 	<ul style="list-style-type: none"> Modification of ISG to eliminate Partial Domestic Surplus condition Extension of the modified guidelines through 2026
Water Supply	<ul style="list-style-type: none"> Release full annual entitlement amounts until Lake Mead is drawn down to dead pool (elevation 895) 	<ul style="list-style-type: none"> Minimum objective release of 8.23 maf from Lake Powell unless storage equalization releases are required Balancing if Lake Powell is below elevation 3,575 or Lake Mead is below elevation 1,075 	<ul style="list-style-type: none"> No water management mechanism for storage and delivery of conserved system and/or non-system water 	<ul style="list-style-type: none"> Extension of the existing ISG through 2026
Reservoir Storage	<ul style="list-style-type: none"> Shortages (i.e. reduced deliveries) of 600, 800, 1,000, and 1,200 kaf from Lake Mead at elevations 1,100, 1,075, 1,050, and 1,025 respectively 	<ul style="list-style-type: none"> Minimum objective release of 8.23 maf from Lake Powell if Lake Powell is above elevation 3,595 unless storage equalization releases are required 7.8 maf release from Lake Powell between Lake Powell elevations of 3,560 and 3,595 Balancing below Lake Powell elevation of 3,560 	<ul style="list-style-type: none"> Storage and delivery of conserved system and/or non-system water Maximum total storage of conserved system and/or non-system water of 3.05 maf System assessment of 10 percent of stored conserved system and/or non-system water 	<ul style="list-style-type: none"> Permissive provisions of existing ISG terminate in 2007, and during period from 2008 to 2026, surplus determinations are limited to Quantified and Flood Control conditions

Table 2.7-2
Comparison of Alternatives – Lake Powell

Lake Powell Elevation (feet msl)	No Action Alternative	Basin States Alternative	Conservation Before Shortage Alternative	Water Supply Alternative	Reservoir Storage Alternative	Lake Powell Storage (maf)
3,700	Equalize or Release 8.23 maf	Equalize or Release 8.23 maf	Equalize or Release 8.23 maf	Equalize or Release 8.23 maf	Equalize or Release 8.23 maf	24.3
Equalization	602(a) Release 8.23 maf	Upper Equalization Line Release 8.23 maf; if Lake Mead < 1,075 feet msl, balance contents with a min/max release of 7.0 and 9.0 maf	Upper Equalization Line Release 8.23 maf; if Lake Mead < 1,075 feet msl, balance contents with a min/max release of 7.0 and 9.0 maf	602(a) Release 8.23 maf; if Lake Mead < 1,075 feet msl, balance contents with a min/max release of 7.0 and 9.5 maf	602(a) Release 8.23 maf	Equalization
3,595						11.3
3,575					Release 7.8 maf	9.5
3,560		Release 7.48 maf; if Lake Mead < 1,025 feet msl, release 8.23 maf	Release 7.48 maf; if Lake Mead < 1,025 feet msl, release 8.23 maf	Balance contents with a min/max release of 7.0 and 9.5 maf		8.3
3,525					Balance contents with a min/max release of 7.8 and 9.5 maf	5.9
3,490		Balance contents with a min/max release of 7.0 and 9.5 maf	Balance contents with a min/max release of 7.0 and 9.5 maf			4.0
3,370						0

Table 2.7-3
Comparison of Alternatives – Lake Mead

Lake Mead Elevation (feet msl)	No Action Alternative	Basin States Alternative	Conservation Before Shortage Alternative	Water Supply Alternative	Reservoir Storage Alternative	Lake Mead Storage (maf)
1,220	Flood Control Surplus	Flood Control Surplus	Flood Control Surplus	Flood Control Surplus	Flood Control Surplus	25.9
1,200	Full Domestic Surplus (through 2016)	Full Domestic Surplus	Full Domestic Surplus	Full Domestic Surplus	Normal Operations	22.9
1,145	Partial Domestic Surplus (through 2016)	Normal Operations	Normal Operations	Partial Domestic Surplus		15.9
1,125	Normal Operations			Normal Operations		13.9
1,100						11.5
1,075	Shortage 80 Percent Protection of elevation 1,050 feet msl	Shortage 400 kaf			Shortage 600 kaf	9.4
1,050		Shortage 500 kaf	Voluntary Conservation		Shortage 800 kaf	7.5
1,025		Shortage 600 kaf and Reconsultation			Shortage 1,000 kaf	5.8
1,000	Shortage Absolute Protection of elevation 1,000 feet msl		Shortage Absolute Protection of elevation 1,000 feet msl		Shortage 1,200 kaf	4.3
895						0

1 **2.8 Summary of Potential Effects**

- 2 Table 2.8-1 presents a summary of the potential effects of the alternatives. Chapter 4 contains
- 3 detailed descriptions of these effects.

