
Appendix H

Sensitivity Analysis – Effects of Demand Schedule
Assumptions on Modeled Unused Tribal Water
Available for Storage in the Enhanced
Coordination Alternative

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Acronyms and Abbreviations

Acronym or Abbreviation	Full Phrase
CRSS	Colorado River Simulation System
EIS	environmental impact statement
maf	million acre-feet
Reclamation	United States Bureau of Reclamation
UCRC	Upper Colorado River Commission
U.S.	United States

Appendix H. Sensitivity Analysis – Effects of Demand Schedule Assumptions on Modeled Unused Tribal Water Available for Storage in the Enhanced Coordination Alternative

H.1 Introduction

The Enhanced Coordination Alternative contemplates mechanisms to store Upper Basin unused tribal water in a Lake Powell conservation pool and Lower Basin unused tribal water in the Protection Pool in Lake Mead. The volume of unused tribal water that could be potentially available for storage in each basin is highly dependent on the modeled baseline demands and modeling assumptions developed for each storage mechanism.

This appendix summarizes the baseline demands that the United States (U.S.) Bureau of Reclamation (Reclamation) used to estimate the volumes of unused tribal water available for conservation and storage in each basin, describes the methodology for calculating these volumes, and compares potential accumulation volumes under two demand scenarios. The first scenario is based on baseline demands, which is used in the resource analysis for the Enhanced Coordination Alternative. The second scenario assumes the demands remain near historical (i.e., 2027) levels throughout the simulation period, providing an upper bound on the volume of unused tribal that could be available for storage if future demands do not increase as projected in the baseline scenario.

This appendix is exploratory and for modeling purposes only, is not intended to express any legal positions or conclusions about unused tribal water, and it does not modify any legal authorities applicable to any particular tribe's water resources. Further, nothing in this appendix represents a legal position or interpretation of any of the water rights of any basin tribes, other water users, or the Law of the River including as applicable unused water. Nothing in this appendix shall be construed so as to interpret, diminish or modify the water rights of any tribe or other water users. Reclamation continues to recognize the right of each tribe and of each of the Basin States under existing law to use and develop the water of the Colorado River System.

For purposes of this appendix, unused tribal water is defined as the difference between a quantified¹ entitlement or its depletion equivalent and the associated modeled baseline demand, subject to the following key assumptions:

- The analyzed volumes of unused tribal water are physically and legally available and deliverable for storage in Lake Powell or Lake Mead, as applicable, and can be stored in Lake Powell or Lake Mead consistent with the mechanisms explored in the Enhanced Coordination Alternative.
- In the Lower Basin, the unused tribal water analyzed in this appendix includes mainstream Lower Colorado River water entitlements.
- This appendix does not attempt to define the contours of any trust asset. Please see **Technical Appendix 18**, Indian Trust Assets, for more information on trust assets.
- The analyzed volumes of unused tribal water are derived from the entitlement-holder and do not include any analysis of possible end-user arrangements, if applicable.
- Unused tribal water is water that a tribe does not divert from the mainstream Colorado River or other applicable authorized diversion location in any given year. Unused tribal water does not include return flows or effluent.
- The term unused tribal water is used to describe when a tribe does not fully divert its quantified water entitlement, for any reason; the term does not indicate or imply that any water in the Colorado River System is left unused in any given year, as such water may be used by the other Basin, state(s), or more junior priorities consistent with existing law.
- Rounding may be used for any given entitlement.
- The Colorado River Simulation System (CRSS) requires depletion schedules to function. Tribal water entitlements may be quantified by depletion, diversion, or both, as described in the applicable legal authority. Accordingly, depletion, and/or diversion, entitlement or equivalent volumes are calculated or estimated for CRSS modeling purposes as necessary for model functionality, as described in the sections below.
- The tribal water entitlement is legally quantified, including by settlement, adjudication, or contract, with some caveats for modeling purposes as noted herein. This appendix does not attempt to quantify any currently unquantified tribal water rights.
- This appendix does not address a number of issues that may be related to implementation of any alternative, including but not limited to baseline depletion or consumptive use calculations, forbearance agreements, legal authorities, calculations related to diversion or depletion equivalents, and other operational and accounting details such as verification, water orders, and interaction with shortage distribution scheme(s).

¹ In some instances for modeling purposes, this appendix references an estimate or other data about a tribal water right. Where this occurs, it is not intended to represent a modification, alteration, or interpretation of any legal quantification and law applicable to a tribal water right. Reclamation reserves the right to update any quantifications, estimates, or data applicable to any tribal water rights as needed.

