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1 ES.1 Background

2 The Secretary of the United States Department of the Interior (Secretary), acting through the
3 Bureau of Reclamation (Reclamation), proposes to adopt specific interim guidelines for
4 Colorado River Lower Basin (Lower Basin) shortages and coordinated operations for Lake
5 Powell and Lake Mead, particularly under drought and low reservoir conditions.

6 Reclamation, as the agency that is designated to act on the Secretary's behalf with respect to
7 operation of Glen Canyon Dam and Hoover Dam and managing the mainstream waters of the
8 lower Colorado River pursuant to federal law, is the lead federal agency for the purposes of
9 compliance pursuant to the National Environmental Policy Act of 1969 (NEPA) for the
10 development and implementation of the proposed interim guidelines. Five federal agencies are
11 cooperating for purposes of assisting with environmental analysis and preparation of the Draft
12 EIS. The cooperating agencies are the Bureau of Indian Affairs (BIA), United States Fish and
13 Wildlife Service (FWS), National Park Service (NPS), Western Area Power Administration
14 (Western), and the United States Section of the International Boundary and Water Commission
15 (USIBWC).

16 The Draft EIS includes six chapters as outlined below:

- 17 ◆ Chapter 1: Purpose and Need;
- 18 ◆ Chapter 2: Description of Alternatives;
- 19 ◆ Chapter 3: Affected Environment;
- 20 ◆ Chapter 4: Environmental Consequences;
- 21 ◆ Chapter 5: Other Considerations and Cumulative Impacts; and
- 22 ◆ Chapter 6: Consultation and Coordination.

23 ES.1.1 Purpose and Need for Action

24 During the period of 2000 through 2006, the Colorado River Basin experienced the worst
25 drought conditions in approximately one hundred years of recorded history. During this
26 period, storage in Colorado River reservoirs has dropped from nearly full to less than 60
27 percent of capacity at the end of 2006. Currently, the Department of the Interior
28 (Department) does not have specific operational guidelines in place to define the
29 circumstances under which the Secretary would reduce the annual amount of water available
30 for consumptive use from Lake Mead nor to address the coordinated operations of Lake
31 Powell and Lake Mead during drought and low reservoir conditions.

32 The purpose of the proposed federal action is to: 1) improve Reclamation's management of
33 the Colorado River by considering tradeoffs between frequency and magnitude of reductions
34 of water deliveries, and considering the effects on water storage in Lake Powell and Lake
35 Mead, and on water supply, power production, recreation, and other environmental

1 resources; 2) provide mainstream United States users of Colorado River water, particularly
2 those in the Lower Division states, a greater degree of predictability with respect to the
3 amount of annual water deliveries in future years, particularly under drought and low
4 reservoir conditions; and 3) provide additional mechanisms for the storage and delivery of
5 water supplies in Lake Mead.

6 **ES.1.2 Proposed Federal Action**

7 The proposed federal action includes the adoption of specific interim guidelines for Lower
8 Basin shortages and coordinated operations for Lake Powell and Lake Mead. These interim
9 guidelines would remain in effect for determinations to be made through 2025 regarding
10 water supply and reservoir operating decisions through 2026 and would provide guidance
11 each year in development of the Annual Operating Plan for Colorado River Reservoirs
12 (AOP). This proposed federal action considers four operational elements that collectively are
13 designed to address the purpose and need for the proposed federal action.

14 The interim guidelines would be used by the Secretary to:

- 15 ◆ Determine those circumstances under which the Secretary would reduce the annual
16 amount of water available for consumptive use from Lake Mead to the Colorado
17 River Lower Division states (Arizona, California, and Nevada) below 7.5 million
18 acre-feet (maf) (a “Shortage”) pursuant to Article II(B)(3) of the United States
19 Supreme Court in the case of *Arizona v. California*, 547 U.S. ____ (2006)
20 (Consolidated Decree);
- 21 ◆ Define the coordinated operation of Lake Powell and Lake Mead to provide improved
22 operation of these two reservoirs, particularly under low reservoir conditions;
- 23 ◆ Allow for the storage and delivery, pursuant to applicable federal law, of conserved
24 Colorado River system and non-system water in Lake Mead to increase the flexibility
25 of meeting water use needs from Lake Mead, particularly under drought and low
26 reservoir conditions; and
- 27 ◆ Determine those conditions under which the Secretary may declare the availability of
28 surplus water for use within the Lower Division states. The proposed federal action
29 would modify the substance of the existing Interim Surplus Guidelines (ISG),
30 published in the Federal Register on January 25, 2001 (66 Fed. Reg. 7772), and the
31 term of the ISG from 2016 to 2026.

ES.1.3 Geographic Scope

The geographic region that could potentially be affected by the proposed federal action begins with Lake Powell and extends downstream along the Colorado River floodplain to the Southerly International Boundary (SIB) with Mexico. In addition to the potential impacts that may occur within the river corridor, the alternatives may also affect the water supply that is available to specific Colorado River water users in the Lower Basin. The following water agency service areas are also included in the appropriate affected environment discussions:

- ◆ Arizona water users, particularly the lower priority water users located in the Central Arizona Project service area;
- ◆ The Southern Nevada Water Authority service area; and
- ◆ The Metropolitan Water District of Southern California service area.

