

ATTACHMENT B

**Technical Memorandum: Review of Potential Hydrologic Effects Associated With
Colorado River Water Delivery Agreement**

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INTRODUCTION

The purpose of this technical memorandum is to summarize the evaluation of potential hydrologic impacts associated with the Colorado River Water Delivery Agreement (Water Delivery Agreement). The Water Delivery Agreement supersedes the proposed Implementation Agreement (IA), wherein the Secretary of the Interior would agree to make changes in the amount and/or location of deliveries of Colorado River water that are necessary to implement the Quantification Settlement Agreement (QSA). The QSA would provide a framework for conservation measures and water transfers for a period of up to 75 years, providing a substantial mechanism for California to reduce its use of Colorado River water to the state's normal year apportionment of 4.4 million acre-feet (MAF).

Reclamation based its Final Environmental Impact Statement (dated October, 2002) for the Implementation Agreement, Inadvertent Overrun and Payback Policy, and Related Federal Actions (Final IA EIS) on the terms of the proposed QSA. The Water Delivery Agreement reflects the final changes to the schedule of QSA water transfers agreed to by the California parties and is included as Attachment A of the Environmental Evaluation.

The Final IA EIS described the potential environmental impacts of the following three proposed actions:

- Execution of an IA, wherein the Secretary agrees to changes in the amount and/or location of deliveries of Colorado River water that are necessary to implement the proposed QSA.
- Adoption of an Inadvertent Overrun and Payback (IOP) Policy, which establishes requirements for payback of inadvertent overuse of Colorado River water by Colorado River water users in the Lower Division States. This is a condition precedent to the execution of the IA and QSA and must be in place by the time these agreements go into effect.
- Implementation of biological conservation measures to offset potential impacts from the proposed actions that could occur to federally listed fish and wildlife species or their associated critical habitats within the historic floodplain of the Colorado River between Parker Dam and Imperial Dam.

This Technical Memorandum updates the hydrologic analysis of the Final IA EIS, based on determined differences between the proposed QSA and the Water Delivery Agreement.

DIFFERENCES BETWEEN THE QSA AND THE WATER DELIVERY AGREEMENT

Two differences between the proposed QSA and the Water Delivery Agreement were determined to have the potential to result in different hydrologic effects than those analyzed in the Final IA EIS. In narrative form, these differences are as follows:

1. There are changes in the water delivery (Aramp-up@) schedules. Particularly, the rate at which water is transferred from IID to SDCWA and from IID to CVWD is slower under the Water Delivery Agreement versus the proposed QSA. Also, the canal lining projects for the All American and Coachella Canals are delayed slightly. Further, IID has agreed to conserve and transfer up to a total of 145 KAF of additional water when needed to meet the Interim Surplus Guidelines (ISG) agricultural reduction benchmarks. There are other minor changes that are detailed in the Water Delivery Agreement (Attachment A), and are included in this analysis. The Water Delivery Agreement also includes two new potential future transfers of water that were not analyzed in this Technical Memorandum. These two transfers, up to 800 KAF each, could be transferred from IID to MWD if and when a Salton Sea Restoration Plan is approved. The timing and ultimate quantity of water that will be transferred depends on the specific Restoration Plan that may be adopted at some future date. As such, because of the uncertainty of the timing and actual quantities, these transfers were not analyzed in this Technical Memorandum. Further analysis would be required for any federal action related to these transfers of water. Finally, the Water Delivery Agreement provides for the potential delivery of up to 135 KAFY (originally 35 KAFY was considered in the proposed QSA) of Colorado River water to CVWD pursuant to a State Water Project Exchange between CVWD and MWD. When requested by MWD, this water would be delivered by the Secretary to CVWD at Imperial Dam. Such deliveries would increase the river flows below Parker Dam, since this water would otherwise be diverted by MWD at Lake Havasu. However, these water transfers are not expected to occur every year and in some years, the quantities may be substantially less than 135 KAFY. In the years when these transfers do occur, the increased flows in this river reach will result in a slightly positive effect. For the Final IA EIS, in order to analyze the maximum impact with respect to river flows, the originally proposed 35 KAF exchange was not modeled. Consistent with that assumption, we have not analyzed the potential benefits to river flows that may result from the 135 KAFY exchange in this Technical Memorandum.
2. There is a provision in the Water Delivery Agreement requiring the signatory California parties to repay previously incurred overruns for 2001 and 2002. The Water Delivery Agreement states, in part:

“any existing overruns in calendar years 2001 and 2002 by parties to this Agreement must be repaid within an eight-year period beginning in calendar year 2004 in accordance with the schedule attached hereto in Exhibit C.... Repayment of any overruns other than for calendar years 2001 and 2002 shall be pursuant to the Inadvertent Overrun and Payback Policy”

Overruns of 43,500 acre-feet (AF) and 269,700 AF were incurred in 2001 and 2002, respectively. A copy of the repayment schedule established for the

overruns incurred by the California parties is included in Exhibit C of the Water Delivery Agreement (Attachment A). It is important to note that the overruns incurred in 2001 and 2002 and the subsequent paybacks are independent of the proposed IOP Policy. However, the Secretary and the agencies have agreed that these overrun amounts will be paid back, albeit under different provisions to those specified in the IOP Policy.

As noted above, the analyses conducted for the Final IA EIS were based on certain assumptions with respect to future water transfers between the California parties. The quantity and timing of the different transfers outlined in the proposed QSA provisions were modeled for the Final IA EIS to evaluate potential effects that could result from these transfers. In order to update the hydrologic analysis of the Final IA EIS, the differences between the transfer schedules modeled for the Final IA EIS and the updated schedules provided in the Water Delivery Agreement must first be quantified.

Summaries of the water transfer schedules used in the modeling of the Final IA EIS and the transfers proposed in the Water Delivery Agreement are provided in Table 1 and Table 2, respectively. Table 2 was derived from Exhibit B of the Water Delivery Agreement, consistent with the assumptions used for the analysis in the Final IA EIS. Table 2 and Exhibit B may be directly compared as follows:

- Column 4 of Exhibit B (“IID Reduction: MWD 1988 Agreement Transfer”) is not included in Table 2, because this transfer (110 KAF from IID to MWD under the 1988 Conservation Agreement) was included in the No Action conditions of the Final IA EIS.
- Column 5 of Exhibit B (“IID Reduction: SDCWA Transfer”) is equivalent to the column “SDCWA Transfer” in Table 2.
- Column 6 of Exhibit B (“IID Reduction: AAC Lining, IID, SDCWA & SLR”) is equivalent to the column “AAC Lining IID SDCWA & SLR” in Table 2.
- Column 7 of Exhibit B (“IID Reduction: SDCWA Mitigation Transfer”) is not included in Table 2, as this transfer is not included in this Technical Memorandum analysis (see discussion above).
- Column 8 of Exhibit B (“Intra-Priority 3 Transfer IID/CVWD”) is equivalent to the column “IID Conservn. of 1st and 2nd 50 KAF (To MWD)” in Table 2, as it was assumed in the Final IA EIS analysis that this conserved water would go to MWD to achieve a maximum impact scenario with respect to river flows below Parker Dam.
- Column 9 of Exhibit B (“IID Reduction: MWD Transfer with Salton Sea Restoration”) is not included in Table 2, as this transfer is not included in this Technical Memorandum analysis (see discussion above).
- Column 10 of Exhibit B (“IID Reduction: Conditional ISG Backfill”) is equivalent to the column “Conditional ISG Backfill” in Table 2.
- Column 11 of Exhibit B (“IID Reduction: Misc. PPR’s”) is equivalent to the column “IID PPR’s” in Table 2.
- Column 15 of Exhibit B (“CVWD Reduction: CC Lining, IID, SDCWA & SLR”) is equivalent to the column “CC Lining SDCWA & SLR” in Table 2.

- Column 16 of Exhibit B (“CVWD Reduction: Misc. PPR’s”) is equivalent to the column “CVWD PPR’s” in Table 2.
- Column 18 of Exhibit B (“Intra-Priority Transfer IID/CVWD”) is not included in Table 2 as it was already included as column “IID Conservn. of 1st and 2nd 50 KAF (To MWD)”
- Column 19 of Exhibit B (“CVWD Addition: Intra-Priority 3 Transfer MWD/CVWD”) is equivalent to the column “IID/MWD 1988 Agmt. Transfer” in Table 2, as it was assumed in the Final IA EIS that 20 KAF of that conserved water would go back to CVWD.