H.2 Overview of Baseline Demand Schedules

H.2.1 Upper Basin Demand Schedules

The Upper Basin CRSS baseline demand schedules were developed using data from the Upper Colorado River Commission’s (UCRC) updated 2016 Depletion Demand Schedule.² Specifically, the UCRC—in coordination with the Upper Division States—developed decadal projections of water depletion demands by sector at the state level to support long-term planning efforts. These projections represent anticipated water demands under assumed economic and hydrologic conditions. The representation of the Upper Colorado Basin Tribes in the UCRC depletion demand schedule was presented in documentation provided by Reclamation to the Upper Colorado Basin Tribes dated July 13, 2022, that outlines the differences between the 2018 Tribal Water Study³ demand schedules and the updated 2016 Depletion Demand Schedule. Information on how these projections are integrated into CRSS is provided in **Appendix L**, Upper Division States Depletion Schedules, with the resulting depletion schedules for the Upper Basin Tribes summarized in **Table H-1**. **Table H-1** cites the U.S. Bureau of Reclamation and Ten Tribes Partnership, Colorado River Basin Tribal Water Study (2018) as a source for certain aspects of the tribal water rights discussed herein. This citation is intended to provide an accessible source of information for the reader, and it does not supersede or modify any tribal water rights settlement or other authority. Reclamation reserves the right to update references to tribal water rights authorities in this appendix as needed and appropriate.

² Upper Colorado River Commission (UCRC) & Upper Division States. (2022, June 14). *Combined Resolution and Updated 2016 Depletion Demand Schedule*. Upper Colorado River Commission. Retrieved from <http://www.ucrccommission.com/wp-content/uploads/2022/06/UCRC-and-Upper-Division-States-Combined-Resolution-and-Updated-2016-Depletion-Demand-Schedule-June-14-2022-1.pdf>.

³ All disclaimers in the 2018 Tribal Water Study regarding its limitations and assumption are incorporated herein by reference, including that it does not, and shall not, represent a legal position or interpretation of any of the water rights of the Partnership Tribes, by any Basin State, the federal government, or the Upper Colorado River Commission as it relates to the Law of the River. Furthermore, nothing in the Tribal Water Study is intended to, nor shall the Study be construed so as to, interpret, diminish or modify the water rights of any of the Partnership Tribes, any other tribe, any Basin State, the federal government, or the UCRC under federal or state law or administrative rule, regulation or guideline. Reclamation and the Partnership continue to recognize the right of each of the Partnership Tribes and of each of the Basin States under existing law to use and develop the water of the Colorado River System.

Table H-1
CRSS Baseline Depletion Demand Schedules for Upper Basin Tribes (acre-feet)

Year	Jicarilla (NM)	Navajo ⁴				Southern Ute (CO)	Ute Indian (UT) ⁵	Ute Mtn. Ute (CO)	Upper Basin Total
		(NM)	(UT)	(AZ UB)	(Total)				
2027	30,380	286,910	10,615	37,875	335,400	33,578	184,641	13,067	597,066
2028	31,020	290,040	11,896	38,400	340,336	33,912	190,157	13,131	608,556
2029	31,660	293,170	13,176	38,925	345,271	34,246	195,674	13,195	620,045
2030	32,300	296,300	14,456	39,450	350,206	34,580	201,190	13,259	631,535
2031	32,460	299,100	15,736	39,975	354,811	34,914	206,965	13,323	642,474
2032	32,620	301,900	17,017	40,500	359,417	35,248	212,741	13,387	653,413
2033	32,780	304,700	18,297	41,025	364,022	35,583	218,516	13,451	664,352
2034	32,940	307,500	19,578	41,550	368,628	35,917	224,291	13,515	675,291
2035	33,100	310,300	20,858	42,075	373,233	36,251	230,067	13,579	686,230
2036	33,260	313,100	22,138	42,600	377,838	36,585	235,842	13,643	697,168
2037	33,420	315,900	23,419	43,125	382,444	36,919	241,617	13,707	708,107
2038	33,580	318,700	24,699	43,650	387,049	37,254	247,392	13,771	719,046
2039	33,740	321,500	25,980	44,175	391,655	37,588	253,168	13,835	729,985
2040	33,900	324,300	27,260	44,700	396,260	37,922	258,943	13,899	740,924
2041	33,900	324,540	27,950	44,700	397,190	38,195	258,943	14,072	742,301
2042	33,900	324,780	28,641	44,700	398,121	38,468	258,943	14,245	743,677
2043	33,900	325,020	29,331	44,700	399,051	38,742	258,943	14,418	745,054
2044	33,900	325,260	30,021	44,700	399,981	39,015	258,943	14,591	746,430
2045	33,900	325,500	30,712	44,700	400,912	39,288	258,944	14,764	747,807
2046	33,900	325,740	31,402	44,700	401,842	39,561	258,944	14,936	749,183
2047	33,900	325,980	32,092	44,700	402,772	39,834	258,944	15,109	750,560
2048	33,900	326,220	32,782	44,700	403,702	40,108	258,944	15,282	751,936
2049	33,900	326,460	33,473	44,700	404,633	40,381	258,944	15,455	753,313
2050	33,900	326,700	34,163	44,700	405,563	40,654	258,944	15,628	754,689
2051	33,910	326,860	34,756	44,700	406,316	40,927	258,944	15,801	755,898
2052	33,920	327,020	35,350	44,700	407,070	41,200	258,944	15,974	757,107
2053	33,930	327,180	35,943	44,700	407,823	41,473	258,944	16,146	758,317

⁴ The information reflected in the baseline depletion demands schedule relies on information about projected future tribal water demands. The projections were based on information compiled in a Colorado River Basin Ten Tribes Partnership Tribal Water Study (December 2018). As discussed in Chapter 8 of that Study, the technical approach was based on the best science and information available at the time, given limitations related to timeframes and resource constraints, among other things. The Navajo Nation informed Reclamation that it was developing updated projections as part of its water development planning. Reclamation worked with the Navajo Nation as needed to update demand schedules prior to the publication of the Final EIS.