Figure ES-1 shows the geographic scope for the Draft EIS.

ES.1.4 Alternatives

Five alternatives are considered and analyzed in the Draft EIS. The alternatives consist of a No Action Alternative and four action alternatives. The four action alternatives are: Basin States Alternative, Conservation Before Shortage Alternative, Water Supply Alternative, and Reservoir Storage Alternative. The action alternatives reflect input from Reclamation staff, the cooperating agencies, stakeholders, and other interested parties.

Reclamation received two written proposals for alternatives that met the purpose and need of the proposed federal action, one from the seven Colorado River Basin States (Basin States) and another from a consortium of environmental non-governmental organizations (NGO). These proposals were used by Reclamation to formulate two of the alternatives considered and analyzed in the Draft EIS (Basin States Alternative and Conservation Before Shortage Alternative, respectively). A third alternative (Water Supply Alternative) was developed by Reclamation and a fourth alternative (Reservoir Storage Alternative) was developed by Reclamation in coordination with the NPS and Western. The alternatives were posted on Reclamation's website (<http://www.usbr.gov/lc/region/programs/strategies.html>) on June 30, 2006.

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

Summary descriptions of the No Action Alternative and the four action alternatives considered in the Draft EIS are provided below and in Table ES-1.

Figure ES-1
Geographic Scope



Table ES-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 shortages, 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

ES.1.4.1 No Action Alternative

The No Action Alternative provides a baseline for comparison of each of the action alternatives. The No Action Alternative represents a projection of future conditions that could occur during the life of the proposed federal action without an action alternative being implemented.

Pursuant to the Long-Range Operating Criteria (LROC), the Secretary makes a number of determinations at the beginning of each operating year through the development and execution of the AOP, including the water supply available to users in the Lower Basin and the annual release from Lake Powell. However, the LROC currently does not include specific guidelines for such determinations. Furthermore, there is no actual operating experience under very low reservoir conditions, i.e., there has never been a shortage determination in the Lower Basin. Therefore, in the absence of specific guidelines, the outcome of the annual determination in any particular year in the future cannot be precisely known. However, a reasonable representation of future conditions under the No Action Alternative is needed for comparison to each action alternative. The modeling assumptions used for this representation are consistent with assumptions used in previous environmental compliance documents for the ISG, the Colorado River Water Delivery Agreement, and the Lower Colorado River Multi-Species Conservation Program (LCR MSCP). However, the assumptions used in the No Action Alternative are not intended to limit or predetermine these decisions in any future AOP determination.

ES.1.4.2 Basin States Alternative

The Basin States Alternative was developed by the Basin States and proposes a coordinated operation of Lake Powell and Lake Mead that would minimize shortages in the Lower Basin and avoid risk of curtailments of Colorado River water use in the Upper Basin. This alternative includes shortages to conserve reservoir storage; coordinated operations of Lakes Powell and Mead determined by specified reservoir conditions; a mechanism for the storage and delivery of conserved system and non-system water in Lake Mead; and a modification and extension of the ISG through 2026.

ES.1.4.3 Conservation Before Shortage Alternative

The Conservation Before Shortage Alternative was developed by a consortium of NGOs. The Conservation Before Shortage Alternative includes voluntary, compensated reductions (shortages) in water use to minimize involuntary shortages in the Lower Basin and avoid risk of curtailments of Colorado River water use in the Upper Basin. This alternative includes voluntary shortages prior to involuntary shortages; coordinated operations of Lakes Powell and Mead determined by specified reservoir conditions; an expanded mechanism for the storage and delivery of conserved system and non-system water in Lake Mead, including water for environmental uses; and a modification and extension of the ISG through 2026.

ES.1.4.4 Water Supply Alternative

The Water Supply Alternative maximizes water deliveries at the expense of retaining water in storage in the reservoirs for future use. This alternative would reduce water deliveries only when insufficient water to meet entitlements is available in Lake Mead. When reservoir conditions are relatively low, Lakes Powell and Mead would share water

1 (“balance contents”). This alternative does not include a mechanism for the storage and
2 delivery of conserved system and non-system water in Lake Mead. The existing ISG
3 would be extended through 2026.

4 **ES.1.4.5 Reservoir Storage Alternative**

5 The Reservoir Storage Alternative was developed in coordination with the cooperating
6 agencies and other stakeholders, primarily Western and the NPS. This alternative would
7 keep more water in storage in Lake Powell and Lake Mead by reducing water deliveries
8 and by increasing shortages to benefit power and recreational interests. This alternative
9 includes larger, more frequent shortages that serve to conserve reservoir storage;
10 coordinated operations of Lakes Powell and Mead determined by specified reservoir
11 conditions (more water would be held in Lake Powell than under the Basin States
12 Alternative); and an expanded mechanism for the storage and delivery of conserved
13 system and non-system water in Lake Mead. The existing ISG would be terminated after
14 2007.