A comparison of Table 1 and Table 2 shows that the maximum water transfer amounts, under the assumptions used for the analysis in the Final IA EIS, are essentially the same. By 2026, a maximum of 388.2 KAF of transfers is achieved under the Final IA EIS (Table 1) and a maximum of 391.2 KAF of transfers is achieved for the Water Delivery Agreement (Table 2). The major difference lies in the rate with which the total water transfers will be implemented as shown in Table 3. Again, it should be noted that these differences do not include the two 800 KAF transfers for Salton Sea Restoration and the potential State Water Project exchange.

**Table 1.
Water Transfer Schedule Considered in the Final IA EIS (KAF)**

Year	SDCWA Transfers	AAC Lining IID, SDCWA & SLR	IID Conservn. of 1st & 2nd 50KAF (To MWD)	IID PPRs	Total IID Transfers	CC Lining SDCWA & SLR	CVWD PPRs	IID/MWD 1988 Agrmt Transfer to CVWD	Total CVWD Transfers	Total Transfers
2002	20.0	0.0	0.0	11.5	31.5	0.6	3.0	(20.0)	(16.4)	15.1
2003	40.0	0.0	0.0	11.5	51.5	11.5	3.0	(20.0)	(5.5)	46.0
2004	60.0	0.0	0.0	11.5	71.5	25.6	3.0	(20.0)	8.6	80.1
2005	82.5	16.9	2.5	11.5	113.4	26.0	3.0	(20.0)	9.0	122.4
2006	105.0	16.9	5.0	11.5	138.4	26.0	3.0	(20.0)	9.0	147.4
2007	122.5	67.7	7.5	11.5	209.2	26.0	3.0	(20.0)	9.0	218.2
2008	140.0	67.7	10.0	11.5	229.2	26.0	3.0	(20.0)	9.0	238.2
2009	160.0	67.7	15.0	11.5	254.2	26.0	3.0	(20.0)	9.0	263.2
2010	180.0	67.7	20.0	11.5	279.2	26.0	3.0	(20.0)	9.0	288.2
2011	200.0	67.7	25.0	11.5	304.2	26.0	3.0	(20.0)	9.0	313.2
2012	200.0	67.7	30.0	11.5	309.2	26.0	3.0	(20.0)	9.0	318.2
2013	200.0	67.7	35.0	11.5	314.2	26.0	3.0	(20.0)	9.0	323.2
2014	200.0	67.7	40.0	11.5	319.2	26.0	3.0	(20.0)	9.0	328.2
2015	200.0	67.7	45.0	11.5	324.2	26.0	3.0	(20.0)	9.0	333.2
2016	200.0	67.7	50.0	11.5	329.2	26.0	3.0	(20.0)	9.0	338.2
2017	200.0	67.7	55.0	11.5	334.2	26.0	3.0	(20.0)	9.0	343.2
2018	200.0	67.7	60.0	11.5	339.2	26.0	3.0	(20.0)	9.0	348.2
2019	200.0	67.7	65.0	11.5	344.2	26.0	3.0	(20.0)	9.0	353.2
2020	200.0	67.7	70.0	11.5	349.2	26.0	3.0	(20.0)	9.0	358.2
2021	200.0	67.7	75.0	11.5	354.2	26.0	3.0	(20.0)	9.0	363.2
2022	200.0	67.7	80.0	11.5	359.2	26.0	3.0	(20.0)	9.0	368.2
2023	200.0	67.7	85.0	11.5	364.2	26.0	3.0	(20.0)	9.0	373.2
2024	200.0	67.7	90.0	11.5	369.2	26.0	3.0	(20.0)	9.0	378.2
2025	200.0	67.7	95.0	11.5	374.2	26.0	3.0	(20.0)	9.0	383.2
2026 to 2046	200.0	67.7	100.0	11.5	379.2	26.0	3.0	(20.0)	9.0	388.2
2047 to 2076	200.0	67.7	50.0	11.5	329.2	26.0	3.0	(20.0)	9.0	338.2

Table 2.
Water Transfer Schedule Considered in the Water Delivery Agreement (KAFY)