⁵ The Post-2026 modeling is based on water rights of the Ute Indian Tribe of the Uintah & Ouray Reservation that have not been ratified by all parties. The Ute Indian Tribe of the Uintah & Ouray Reservation has federally reserved Indian water rights, a portion of which were federally decreed in 1923 and a portion of which have been separately recognized and put to use by the U.S. and the State of Utah, which are not fully resolved. The information presented on these water rights in the Final EIS is for analysis purposes only and does not reflect a legal position or interpretation of the water rights by the U.S.

H. Sensitivity Analysis – Effects of Demand Schedule Assumptions on Modeled Unused Tribal Water Available for Storage in the Enhanced Coordination Alternative (Overview of Baseline Demand Schedules)

Year	Jicarilla (NM)	Navajo ⁴				Southern Ute (CO)	Ute Indian (UT) ⁵	Ute Mtn. Ute (CO)	Upper Basin Total
		(NM)	(UT)	(AZ UB)	(Total)				
2054	33,940	327,340	36,536	44,700	408,576	41,746	258,944	16,319	759,526
2055	33,950	327,500	37,130	44,700	409,330	42,020	258,944	16,492	760,735
2056	33,960	327,660	37,723	44,700	410,083	42,293	258,944	16,665	761,944
2057	33,970	327,820	38,316	44,700	410,836	42,566	258,944	16,838	763,153
2058	33,980	327,980	38,909	44,700	411,589	42,839	258,944	17,010	764,363
2059	33,990	328,140	39,503	44,700	412,343	43,112	258,944	17,183	765,572
2060	34,000	328,300	40,096	44,700	413,096	43,385	258,944	17,356	766,781
Diversions Entitlement/ Equivalent	45,683 ⁶	633,531 ⁷				128,939	480,590 ⁸		
Depletion Entitlement/ Equivalent	34,194 ⁹	336,979 ¹⁰	81,500 ¹¹	47,000 ¹²	465,479	70,049 ¹³	258,944 ¹⁴	78,123 ¹⁵	928,621

H.2.2 Lower Division States Depletion Schedules

As part of the Post-2026 Environmental Impact Statement (EIS) process, the Lower Division States CRSS baseline depletion schedules were developed to ensure all water users reach their full entitlement by 2040. In general, the initial 2027 depletion is estimated as the lesser of the historical average maximum use and the user’s entitlement. This estimate serves as the starting point for linear interpolation, with annual depletions gradually increasing to the full entitlement by 2040. This methodology is applied to all water users except for Metropolitan Water District, Central Arizona Project, and Southern Nevada Water Authority. For these users, the depletion is estimated by subtracting the total revised depletion schedules of all other users from the State’s apportionment. The corresponding diversion is then calculated using historical average efficiency.

The depletion schedules represent the baseline demands, which are further adjusted using CRSS to account for new conservation mechanisms, Intentionally Created Surplus, shortage, surplus, and other alternative specific assumptions. A detailed description of the methodology used to develop

⁶ U.S. Bureau of Reclamation and Ten Tribes Partnership, *Colorado River Basin Tribal Water Study* (2018), Table 5.4-A.

⁷ U.S. Bureau of Reclamation and Ten Tribes Partnership, *Colorado River Basin Tribal Water Study* (2018), Table 5.5-B.

⁸ This table includes depletion and diversion volumes from the 2009 version of the proposed Ute Indian Water Compact, which was not ratified. These volumes are intended as a placeholder for National Environmental Policy Act (NEPA) analysis purposes, may be subject to change, and are not to be construed as federal legal or policy position. See also U.S. Bureau of Reclamation and Ten Tribes Partnership, *Colorado River Basin Tribal Water Study* (2018), Table 5.1-G.

⁹ U.S. Bureau of Reclamation and Ten Tribes Partnership, *Colorado River Basin Tribal Water Study* (2018), Table 5.4-A.

¹⁰ U.S. Bureau of Reclamation and Ten Tribes Partnership, *Colorado River Basin Tribal Water Study* (2018), Table 5.5-B.

¹¹ *Navajo-Utah Water Rights Settlement Act* (Pub. L. 116-260, § 1102, 2020).

¹² This table includes the depletion volume as proposed in S.953. This volume is intended as a placeholder for NEPA analysis purposes, may be subject to change, and is not to be construed as federal legal or policy position.

¹³ U.S. Bureau of Reclamation and Ten Tribes Partnership, *Colorado River Basin Tribal Water Study* (2018), Table 5.2-I.

¹⁴ This table includes depletion and diversion volumes from the 2009 version of the proposed Ute Indian Water Compact, which was not ratified. These volumes are intended as a placeholder for NEPA analysis purposes, may be subject to change, and are not to be construed as federal legal or policy position.