15 **ES.2 Summary of Potential Environmental Effects**

16 **ES.2.1 Methodology**

17 Hydrologic modeling of the Colorado River system was conducted to determine the potential
18 hydrologic effects of the alternatives. The modeling provides projections of potential future
19 Colorado River system conditions (i.e., reservoir elevations, reservoir releases, river flows)
20 for comparison of those conditions under the No Action Alternative to conditions under each
21 action alternative. Due to the uncertainty with regard to future inflows into the system,
22 multiple simulations were performed in order to quantify the uncertainties of future
23 conditions and as such, the modeling results are typically expressed in probabilistic terms.

24 The hydrologic modeling also provides the basis for the analysis of the potential effects of
25 each alternative on other environmental resources such as recreation, biology, and electrical
26 power. The potential effects to specific resources are identified and analyzed for each action
27 alternative and are compared to the potential effects to that resource under the No Action
28 Alternative. These comparisons are typically expressed in terms of the relative differences in
29 probabilities between the No Action Alternative and the action alternatives.

30 **ES.2.2 Hydrologic Resources**

31 **ES.2.2.1 Reservoir Storage**

32 **Lake Powell.** Under the No Action Alternative and the action alternatives, the elevations of
33 Lake Powell are projected to fluctuate between full and lower levels during the period of
34 analysis (2008 through 2060). At the 90th percentile Lake Powell end-of-July elevations
35 values, the action alternatives and the No Action Alternative are projected to be similar
36 over the period of analysis.
37

38 At the 50th percentile Lake Powell end-of-July elevation values, the action alternatives
39 and the No Action Alternative are projected to be similar during the period of 2008
40 through 2015. During the period of 2016 through 2026, the Reservoir Storage Alternative

1 generally provides the highest elevations of the alternatives and is approximately five feet
2 higher than the No Action Alternative in 2026. The Water Supply Alternative generally
3 provides the lowest elevations of the alternatives and is approximately 28 feet lower than
4 the No Action Alternative in 2026. The 50th percentile elevation values of the Basin
5 States and Conservation Before Shortage alternatives are similar to each other and are
6 approximately ten feet lower than the No Action Alternative in 2026. The 50th percentile
7 elevation values of all of the alternatives converge by 2040.

8 At the 10th percentile Lake Powell end-of-July elevation values, distinct differences
9 between the action alternatives and the No Action Alternative become apparent after
10 2010. During the period of 2010 through 2026, the Reservoir Storage Alternative
11 provides higher elevations than any of the alternatives and is approximately ten feet
12 higher than the No Action Alternative in 2026. The Water Supply Alternative provides
13 the lowest 10th percentile elevation values of the alternatives and is approximately 52 feet
14 lower than the No Action Alternative in 2026. The 10th percentile elevation values of the
15 Basin States and Conservation Before Shortage alternatives are similar, are higher than
16 those under the No Action Alternative through 2017, and then are lower than those under
17 the No Action Alternative from 2019 through 2026. The 10th percentile elevation values
18 of the Basin States and Conservation Before Shortage alternatives are approximately
19 seven feet lower than the No Action Alternative in 2026. The 10th percentile Lake Powell
20 end-of-July elevation values of all of the alternatives converge by 2040.

21 **Lake Mead.** Under the No Action Alternative and the action alternatives, the elevation of
22 Lake Mead is projected to fluctuate between full and lower levels during the period of
23 analysis (2008 through 2060). At the 90th percentile Lake Mead end-of-December
24 elevation values, the Basin States, Conservation Before Shortage, and Water Supply
25 alternatives and the No Action Alternative are projected to be similar over the period of
26 analysis. The 90th percentile Lake Mead end-of-December elevation values under the
27 Reservoir Storage Alternative are generally slightly higher than the other alternatives
28 during the period from 2010 through 2032 and are approximately seven feet higher than
29 the No Action Alternative in 2026.

30 At the 50th percentile Lake Mead end-of-December elevation values, the Reservoir
31 Storage Alternative provides higher elevations than any of the alternatives during the
32 period of 2009 through 2049 and is approximately 26 feet higher than the No Action
33 Alternative in 2026. The Water Supply Alternative provides the lowest 50th percentile
34 elevation values of the alternatives and is approximately 15.7 feet lower than the No
35 Action Alternative in 2026. The 50th percentile elevation values of the Basin States and
36 Conservation Before Shortage alternatives are similar to each other, are higher than those
37 under the No Action Alternative through 2024, and then are lower than those under the
38 No Action Alternative from 2025 through 2032. The 50th percentile Lake Mead end-of-
39 December elevation values of the Basin States and Conservation Before Shortage
40 alternatives are approximately 11 feet lower than the No Action Alternative in 2026. The
41 50th percentile Lake Mead end-of-December elevation values of all of the alternatives
42 converge by 2050.