Year	SDCWA Transfers	AAC Lining IID, SDCWA & SLR	IID Consvrn. of 1st & 2nd 50KAF (To MMD)	IID PPPs	IID Conditional ISG Backfill	Total IID Transfers	CC Lining SDCWA & SLR	CVWD PPPs	IID/MWD 1988 Agrmt Transfer to CVWD	Total CVWD Transfers	Total Transfers
2003	10	0.0	0.0	11.5	0.0	21.5	0.0	3.0	(20.0)	(17.0)	4.5
2004	20	0.0	0.0	11.5	0.0	31.5	0.0	3.0	(20.0)	(17.0)	14.5
2005	30	0.0	0.0	11.5	0.0	41.5	0.0	3.0	(20.0)	(17.0)	24.5
2006	40	0.0	0.0	11.5	9.0	60.5	26.0	3.0	(20.0)	9.0	69.5
2007	50	0.0	0.0	11.5	0.0	61.5	26.0	3.0	(20.0)	9.0	70.5
2008	50	67.7	4.0	11.5	0.0	133.2	26.0	3.0	(20.0)	9.0	142.2
2009	60	67.7	8.0	11.5	0.0	147.2	26.0	3.0	(20.0)	9.0	156.2
2010	70	67.7	12.0	11.5	0.0	161.2	26.0	3.0	(20.0)	9.0	170.2
2011	80	67.7	16.0	11.5	0.0	175.2	26.0	3.0	(20.0)	9.0	184.2
2012	90	67.7	21.0	11.5	0.0	190.2	26.0	3.0	(20.0)	9.0	199.2
2013	100	67.7	26.0	11.5	0.0	205.2	26.0	3.0	(20.0)	9.0	214.2
2014	100	67.7	31.0	11.5	0.0	210.2	26.0	3.0	(20.0)	9.0	219.2
2015	100	67.7	36.0	11.5	0.0	215.2	26.0	3.0	(20.0)	9.0	224.2
2016	100	67.7	41.0	11.5	0.0	220.2	26.0	3.0	(20.0)	9.0	229.2
2017	100	67.7	45.0	11.5	0.0	224.2	26.0	3.0	(20.0)	9.0	233.2
2018	130	67.7	63.0	11.5	0.0	272.2	26.0	3.0	(20.0)	9.0	281.2
2019	160	67.7	68.0	11.5	0.0	307.2	26.0	3.0	(20.0)	9.0	316.2
2020	192.5	67.7	73.0	11.5	0.0	344.7	26.0	3.0	(20.0)	9.0	353.7
2021	205	67.7	78.0	11.5	0.0	362.2	26.0	3.0	(20.0)	9.0	371.2
2022	202.5	67.7	83.0	11.5	0.0	364.7	26.0	3.0	(20.0)	9.0	373.7
2023	200	67.7	88.0	11.5	0.0	367.2	26.0	3.0	(20.0)	9.0	376.2
2024	200	67.7	93.0	11.5	0.0	372.2	26.0	3.0	(20.0)	9.0	381.2
2025	200	67.7	98.0	11.5	0.0	377.2	26.0	3.0	(20.0)	9.0	386.2
2026	200	67.7	103.0	11.5	0.0	382.2	26.0	3.0	(20.0)	9.0	391.2
2027	200	67.7	103.0	11.5	0.0	382.2	26.0	3.0	(20.0)	9.0	391.2
2028	200	67.7	103.0	11.5	0.0	382.2	26.0	3.0	(20.0)	9.0	391.2
2029-2037	200	67.7	103.0	11.5	0.0	382.2	26.0	3.0	(20.0)	9.0	391.2
2038-2047	200	67.7	103.0	11.5	0.0	382.2	26.0	3.0	(20.0)	9.0	391.2
2048-2077	200	67.7	100.0	11.5	0.0	379.2	26.0	3.0	(20.0)	9.0	388.2

Table 3.
Differences in Total Transfers Between
Water Delivery Agreement and Final IA EIS (KAFY)¹

Year	Difference	Year	Difference
2003	(42)	2014	(109)
2004	(66)	2015	(109)
2005	(98)	2016	(109)
2006	(78)	2017	(110)
2007	(148)	2018	(67)
2008	(96)	2019	(37)
2009	(107)	2020	(5)
2010	(118)	2021	8
2011	(129)	2022	6
2012	(119)	2023-2047	3
2013	(109)	2048-2077	0