¹⁵ U.S. Bureau of Reclamation and Ten Tribes Partnership, *Colorado River Basin Tribal Water Study* (2018), Table 5.3-I.

the baseline depletion schedules is provided in **Appendix M**, Lower Division States Depletion Schedules, with the resulting revised depletion schedules for the Lower Division States Tribes' mainstream entitlements summarized in **Table H-2**.

Table H-2
CRSS Baseline Depletion Schedules for Lower Division Tribes with Mainstream Entitlements¹⁶
(acre-feet)

Year	Chemehuevi Indian Res.	Cocopah Indian Res. (Priority 1)	Cocopah Indian Res. (Priority 4)	Colorado River Indian Res. (AZ)	Colorado River Indian Res. (CA)	Fort Mojave Indian Res. (AZ)
2027	219	5,910	31	337,116	3,322	39,174
2028	673	5,910	133	337,680	5,602	40,461
2029	1,128	5,910	235	338,244	7,883	41,748
2030	1,582	5,910	337	338,808	10,164	43,036
2031	2,036	5,910	439	339,372	12,444	44,323
2032	2,490	5,910	541	339,936	14,725	45,610
2033	2,944	5,910	643	340,500	17,006	46,898
2034	3,399	5,910	745	341,065	19,287	48,185
2035	3,853	5,910	847	341,629	21,567	49,472
2036	4,307	5,910	949	342,193	23,848	50,760
2037	4,761	5,910	1,051	342,757	26,129	52,047
2038	5,215	5,910	1,153	343,321	28,409	53,334
2039	5,669	5,910	1,255	343,885	30,690	54,622
2040-2060	6,124	5,910	1,357	344,449	32,971	55,909
Diversion Entitlement ¹⁷	11,340	8,821	2,026	662,402	56,846	103,535
Depletion Equivalent ¹⁸	6,124	5,910	1,357	344,449	32,971	55,909

¹⁶ This analysis does not include the Hualapai Tribe's Arizona Priority 4 entitlement as it was acquired after the Lower Division States depletion schedules were finalized for this Final EIS.

¹⁷ Unless otherwise noted, see the Consolidated Decree entered by the Supreme Court of the U.S. in *Arizona v. California*, 547 U.S. 150 (2006).

¹⁸ CRSS requires depletion schedules; the depletion equivalent is calculated using the diversion entitlement and average historical efficiencies (2008-2022), unless otherwise noted in **Appendix M**, Lower Division States Depletion Schedules.

Table H-2 (continued)
CRSS Baseline Depletion Schedules for Lower Division Tribes with Mainstream Entitlements¹⁹
(acre-feet)

Year	Fort Mojave Indian Res. (CA)	Fort Mojave Indian Res. (NV)	Fort Yuma Indian Res. (AZ)	Fort Yuma Indian Res. (CA)	Hopi Tribe ²⁰	Indian Water Rights Settlements Priority 4 ²¹
2027	9,029	3,538	1,501	32,954	3,037	0
2028	9,029	3,911	2,334	32,954	3,133	269
2029	9,029	4,285	3,167	32,954	3,228	538
2030	9,029	4,659	4,001	32,954	3,324	808
2031	9,029	5,033	4,001	32,954	3,419	1,077
2032	9,029	5,407	4,001	32,954	3,515	1,346
2033	9,029	5,781	4,001	32,954	3,610	1,615
2034	9,029	6,155	4,001	32,954	3,705	1,885
2035	9,029	6,528	4,001	36,524	3,801	2,154
2036	9,029	6,902	4,001	36,524	3,896	2,423
2037	9,029	7,276	4,001	36,524	3,992	2,692
2038	9,029	7,650	4,001	36,524	4,087	2,962
2039	9,029	8,024	4,001	36,524	4,183	3,231
2040-2060	9,029	8,398	4,001	36,524	4,278	3,500
Diversion Entitlement ²²	16,720	12,534	6,350	71,616	4,278	3,500
Depletion Equivalent ²³	9,029	8,398	4,001	36,524	4,278	3,500

¹⁹ This analysis does not include the Hualapai Tribe's Arizona Priority 4 entitlement as it was acquired after the Lower Division States depletion schedules were finalized for this Final EIS.

²⁰ The Hopi Tribe holds a delivery contract for an Arizona Priority 4 entitlement. This table does not include the Hopi Tribe's Arizona Priority 5 and 6 entitlements. This table is not intended to limit or preclude any future settlement terms associated with the Hopi Tribe's water resources and is not to be construed as a federal legal or policy position.

²¹ This column shows the 3,500 acre-feet of Arizona Priority 4 water reserved for a Navajo-Hopi Indian water rights settlement pursuant to paragraph 11.3 of the 2007 Arizona Water Settlement Agreement as a placeholder. This table is not intended to limit or preclude any future settlement terms associated with this water and is not to be construed as a federal legal or policy position.

²² Unless otherwise noted, see the Consolidated Decree entered by the Supreme Court of the U.S. in *Arizona v. California*, 547 U.S. 150 (2006).

²³ CRSS requires depletion schedules; the depletion equivalent is calculated using the diversion entitlement and average historical efficiencies (2008-2022), unless otherwise noted in **Appendix M**, Lower Division States Depletion Schedules.