1 At the 10th percentile Lake Mead end-of-December elevation values, the Reservoir
2 Storage Alternative provides higher elevations than any of the alternatives and is
3 approximately 47 feet higher than the No Action Alternative in 2026. At the 10th
4 percentile elevations the Water Supply, Basin States, and Conservation Before Shortage
5 alternatives fluctuate above and below the No Action Alternative. The 10th percentile
6 elevation value for the Water Supply Alternative is approximately one foot higher than
7 the No Action Alternative in 2026. The 10th percentile elevation value of the Basin States
8 and Conservation Before Shortage alternatives are approximately 15 feet and 12 feet
9 higher than the No Action Alternative in 2026, respectively. The 10th percentile Lake
10 Mead end-of-December elevation values under all of the alternatives, with the exception
11 of those under the Reservoir Storage Alternative, converge by about 2038. The 10th
12 percentile Lake Mead end-of-December elevation values of the Reservoir Storage
13 Alternative converge with the other alternatives by about 2057.

14 **Lake Mohave and Lake Havasu.** Lake Mohave and Lake Havasu are operated on rule curves
15 and have target end-of-month elevations. This manner of operation for the two reservoirs
16 will continue in the future and would apply to operations under the No Action Alternative
17 and the action alternatives. Therefore, future Lake Mohave and Lake Havasu water levels
18 would not be affected by the proposed federal action.

19 **ES.2.2.2 Reservoir Releases**

20 Glen Canyon Dam releases less than the annual minimum objective release of 8.23 maf is
21 projected to occur less than one percent of the time under the No Action Alternative,
22 approximately four percent of the time under the Basin States, Conservation Before
23 Shortage, and Water Supply alternatives, and approximately six percent of the time under
24 the Reservoir Storage Alternative.

25 Glen Canyon Dam releases greater than the annual minimum objective release of 8.23
26 maf is projected to occur approximately 35 percent of the time under the No Action
27 Alternative, approximately 42 percent of the time under the Basin States, Conservation
28 Before Shortage, and Water Supply alternatives, and approximately 37 percent of the
29 time under the Reservoir Storage Alternative.

30 Glen Canyon Dam releases greater than 9.0 maf generally correspond to years that either
31 equalization or spill avoidance releases are made from Lake Powell. Glen Canyon Dam
32 releases greater than 9.0 maf are projected to occur 30 percent of the time under the No
33 Action Alternative, 36 percent of the time under the Basin States and Conservation
34 Before Shortage alternatives, 37 percent of the time under the Water Supply Alternative,
35 and 31 percent of the time under the Reservoir Storage Alternative.

36 More water is held in storage in Lake Mead under the Reservoir Storage Alternative and
37 therefore the releases from Hoover Dam are projected to be lower under this alternative
38 during the interim period of 2008 through 2026, as compared to the No Action
39 Alternative. Conversely, the Hoover Dam releases under the Water Supply Alternative
40 are projected to be greater than those under the No Action Alternative because less water
41 is held in storage under this alternative. Hoover Dam releases under the Basin States and
42 Conservation Before Shortage alternatives are projected to be slightly less than those

1 under the No Action Alternative. The alternative with the greatest effect on Hoover Dam
2 releases due to shortage-related delivery reductions is the Reservoir Storage Alternative.

3 The releases from Davis Dam and Parker Dam generally reflect the same pattern of
4 releases under the different action alternatives as those from Hoover Dam. The
5 differences in the release volumes are mostly attributed to the depletions that occur
6 upstream of each respective dam.

7 **ES.2.2.3 Groundwater**

8 Differences in Colorado River flows below Hoover Dam are similar between the action
9 alternatives and the No Action Alternative and are relatively minor. Corresponding
10 effects on groundwater will also be relatively minor.

11 **ES.2.3 Water Deliveries**

12 All of the action alternatives generally improve water supply conditions during the interim
13 period relative to the No Action Alternative, improve the probability that normal deliveries
14 will be met, and reduce the probability that Shortage condition deliveries will occur. The
15 differences between the action alternatives and the No Action Alternative, in terms of the
16 probability of occurrence for Normal conditions water supply deliveries, diminish after 2027
17 and converge by about 2038.

18 The Water Supply Alternative provides the same probability of Surplus condition deliveries
19 as the No Action Alternative (between about 30 to 40 percent) between 2008 and 2016 and
20 this alternative consistently provides the highest probability of Surplus condition deliveries
21 during the interim period. The Reservoir Storage Alternative provides the lowest
22 probabilities (between about 10 to 20 percent) during the interim period. The surplus
23 provisions under the Basin States and Conservation Before Shortage alternatives are similar
24 and the probability of Surplus conditions between 2010 through 2016 is slightly less than
25 under the No Action Alternative. After 2026 the probability for all alternatives converges and
26 ranges between 10 and 20 percent.