Table 2.8-1
Summary of Potential Effects of the Alternatives

Draft EIS Section	Consequences by Resource, Year and Value	Alternatives				
		No Action	Basin States	Conservation Before Shortage	Water Supply	Reservoir Storage
4.3	Hydrologic Resources					
	Probability of Glen Canyon annual release volumes ≥ 7.5 maf, 2009 to 2060	100%	96.3%	96.3%	97.4%	100%
	Probability of Glen Canyon annual release volumes ≥ 8.23 maf, 2009 to 2060	99.7%	96.3%	96.3%	96.3%	94.0%
	Lake Powell March elevation, probability of elevations ≤ 3,490 feet msl, 2026	1.0%	0%	0%	8.0%	0%
	Lake Mead December elevation, probability of elevations ≤ 1,050 feet msl, 2026	26.0%	20.0%	20.0%	21.0%	4.0%
	Hoover Dam annual release, 2026 50 th percentile values	9.1 maf	9.2 maf	9.1 maf	9.4 maf	8.7 maf
4.4	Water Deliveries					
	Probability of involuntary Shortage, 2026	47%	35%	8%	9%	37%
	Probability of voluntary and involuntary Shortage, 2026	47%	35%	33%	9%	37%
	Probability of Normal deliveries	35%	26%	29%	52%	47%
4.5	Probability of Surplus	17%	38%	37%	39%	16%
	Water Quality					
	Temperature at Little Colorado River, July 2026, 50 th percentile	10 to 14 °C	10 to 15°C	10 to 15°C	10 to 15°C	10 to 13°C
4.6	Lake Mead release temperature, July 2026, 50 th percentile	13 to 18°C	13 to 18°C	13 to 18°C	13 to 18°C	12 to 16°C
	Salinity below Parker Dam, 2026	624 mg/L	628 mg/L	629 mg/L	637 mg/L	619 mg/L
	Salinity at Imperial Dam, 2026	744 mg/L	751 mg/L	756 mg/L	764 mg/L	740 mg/L
	Air Quality					
4.6	Lake Powell 2026, 10 th percentile lake elevation, exposed shoreline	17,000 acres	17,000 acres	17,000 acres	21,000 acres	14,000 acres
	Lake Mead 2026, 10 th percentile lake elevation, exposed shoreline	87,000 acres	84,000 acres	85,000 acres	86,000 acres	72,000 acres

Table 2.8-1
Summary of Potential Effects of the Alternatives

Draft EIS Section	Consequences by Resource, Year and Value	Alternatives					
		No Action	Basin States	Conservation Before Shortage	Water Supply	Reservoir Storage	
4.7	Visual Resources						
	Lake Powell maximum height of calcium carbonate ring, 10 th percentile lake elevation, 2026	160 feet	150 feet	150 feet	195 feet	160 feet	
4.8	Lake Mead maximum height of calcium carbonate ring, 10 th percentile lake elevation, 2026	209 feet	209 feet	209 feet	210 feet	208 feet	
	Biological Resources ¹						
4.9	Effects on Vegetation and Wildlife						
	Lakes Powell and Mead	-	None	None	Minor negative	Minor positive	
4.10	Glen Canyon Dam to Lake Mead	-	Minor negative	Minor negative	Minor negative	Minor negative	
	Hoover Dam to NIB	-	None to minor negative	None to minor negative	Minor positive to none	Minor negative	
4.9	NIB to SIB	-	None	Moderate positive	None	Moderate positive	
	Effects on Special Status Species						
4.9	Glen Canyon Dam to Lake Mead humpback chub	-	None	None	Minor positive	Minor negative	
	Parker Dam to Imperial Dam Yuma clapper rail	-	None	None	Minor positive	Minor negative	
4.9	NIB to SIB	-	None	Moderate positive	None	Moderate positive	
	Southwestern willow flycatcher						
4.9	Cultural Resources						
	Number of Lake Powell sites potentially exposed, 10 th percentile lake elevation	193 sites	190 sites	190 sites	222 sites	193 sites	
4.10	Probability of exposing 32 Lake Mead sites, elevation ≤ 1,080 feet msl, 2026	43%	44%	44%	48%	22%	
	Indian Trust Assets ¹						
4.10	Water rights affected	-	None	None	None	None	
	Trust land affected	-	None	None	None	None	