H.3 Estimated Volume of Unused Tribal Water in the Baseline Demand Schedules

H.3.1 Upper Basin

Table H-3 shows the estimated unused water for the Upper Basin Tribes from 2027-2060.²⁴ For modeling purposes, unused water is calculated as the difference between each tribe's depletion entitlement (or depletion equivalent) (**Table H-1**) and its corresponding annual baseline depletion demand (**Table H-1**).

In the Enhanced Coordination Alternative, a portion of the total Upper Basin unused volume is assumed to be stored in the Lake Powell conservation pool each year. Additional information on the associated modeling assumptions and portion determination is provided in the following section.

Table H-3
Estimated Unused Water (Depletion) for Upper Basin Tribes (acre-feet)

Year	Jicarilla (NM)	Navajo (NM)	Navajo (UT)	Navajo (AZ UB)	Navajo (Total)	Southern Ute (CO)	Ute Indian (UT)	Ute Mountain Ute (CO)	Total
2027	3,814	50,069	70,885	9,125	130,079	36,471	74,303	65,056	309,723
2028	3,174	46,939	69,604	8,600	125,143	36,137	68,787	64,992	298,233
2029	2,534	43,809	68,324	8,075	120,208	35,803	63,270	64,928	286,744
2030	1,894	40,679	67,044	7,550	115,273	35,469	57,754	64,864	275,254
2031	1,734	37,879	65,764	7,025	110,668	35,135	51,979	64,800	264,315
2032	1,574	35,079	64,483	6,500	106,062	34,801	46,203	64,736	253,376
2033	1,414	32,279	63,203	5,975	101,457	34,466	40,428	64,672	242,437
2034	1,254	29,479	61,922	5,450	96,851	34,132	34,653	64,608	231,498
2035	1,094	26,679	60,642	4,925	92,246	33,798	28,878	64,544	220,559
2036	934	23,879	59,362	4,400	87,641	33,464	23,102	64,480	209,621
2037	774	21,079	58,081	3,875	83,035	33,130	17,327	64,416	198,682
2038	614	18,279	56,801	3,350	78,430	32,795	11,552	64,352	187,743
2039	454	15,479	55,520	2,825	73,824	32,461	5,776	64,288	176,804
2040	294	12,679	54,240	2,300	69,219	32,127	1	64,224	165,865
2041	294	12,439	53,550	2,300	68,289	31,854	1	64,051	164,488
2042	294	12,199	52,859	2,300	67,358	31,581	1	63,878	163,112
2043	294	11,959	52,169	2,300	66,428	31,307	1	63,705	161,735
2044	294	11,719	51,479	2,300	65,498	31,034	1	63,532	160,359
2045	294	11,479	50,788	2,300	64,567	30,761	0	63,359	158,982
2046	294	11,239	50,098	2,300	63,637	30,488	0	63,187	157,606

²⁴ This estimate is included for analysis purposes only, and it is not a limit on or prediction of actual tribal water use. Actual tribal water use may vary.

H. Sensitivity Analysis – Effects of Demand Schedule Assumptions on Modeled Unused Tribal Water Available for Storage in the Enhanced Coordination Alternative (Estimated Volume of Unused Tribal Water in the Baseline Demand Schedules)

Year	Jicarilla (NM)	Navajo (NM)	Navajo (UT)	Navajo (AZ UB)	Navajo (Total)	Southern Ute (CO)	Ute Indian (UT)	Ute Mountain Ute (CO)	Total
2047	294	10,999	49,408	2,300	62,707	30,215	0	63,014	156,229
2048	294	10,759	48,718	2,300	61,777	29,941	0	62,841	154,853
2049	294	10,519	48,027	2,300	60,846	29,668	0	62,668	153,476
2050	294	10,279	47,337	2,300	59,916	29,395	0	62,495	152,100
2051	284	10,119	46,744	2,300	59,163	29,122	0	62,322	150,891
2052	274	9,959	46,150	2,300	58,409	28,849	0	62,149	149,682
2053	264	9,799	45,557	2,300	57,656	28,576	0	61,977	148,472
2054	254	9,639	44,964	2,300	56,903	28,303	0	61,804	147,263
2055	244	9,479	44,370	2,300	56,149	28,030	0	61,631	146,054
2056	234	9,319	43,777	2,300	55,396	27,756	0	61,458	144,845
2057	224	9,159	43,184	2,300	54,643	27,483	0	61,285	143,636
2058	214	8,999	42,591	2,300	53,890	27,210	0	61,113	142,426
2059	204	8,839	41,997	2,300	53,136	26,937	0	60,940	141,217
2060	194	8,679	41,404	2,300	52,383	26,664	0	60,767	140,008

H.3.2 Lower Division States

Table H-4 shows the estimated unused water for the Lower Division Tribes with mainstream entitlements from 2027-2060. All of the Lower Division Tribes with mainstream entitlements hold diversion entitlements; therefore, for modeling purposes, unused water is calculated as the difference between the depletion equivalent of each tribe's entitlement (**Table H-2**) and its corresponding annual baseline depletion schedule (**Table H-2**).

In the Enhanced Coordination Alternative, a portion of the total unused water volume from the Lower Division Tribes with mainstream entitlements is assumed to be contributed to the Protection Pool each year. These modeling assumptions are detailed in the following section.