27 During most of the interim period, the probability of involuntary and voluntary shortage is
28 less under all of the action alternatives compared to the No Action Alternative. The
29 probability of occurrence of shortages under the Water Supply Alternative is generally less
30 than under the No Action Alternative and other action alternatives during the interim period.
31 However, after 2026, the Water Supply Alternative has the highest probability of occurrence.
32 Average shortages that occur under the Water Supply Alternative are significantly less than
33 those observed under the No Action Alternative during the interim period.

34 The probability of occurrence of shortages under the Reservoir Storage Alternative is slightly
35 higher than under the No Action Alternative between 2008 and 2013. However, after 2013
36 and through about 2037, shortages under the Reservoir Storage Alternative occur less
37 frequently as compared to the No Action Alternative. In terms of magnitude, the average
38 shortage volumes that are observed during the interim period are highest under the Reservoir
39 Storage Alternative.

1 Shortages also occur less frequently under the Basin States and Conservation Before
2 Shortage alternatives during the interim period as compared to the No Action Alternative and
3 are similar after 2026. The probability values of the Basin States Alternative and
4 Conservation Before Shortage Alternative differ by a maximum of about five percent with
5 those of the Conservation Before Shortage Alternative being generally slightly lower than
6 those under the Basin States Alternative. The probability of an involuntary and voluntary
7 shortage under the No Action Alternative in 2026 is 47 percent. In contrast, in 2026, the
8 probability of an involuntary and voluntary shortage under the Basin States, Conservation
9 Before Shortage, Water Supply, and Reservoir Storage alternatives is 35 percent, 33 percent,
10 nine percent, and 37 percent, respectively. In terms of magnitude, the average involuntary
11 and voluntary shortages that are observed under the Basin States and Conservation Before
12 Shortage alternatives are similar to each other and both are less than those observed under the
13 No Action Alternative during the interim period. After 2026, the average shortage volumes
14 are similar.

15 The mechanism to deliver and store conserved system and non-system water in Lake Mead
16 assumed as part of the Basin States, Conservation Before Shortage and Reservoir Storage
17 alternatives has the effect of decreasing the occurrence of shortages. The greatest reduction
18 during the interim period occurs under the Reservoir Storage Alternative.

19 **ES.2.4 Water Quality**

20 The future average annual salinity levels under the different action alternatives are not
21 expected to exceed the numeric criteria for salinity at Hoover Dam, Parker Dam and Imperial
22 Dam, established by the Colorado River Salinity Control Forum.

23 The temperature range for Glen Canyon Dam releases under the Water Supply Alternative
24 could potentially be warmer due to lower Lake Powell reservoir elevations. The Reservoir
25 Storage Alternative generally results in cooler temperatures for Glen Canyon Dam releases.
26 The temperature of Glen Canyon Dam releases under the Basin States and Conservation
27 Before Shortage alternatives are similar to those under the No Action Alternative.

28 Hydrologic and water quality modeling for Lake Mead for the Boulder Islands North
29 Alternative (preferred alternative) published in the System Conveyance and Operations
30 Program Final EIS (October 2006) shows that drawing the Lake Mead water level down to
31 an elevation of 1,000 feet msl would not have a significant effect on water quality in Lake
32 Mead. The probability that Lake Mead will be drawn down below 1,000 feet msl over the
33 interim period is negligible for the No Action, the Basin States, Conservation Before
34 Shortage, and Reservoir Storage alternatives. Under the Water Supply Alternative there is up
35 to a 4 percent chance that Lake Mead would drop below 1,000 feet msl over the interim
36 period.

37 The projected elevations and corresponding changes in dilution capacity in Lake Mead are
38 not expected to result in metals concentrations of concern. It is not anticipated that any of the
39 action alternatives would result in a significantly increased concentration of perchlorate.

ES.2.5 Air Quality

As reservoir elevation decreases and shoreline is exposed, the potential for increased fugitive dust increases. The potential exposed shoreline acreage for the Basin States Alternative and the Conservation Before Shortage Alternative are similar to the No Action Alternative at both Lake Powell and Lake Mead. The Water Supply Alternative is projected to have the greatest increase in exposed shoreline acreage compared to the No Action Alternative at Lake Powell, but is projected to be similar to the No Action Alternative at Lake Mead. The Reservoir Storage Alternative is projected to result in less exposed shoreline acreage compared to the No Action Alternative for both Lake Powell and Lake Mead.

An increase in fugitive dust as a result of increased exposed shoreline would be limited at Lake Powell because the increased exposure of acreage would be comprised largely of sandstone. All of the action alternatives have the potential to decrease exposed acreage of shoreline at Lake Mead compared to the No Action Alternative.

ES.2.6 Visual Resources

The probability of water being visible under or near Rainbow Bridge is 59 percent under the No Action Alternative and ranged from a low of 40 percent under the Water Supply Alternative to 62 percent under the Reservoir Storage Alternative. Under the No Action Alternative there is a four percent probability of exposing Cathedral in the Desert. For the action alternatives there is a range from 17 percent probability of exposing Cathedral in the Desert to one percent under the Water Supply Alternative and Reservoir Storage Alternative, respectively. There would be no effect on attraction features at Lake Mead.