Table 2.8-1
Summary of Potential Effects of the Alternatives

Draft EIS Section	Consequences by Resource, Year and Value	Alternatives				
		No Action	Basin States	Conservation Before Shortage	Water Supply	Reservoir Storage
4.11	Electrical Power Resources					
	Glen Canyon Powerplant					
	Average annual generation and percent change from No Action Alternative value	4,265,749 MWh	(0.25)%	(0.21)%	(2.2)%	0.63%
	Average monthly capacity and percent change from No Action Alternative value	603 MW	0.57%	0.60%	(1.9)%	1.6%
	Average total economic value and percent change from No Action Alternative value	\$6,808,948,737	(0.07)%	(0.04)%	(2.05)%	0.92%
	Hoover Powerplant					
	Average annual generation and percent change from No Action Alternative value	3,156,820 MWh	0.46%	0.59%	(1.5)%	8.7%
	Average monthly capacity and percent change from No Action Alternative value	1,201 MW	1.1%	1.3%	(1.9)%	11.3%
	Average total economic value and percent change from No Action Alternative value	\$7,350,904,219	1.03%	1.22%	(1.20)%	10.1%
	Davis and Parker Powerplants					
	Average annual generation and percent change from No Action Alternative value	1,618,736 MWh	(0.58)%	(0.69)%	0.1%	(1.1)%
	Average monthly capacity and percent change from No Action Alternative value	331 MW	0%	0%	0%	0%
	Average total economic value and percent change from No Action Alternative value	\$2,242,612,717	(0.55)%	(0.73)%	0.28%	(1.6)%
	Headgate Rock Powerplant					
	Average annual generation and percent change from No Action Alternative value	77,386 MWh	(1.2)%	(1.6)%	(0.29)%	(1.8)%
	Average monthly capacity and percent change from No Action Alternative value	not applicable	not applicable	not applicable	not applicable	not applicable
	Average total economic value and percent change from No Action Alternative value	\$102,892,840	(1.3)%	(1.9)%	(0.19)%	(2.5)%

Table 2.8-1
Summary of Potential Effects of the Alternatives

Draft EIS Section	Consequences by Resource, Year and Value	Alternatives				
		No Action	Basin States	Conservation Before Shortage	Water Supply	Reservoir Storage
4.12	Recreation					
	Lake Powell					
	Probability of closure, Wahweap and lower Bullfrog launch ramps, 2026	6%	8%	8%	20%	2%
	Probability of navigation closures, Castle Rock, Gregory Butte, 2026	29%	36%	36%	47%	21%
	Effects on sport fish	-	None	None	None	None
	Lake Mead					
	Probability of closure, Pearce Bay launch ramp, 2026	76%	76%	77%	78%	68%
	Probability of closure, Echo Bay launch ramp, 2026	26%	20%	22%	21%	4%
	Probability of navigation difficulties, upper Lake Mead, 2026	74%	73%	73%	77%	65%
4.13	Transportation ¹					
	Probability of Lake Powell ferry closure, end of September 2026	4%	6%	6%	17%	1%
	Effects on Colorado River ferry	-	None	None	Slight increase	Slight decrease
	Effects on Lake Havasu ferry service	-	None	None	None	None

Table 2.8-1
Summary of Potential Effects of the Alternatives

Draft EIS Section	Consequences by Resource, Year and Value	Alternatives				
		No Action	Basin States	Conservation Before Shortage	Water Supply	Reservoir Storage
4.14	Socioeconomics and Land Use ¹					
	Agricultural production and effects on employment, income, and tax revenues in Arizona, 2026	46%	35%	7%	9%	37%
	Agricultural production and effects on employment, income, and tax revenues in Arizona, 2060	79%	63%	65%	80%	67%
	Agricultural production and resulting effects on employment, income, and tax revenues in California and Nevada	-	None	None	None	None
	Recreation spending at Lake Powell	-	Same	Same	Decrease	Increase
	Recreation spending at Lake Mead (LMNRA)	-	Same	Same	Same	Increase
	Change in river recreation economic activity					
	Lake Powell to Lake Mead	-	None	None	None	None
	Downstream of Lake Mead	-	None	None	None	None
	Change in economic activity in Municipal & Industrial sector					
Arizona	-	None	None	None	None	
Nevada	-	None	None	None	None	
California	-	None	None	None	None	
4.15	Environmental Justice	-	None	None	None	None

Note: ¹⁾ "None" after a hyphen under the No Action Alternative column means no difference between that alternative and the No Action Alternative.

1

2

This page intentionally left blank.

3