Table H-4
Estimated Unused Water (Depletion Equivalent) for Lower Division Tribes with Mainstream Entitlements (acre-feet)

Year	Chemehuevi Indian Res.	Cocopah Indian Res. (Priority 1)	Cocopah Indian Res. (Priority 4)	Colorado River Indian Res. (AZ)	Colorado River Indian Res. (CA)	Fort Mojave Indian Res. (AZ)
2027	5,904	0	1,326	7,333	29,649	16,735
2028	5,450	0	1,224	6,769	27,368	15,448
2029	4,996	0	1,122	6,205	25,088	14,161
2030	4,542	0	1,020	5,641	22,807	12,873
2031	4,088	0	918	5,077	20,526	11,586
2032	3,633	0	816	4,513	18,246	10,299
2033	3,179	0	714	3,949	15,965	9,011
2034	2,725	0	612	3,384	13,684	7,724
2035	2,271	0	510	2,820	11,403	6,437
2036	1,817	0	408	2,256	9,123	5,149
2037	1,363	0	306	1,692	6,842	3,862
2038	908	0	204	1,128	4,561	2,575
2039	454	0	102	564	2,281	1,287
2040-2060	0	0	0	0	0	0

Table H-4 (continued)
Estimated Unused Water (Depletion Equivalent) for Lower Division States Mainstream Tribes (acre-feet)

Year	Fort Mojave Indian Res. (CA)	Fort Mojave Indian Res. (NV)	Fort Yuma Indian Res. (AZ)	Fort Yuma Indian Res. (CA)	Hopi Tribe	Indian Water Rights Settlements Priority 4	Total
2027	0	4,860	2,500	3,570	0	3,500	75,377
2028	0	4,486	1,667	3,570	0	3,231	69,213
2029	0	4,112	833	3,570	0	2,962	63,048
2030	0	3,739	0	3,570	0	2,692	56,884
2031	0	3,365	0	3,570	0	2,423	51,552
2032	0	2,991	0	3,570	0	2,154	46,221
2033	0	2,617	0	3,570	0	1,885	40,890
2034	0	2,243	0	3,570	0	1,615	35,558
2035	0	1,869	0	0	0	1,346	26,657
2036	0	1,495	0	0	0	1,077	21,325
2037	0	1,122	0	0	0	808	15,994
2038	0	748	0	0	0	538	10,663
2039	0	374	0	0	0	269	5,331
2040-2060	0	0	0	0	0	0	0

H.4 Modeled Volume of Unused Tribal Water Available for Storage

This section compares the modeled volumes of unused tribal water available for storage in Lake Powell and Lake Mead under two assumed demand schedules. As noted, only a portion of the unused tribal water, calculated using the baseline demand schedule and documented in the previous section, is assumed to be available for storage in the Enhanced Coordination Alternative. The assumptions for determining this portion are outlined below, and the resulting volume is compared to the potential volume available for storage if tribal demands remain near historical (i.e., 2027) levels.

H.4.1 Modeled Volume of Unused Tribal Water Available for Storage in Lake Powell

The Enhanced Coordination Alternative includes a Lake Powell conservation pool with a maximum capacity of 2.0 million acre-feet (maf). Both the Upper Division States and Upper Basin Tribes would have equal access to contribute to the conservation pool. In addition to storing Upper Basin conservation in the conservation pool, the Upper Basin Tribes could also store a portion of unused tribal water.

For modeling purposes, 5 to 15 percent of the unused Upper Basin tribal water is assumed to be available for storage in the Lake Powell conservation pool. The specific percentage, which varies with hydrologic conditions, is determined by comparing the modeled water year Lees Ferry natural flow to the 1991–2020 historical average (**Table H-5**). Linear interpolation is used to determine the specific percentage when the modeled (water year) Lees Ferry natural flow falls between 13.49 and 20.24 maf—with contributions increasing proportionally from 5 to 15 percent as natural flow increases across this range. It was assumed that this volume is contributed to the Lake Powell conservation pool without changing the inflow to Lake Powell. This operational modeling assumption implies that at least 5 to 15 percent of the unused Upper Basin tribal water physically reaches Lake Powell; however, the actual volume of unused Upper Basin tribal water that physically reaches Lake Powell is beyond the scope of this analysis.

Table H-5
Upper Basin Tribal Water Available for Storage in the Lake Powell Conservation Pool
Relative to Historical Lees Ferry Natural Flow Thresholds

Current Water Year Lees Ferry Natural Flow (maf)	Annual Upper Basin Unused Tribal Contribution (%)
≥ 20.24 ²⁵	15
Between 20.24 and 13.49 ²⁶	5 to 15 (linear interpolation)
= 13.49	5
< 13.49	0

Table H-6 summarizes the potential volume of Upper Basin unused tribal water available for storage in the Lake Powell conservation pool.

Figure H-1 illustrates the potential cumulative contribution based on the baseline demands and the modeled natural flow used in this Final EIS analysis (see **Appendix F**, Approach to Hydrologic Uncertainty), compared to the potential cumulative contribution if the demands remain near historical (i.e., 2027) levels throughout the simulation period. In this latter scenario, the 2027 demands are assumed to remain constant through 2060.