The visibility of calcium carbonate rings along the perimeter of Lake Powell and Lake Mead varies depending on reservoir water levels. At Lake Powell, the maximum height is projected to be 160 feet under the No Action Alternative and ranged from 195 feet under the Water Supply Alternative to 150 feet under the Basin States and Conservation Before Shortage alternatives. At Lake Mead, the maximum height is projected to be 209 feet under the No Action Alternative. The maximum height under the action alternatives is expected to be similar to that under the No Action Alternative. For both reservoirs, the presence of the calcium carbonate ring is more of an aesthetics effect than the height at any given reservoir elevation. Therefore, while there may be some numeric differences in the projected height of the rings, the overall difference in visual impact among the alternatives is not significant.

At both Lake Powell and Lake Mead, sediment deltas will continue to build up over time and be visible under all alternatives. The differences among alternatives are negligible for both Lake Powell and Lake Mead.

ES.2.7 Biological Resources

ES.2.7.1 Vegetation and Wildlife

Changes in reservoir storage and river flows may affect vegetation and wildlife resources by altering their habitats. These potential changes in habitat at Lake Powell and Lake Mead and the reaches of the Colorado River between Glen Canyon Dam and Lake Mead and downstream of Lake Mead were analyzed. The analysis concluded that none of the

1 action alternatives would result in a substantial impact to vegetation or wildlife habitat
2 located at the reservoirs or along the river.

3 At Lake Powell and Lake Mead, the Water Supply Alternative may result in a minor
4 adverse effect on obligate phreatophytes and marsh habitat as a result of lower lake
5 levels. Conversely, the Reservoir Storage Alternative may benefit these same resources
6 because lake levels may be higher.

7 Between Parker Dam and Imperial Dam, the Conservation Before Shortage, Basin States,
8 and Reservoir Storage alternatives may have minor adverse effects to obligate
9 phreatophytes and marsh habitat because of lower flows.

10 No changes in habitat are expected to occur on the reaches from Hoover Dam to Davis
11 Dam, Lake Havasu to Parker Dam, and Imperial Dam to Morelos Dam because the range
12 of river stage (water levels) under all of the alternatives is expected to be similar to
13 historical conditions. Between Davis Dam and Lake Havasu and Parker Dam to Imperial
14 Dam, the Reservoir Storage Alternative may adversely affect habitat because of a
15 potential slight decrease in the median river stage, as compared to the No Action
16 Alternatives.

17 From the Northerly International Boundary with Mexico (NIB) to the SIB, moderate
18 beneficial impacts to the habitat is expected under the Conservation Before Shortage and
19 Reservoir Storage alternatives, due to increased probability of flows below Morelos
20 Dam¹.

21 **ES.2.7.2 Special Status Species**

22 In addition to the assessment of effects on general vegetation and wildlife, the analysis
23 also considered potential effects on special status fish, bird, and plant species. These
24 effects were evaluated for species occurring at Lake Powell and Lake Mead and the
25 reaches of the Colorado River between Glen Canyon Dam and Lake Mead, and
26 downstream of Lake Mead. For the reaches of the Colorado River from Hoover Dam to
27 Davis Dam, Lake Havasu to Parker Dam, and Imperial Dam to Morelos Diversion Dam,
28 there would be no effects on special status fish, bird, or plant species because no changes
29 in the range of river stage would occur. Effects on special status plant species at Lake
30 Mead were considered minor because all habitats below full pool elevation are subject to
31 periodic inundation and exposure.

¹ These flows were modeled as part of the storage and delivery mechanism under the Conservation Before Shortage and Reservoir Storage alternatives. These modeling assumptions were utilized in the Draft EIS in order to analyze the potential impacts to environmental resources of the storage and delivery mechanism, particularly with regard to reservoir elevations and river flow impacts. The use of these modeling assumptions does not represent any determination by Reclamation as to whether, or how, these releases could be made under current administration of the Colorado River.

1 **Fish.** At Lake Powell, special status fish species may benefit under the Conservation
2 Before Shortage, Basin States, and Water Supply alternatives as a result of lower lake
3 levels, thereby extending riverine habitat. At Lake Mead, the Reservoir Storage
4 Alternative may result in minor adverse effects on special status fish species as a result of
5 higher lake levels that may reduce riverine habitat. Conversely, the Water Supply
6 Alternative may result in beneficial effects on special status fish species because lower
7 lake levels may increase riverine habitat.

8 Between Glen Canyon Dam and Lake Mead, the Reservoir Storage and Water Supply
9 alternatives would result in a wider range of flow and water temperature fluctuations. The
10 wider range of temperatures may both benefit and adversely affect special status fish
11 species and amphibians. From Davis Dam to Lake Havasu and Parker Dam to Imperial
12 Dam special status fish species may be adversely affected under the Reservoir Storage
13 Alternative because lower flows would result in a reduction of spawning and rearing
14 habitat. Conversely, increased flows under the Water Supply Alternative may benefit
15 special status fish species.