Note, the volumes shown in **Figure H-1** do not represent modeled storage of Upper Basin unused tribal water in the Lake Powell conservation pool. Stored volumes are subject to overall capacity constraints—which also account for other types of conserved water. Furthermore, water is periodically withdrawn according to the modeling assumptions detailed in the **Appendix B**, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water.

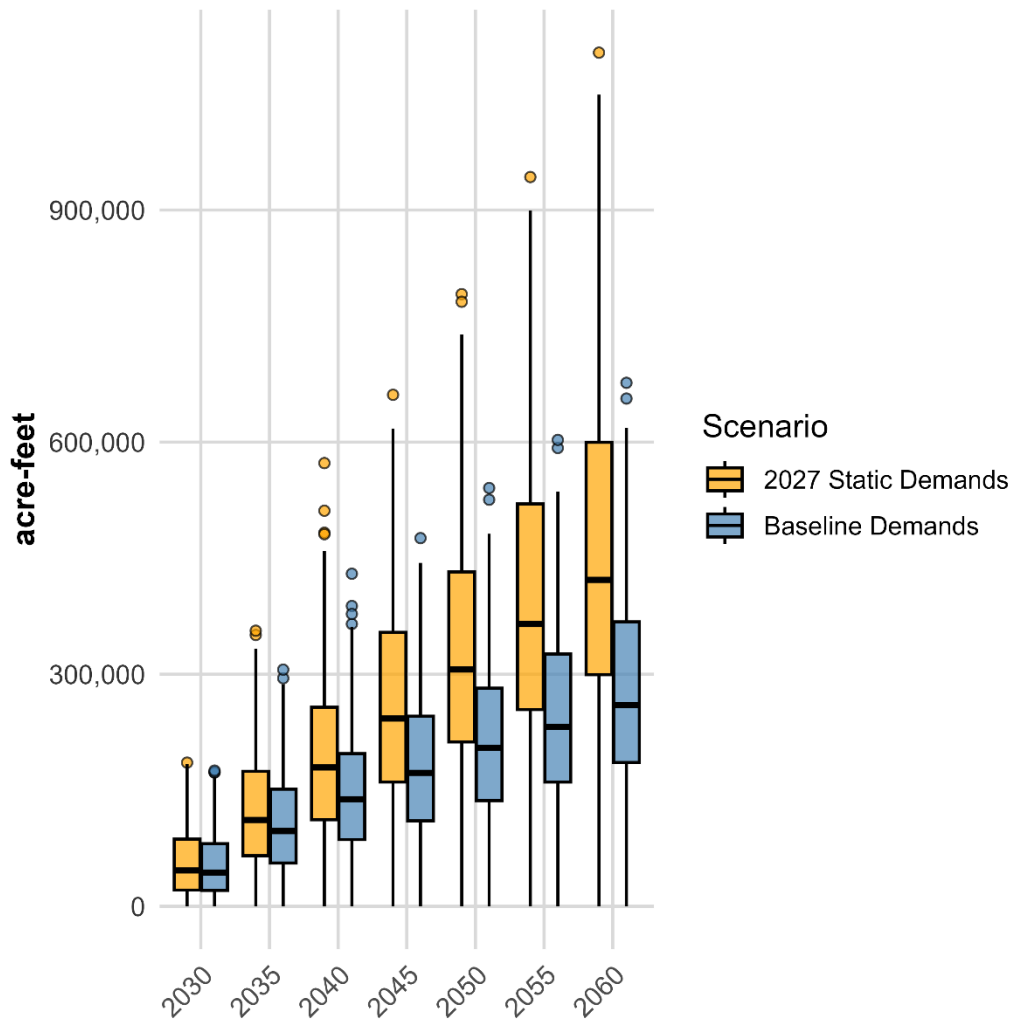
²⁵ 150 percent of the historical average Lees Ferry natural flow from 1991-2020.

²⁶ Historical average Lees Ferry natural flow from 1991-2020.

Table H-6
Potential Volume of Upper Basin Unused Tribal Water Available for Storage in Lake Powell Conservation Pool (acre-feet)

Year	Potential Volume Available for Storage		
	5%	10%	15%
2027	15,486	30,972	46,458
2028	14,912	29,823	44,735
2029	14,337	28,674	43,012
2030	13,763	27,525	41,288
2031	13,216	26,432	39,647
2032	12,669	25,338	38,006
2033	12,122	24,244	36,366
2034	11,575	23,150	34,725
2035	11,028	22,056	33,084
2036	10,481	20,962	31,443
2037	9,934	19,868	29,802
2038	9,387	18,774	28,161
2039	8,840	17,680	26,521
2040	8,293	16,586	24,880
2041	8,224	16,449	24,673
2042	8,156	16,311	24,467
2043	8,087	16,174	24,260
2044	8,018	16,036	24,054
2045	7,949	15,898	23,847
2046	7,880	15,761	23,641
2047	7,811	15,623	23,434
2048	7,743	15,485	23,228
2049	7,674	15,348	23,021
2050	7,605	15,210	22,815
2051	7,545	15,089	22,634
2052	7,484	14,968	22,452
2053	7,424	14,847	22,271
2054	7,363	14,726	22,089
2055	7,303	14,605	21,908
2056	7,242	14,484	21,727
2057	7,182	14,364	21,545
2058	7,121	14,243	21,364
2059	7,061	14,122	21,183
2060	7,000	14,001	21,001

Figure H-1
Potential Cumulative Contribution from Upper Basin Unused Tribal Water



H.4.2 Estimated Modeled Volume of Unused Tribal Water Available for Storage in Lake Mead

The Enhanced Coordination Alternative includes a conservation mechanism referred to as the Protection Pool. In general, the Protection Pool is assumed to be a pool of water in Lake Mead, controlled by Reclamation for Lower Basin-wide benefits, with a maximum capacity of 2.0 maf. It is assumed that water could be acquired through multiple mechanisms, including—but not limited to—both conserved consumptive use and unused Lower Basin tribal water.

For modeling purposes, it is assumed that 10 percent of the unused Lower Basin tribal water can be stored in the Protection Pool. As a result, this water would not be available for diversion and use by lower priority water users. **Figure H-2** shows the resulting maximum potential accumulation of unused tribal water in the Protection Pool given baseline demands, compared with the maximum potential accumulation if the 2027 demands are maintained as static through 2060. The corresponding data is presented in **Table H-7**. Lower priority water users would experience a corresponding reduction in water available for their diversion and use resulting from the volume of unused water storage. Any reductions in water available to lower priority users resulting from increases to baseline demand, however, would be due to tribal water development independent of the Colorado River operations considered herein, and is not an impact of any alternatives.

Figure H-2
Maximum Potential Accumulation of Unused Tribal Water in the Protection Pool



Table H-7
Maximum Accumulation of Unused Tribal Water in the Protection Pool: Assuming 10-Percent Availability for Storage (acre-feet)

Year	Accumulated Volume	
	Baseline Demands ²⁷	2027 Static Demands
2027	7,538	7,538
2028	14,459	15,075
2029	20,764	22,613
2030	26,452	30,151
2031	31,607	37,689
2032	36,230	45,226
2033	40,318	52,764
2034	43,874	60,302
2035	46,540	67,840
2036	48,673	75,377
2037	50,272	82,915
2038	51,338	90,453
2039	51,871	97,991
2040	51,871	105,528
2041	51,871	113,066
2042	51,871	120,604
2043	51,871	128,142
2044	51,871	135,679
2045	51,871	143,217
2046	51,871	150,755
2047	51,871	158,293
2048	51,871	165,830
2049	51,871	173,368
2050	51,871	180,906
2051	51,871	188,444
2052	51,871	195,981
2053	51,871	203,519
2054	51,871	211,057
2055	51,871	218,595
2056	51,871	226,132
2057	51,871	233,670
2058	51,871	241,208
2059	51,871	248,746
2060	51,871	256,283

²⁷ The CRSS modeling erroneously includes unused tribal water associated with the Hopi Tribe. As such, the volumes here do not match 10 percent of the total in Table H-4 as they should. The maximum magnitude of the discrepancy is 868 acre-feet in 2039-2060.

Note that with the baseline demands, the maximum accumulation volume plateaus in 2040 when all users reach full use of their entitlements; in contrast, the maximum accumulation continues to linearly increase throughout the simulation period if the 2027 demands are maintained.

Additional information on the other types of water that may be stored in the Protection Pool, along with detailed modeling assumptions underlying the creation and use of Protection Pool volumes is provided in **Appendix B**, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water.

H.5 Summary

The Enhanced Coordination Alternative contemplates mechanisms to store Upper Basin unused tribal water in a Lake Powell conservation pool and Lower Basin unused tribal water in the Protection Pool in Lake Mead. The volume of unused tribal water available for storage in each basin is highly dependent on the assumed demand schedules and modeling assumptions developed for each storage mechanism. Stored unused tribal water would not be available for diversion and use by lower priority water users, including for some of the existing water uses of Arizona Priority 4 users (including tribes). Because of the sensitivity to these assumptions and the uncertainty associated with future demands, the volume of stored unused tribal water was evaluated using the baseline demand schedules—which generally increase over time—and compared to a scenario assuming continuation of historical demand levels.

This comparison shows that by 2060, approximately 161,933 – 426,714²⁸ acre-feet of additional unused tribal water could be stored in Lake Powell if Upper Basin tribal demands remain near historical levels compared to the baseline demand scenario, based on an assumed 5 to 15 percent contribution rate. As tribal demands grow over time, the volume of unused tribal water available for storage decreases correspondingly. Similarly, in the Lower Basin, approximately 204,412 acre-feet more unused tribal water could be stored in the Lake Mead Protection Pool if Lower Basin mainstream tribal demands remain near historical levels compared to the projected increases under the baseline demand scenario, based on an assumed 10 percent contribution rate. Both estimates depend on the assumed contribution rates, i.e., the portion of total unused water that can be stored.

²⁸ This represents the difference between the median and the maximum from **Figure H-1**, reflecting that the modeled Upper Basin volume of unused tribal water available for storage is also dependent on assumed future hydrology.

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