16 **Birds.** At Lake Mead, the Water Supply Alternative may result in lower elevations and
17 minor adverse effects on habitat for special status bird species. Conversely, higher
18 elevations under the Reservoir Storage Alternative may benefit habitat for special status
19 bird species. Between Davis Dam and Lake Havasu, and between Parker Dam and
20 Imperial Dam, lower flows occurring under the Reservoir Storage Alternative may have a
21 minor adverse effect on habitats used by special status bird species. Conversely, higher
22 flows occurring under the Water Supply Alternative may have minor beneficial effect on
23 special status bird species.

24 From the NIB to the SIB, moderate beneficial impacts to habitat used by special status
25 bird species is expected under the Conservation Before Shortage and Reservoir Storage
26 alternatives, due to increased probability of flows below Morelos Diversion Dam.²

27 **ES.2.8 Cultural Resources**

28 For Lake Powell, under the Water Supply Alternative at the 10th percentile water elevation,
29 there are at least 222 unexcavated sites subject to effect because of increased probability of
30 exposure due to lower lake levels, as compared to about 193 sites under the other
31 alternatives. Consultation is underway regarding eligibility and effect.

² These flows were modeled as part of the storage and delivery mechanism under the Conservation Before Shortage and Reservoir Storage alternatives. These modeling assumptions were utilized in the Draft EIS in order to analyze the potential impacts to environmental resources of the storage and delivery mechanism, particularly with regard to reservoir elevations and river flow impacts. The use of these modeling assumptions does not represent any determination by Reclamation as to whether, or how, these releases could be made under current administration of the Colorado River.

1 For the reach from Glen Canyon Dam to Lake Mead, the alternatives would have no
2 substantial effect on cultural resources. In addition, a variety of programs are underway to
3 protect these resources.

4 For Lake Mead, there are at least 32 cultural resource sites located below the 1,080 feet msl
5 elevation that have not been exposed since the reservoir was initially filled. The Lake Mead
6 water level is expected to fall below this elevation under all of the alternatives. However, the
7 probability of exposing sites below this elevation vary by alternative, with the Reservoir
8 Storage Alternative having the lowest probability (up to 23 percent over the interim period)
9 and the Water Supply Alternative having the highest probability (up to 51 percent over the
10 interim period).

11 For the reaches below Lake Mead, no adverse effects are anticipated from any of the
12 alternatives; consultation regarding eligibility and effect will be undertaken.

13 For Indian sacred sites and other issues of Tribal concern, none of the alternatives are
14 expected to restrict access or result in loss of physical integrity to sacred sites. Consultations
15 with Indian tribes are ongoing with respect to these issues and other issues and concerns.

16 **ES.2.9 Indian Trust Assets**

17 After evaluating each resource, it is concluded that Tribal trust resources identified in the
18 study area would not be adversely affected by any of the anticipated environmental impacts
19 stemming from the proposed federal action.

20 **ES.2.10 Electrical Power Resources**

21 The Water Supply Alternative would have the greatest negative effect on total Colorado
22 River system hydropower generation (approximately -1.5 percent) as compared to the No
23 Action Alternative because of reduced reservoir levels. Conversely, the Reservoir Storage
24 Alternative would result in an increase in total electrical power production as compared to
25 the No Action Alternative (approximately three percent). The Basin States and Conservation
26 Before Shortage alternatives are similar to the No Action Alternative.

27 With respect to other electrical power resource issues, the Water Supply Alternative has a
28 higher potential for total loss of generation at the Glen Canyon Powerplant and the Hoover
29 Powerplant than the other action alternatives and the No Action Alternative.

30 **ES.2.11 Recreation**

31 **ES.2.11.1 Shoreline Facilities**

32 The Reservoir Storage Alternative would result in higher reservoir water levels and a
33 lower probability of closure of shoreline facilities than the other action alternatives and
34 the No Action Alternative. Conversely, the Water Supply Alternative would result in the
35 highest probability of such closures. The Basin States and Conservation Before Shortage
36 alternatives are similar to the No Action Alternative.
37

38 At Lake Mead, all of the alternatives have similar probabilities of facility closures except
39 for the Reservoir Storage Alternative, which has a slightly to moderately lower

1 probability. The probability of closure of the Pearce Bay launch under the No Action
2 Alternative and the Basin States, Conservation Before Shortage, and Water Supply
3 alternatives range from about 76 percent to 78 percent. The probability of this occurrence
4 under the Reservoir Storage Alternative is approximately 68 percent.

5 **ES.2.11.2 Boating and Navigation**

6 The Reservoir Storage Alternative is projected to result in higher reservoir water levels
7 and a lower probability of boating restrictions or prohibitions around Castle Rock and
8 Gregory Butte as compared to the other action alternatives and the No Action Alternative.
9 Conversely, the Water Supply Alternative is projected to result in the highest probability
10 of such occurrences. The Basin States and Conservation Before Shortage alternatives are
11 similar to the No Action Alternative.

12 At Lake Mead, all of the alternatives have similar probabilities of exposing navigational
13 hazards due to lower reservoir water level conditions except for the Reservoir Storage
14 Alternative, which has a slightly to moderately lower probability. The probability of
15 closure of Castle Rock and Gregory Butte under the No Action Alternative is 29 percent
16 in 2026. In contrast, the probability of closure of these areas under the Basin States,
17 Conservation Before Shortage, Water Supply, and Reservoir Storage alternatives is 36
18 percent, 36 percent, 47 percent, and 21 percent, respectively. The probability of
19 navigational hazards being exposed under the No Action Alternative and the Basin
20 States, Conservation Before Shortage, and Water Supply alternatives range from about 73
21 percent to 77 percent in 2026. The probability of this occurrence under the Reservoir
22 Storage Alternative is approximately 65 percent.

23 For whitewater boating through the Grand Canyon, the existing required minimum
24 boating releases will be maintained and will be similar to existing and the No Action
25 Alternative conditions under all alternatives.

26 **ES.2.11.3 Sport Fish Populations**

27 Sport fish populations would not be adversely affected at Lake Powell under any of the
28 alternatives as compared to the No Action Alternative.

29 High water temperatures or low dissolved oxygen could affect rainbow trout in the Lees
30 Ferry reach. The Water Supply Alternative shows the greatest potential to provide
31 warmer river flow temperatures in this reach, while the Reservoir Storage Alternative
32 shows less warming potential than the No Action Alternative and the other action
33 alternatives.

34 **ES.2.12 Transportation**

35 For the Lake Powell ferry, the Basin States and Conservation Before Shortage Alternatives
36 would have minor effects on ferry service; the Water Supply Alternative would result in
37 moderate adverse effects; and the Reservoir Storage Alternative would have beneficial
38 effects. The probability varies from year to year, but there is up to a 17 percent probability
39 that the ferry may become inoperable under the Water Supply Alternative for some period of
40 time. Conversely, the ferry could potentially remain operable more of the time under the
41 Reservoir Storage Alternative.

1 For the Colorado River ferry service below Davis Dam, only under the Reservoir Storage
2 Alternative are there measurable effects and these would be minor. The other action
3 alternatives show no difference from the No Action Alternative.

4 The Lake Havasu ferry service would be unaffected by any alternative.

5 **ES.2.13 Socioeconomics and Land Use**

6 ***ES.2.13.1 Employment, Income, and Tax Revenue***

7 None of the action alternatives are expected to result in a greater change in employment,
8 income or tax revenue attributable to changes in agricultural production due to
9 involuntary shortages when compared to conditions under the No Action Alternative. The
10 estimated change in employment, income, and tax revenues would be less under each of
11 the action alternatives compared to the No Action Alternative. Among the action
12 alternatives, the Reservoir Storage and Basin States alternatives would result in the
13 greatest loss in employment, income, and tax revenues. None of the changes in
14 employment and income are considered substantial when compared to total employment
15 and income generated within the study area.
16

17 ***ES.2.13.2 Municipal and Industrial Water Uses***

18 Adverse effects on employment and income in Arizona and Nevada during shortages
19 would be minimized through implementation of local and state water supply management
20 plans and drought response plans that are currently in place. No adverse effects are
21 expected in California because of the low probability of shortages of sufficient magnitude
22 to affect California and the availability of alternative water supplies within California.

23 ***ES.2.13.3 Recreation Economics***

24 The assessment of changes in recreation-related spending at Lake Powell and Lake Mead
25 suggest that expenditures are expected to decrease under the Basin States, Conservation
26 Before Shortage, and Water Supply alternatives and are expected to increase under the
27 Reservoir Storage Alternative when compared to conditions under the No Action
28 Alternative. The greatest reduction in spending is expected to occur under the Water
29 Supply Alternative because this alternative would result in the greatest change in
30 reservoir storage among the alternatives.

31 Because river flows would remain within normal ranges, there would be no resulting
32 changes in river-related economic activity.

33 ***ES.2.13.4 Environmental Justice***

34 After evaluating each resource, it is concluded that the environmental justice
35 communities identified in the study area would not be disproportionately affected by any
36 of the anticipated environmental impacts stemming from the proposed federal action.

37 **ES.3 Cumulative Impacts**

38 The proposed federal action would not result in any significant cumulative impacts.

ES-2
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 ES-2
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
	Lake Mead maximum height of calcium carbonate ring, 10 th percentile lake elevation, 2026	209 feet	209 feet	209 feet	210 feet	208 feet
4.8	Biological Resources ¹					
	Effects on Vegetation and Wildlife					
	Lakes Powell and Mead	-	None	None	Minor negative	Minor positive
	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
NIB to SIB	-	None	Moderate positive	None	Moderate positive	
4.9	Effects on Special Status Species					
	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
	NIB to SIB	-	None	Moderate positive	None	Moderate positive
	Southwestern willow flycatcher	-	None	Moderate positive	None	Moderate positive
4.10	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 ES-2
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 ES-2
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
4.13	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 ES-2
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