¹ Not including the two 800 KAF transfers for Salton Sea restoration

ANALYSIS OF POTENTIAL HYDROLOGIC IMPACTS

The Final IA EIS identified the portions of the Colorado River system for which substantive hydrologic changes might occur under the proposed action. These portions were as follows: Lake Powell, Lake Mead, the Hoover Dam to Parker Dam river reach, the Parker Dam to Imperial Dam river reach, and Transboundary Effects (i.e., flows to Mexico in excess of their apportionment). Consistent with those analyses, potential effects due to the differences outlined above were considered for the same portions of the River system.

POTENTIAL HYDROLOGIC EFFECTS OF THE CHANGE IN WATER TRANSFER SCHEDULES

As previously shown, the maximum water transfer amounts are essentially the same for the transfers considered for the Final IA EIS and the transfers considered by the Water Delivery Agreement (388.2 KAF and 391.2 KAF respectively). The major difference is in the rate in which the total water transfers will be implemented. Under the Water Delivery Agreement, the transfers proceed at a slower rate, with differences near or above 100 KAF from years 2007 through 2017 (not including the two 800 KAF transfers for Salton Sea restoration).

Lake Mead and Lake Powell

The analysis conducted for the Final IA EIS determined that potential changes in system storage (i.e., storage in Lakes Powell and Mead) due to the proposed water transfers and IA are expected to be minor. Specifically, the IA allows transfers of water between the California parties within the State's total apportionment of 4.4 MAF (i.e., under Normal conditions). The same is true for the Water Delivery Agreement. Under normal conditions, these transfers would have no impact on Lake Mead's storage.

As determined in the Final IA EIS, under surplus conditions, the total delivery to California would be somewhat less under the IA conditions versus the No Action conditions. This is primarily the result of MWD needing less water from storage to meet their Full Domestic and Partial Domestic schedules under the ISG, due to receipt of the water transferred from agricultural uses. The impact of the reduced California deliveries under these surplus levels would be a slight increase in Lake Mead's contents, and under equalization conditions, a corresponding minor increase in Lake Powell, when compared to No Action conditions.

However, due to the slower implementation of the transfers, particularly throughout the ISG period, California's demand for, and take of, surplus water would be somewhat greater under the Water Delivery Agreement, when compared to the IA conditions described in the Final IA EIS.

To quantify these potential changes to storage in Lake Mead, the amount of surplus water that would remain in storage was compared for the Water Delivery Agreement, the IA, and the No-Action conditions. This comparison assumes all years are Full Domestic surplus years to capture the maximum impact with respect to Lake Mead storage levels. Given this assumption, the amount of surplus water that would remain in storage is then relative to the amount of water needed to meet the Direct Delivery Domestic Use by MWD (1250 KAF reduced by the amount of basic apportionment available to MWD), as specified in the ISG. The effect of transfers then is to reduce the amount of water needed to meet that use and therefore can be viewed as water remaining in storage.

It was assumed in the Final IA EIS analysis that the ISG benchmarks would be met by California, through reductions in agricultural or urban uses or both. This was particularly evident under No Action conditions, where it was assumed that MWD would meet the benchmarks by reductions in their use. For this comparison, an identical modeling assumption was made.

Given that modeling assumption, the amount of surplus water remaining in storage depends on the volume of water transferred to urban water users plus any reductions in water use that those urban users must make to meet the ISG benchmarks. Therefore, under the No Action conditions modeled in the Final IA EIS, the amount of surplus water remaining in storage is equal to the amount of reduction in urban use needed to meet the benchmarks. Since the transfers considered in the Final IA EIS were sufficient to meet the benchmarks, no further reductions were necessary and the amount of surplus water remaining in storage would be equal to the amount transferred from agricultural to urban use. For the Water Delivery Agreement transfers considered in this Technical Memorandum (see the discussion in the section titled Differences between the QSA and the Water Delivery Agreement), the benchmarks would not be met without additional reductions in use (approximately 30 to 70 KAF in any year).² It is assumed that these additional reductions in use could be achieved by reductions in urban use, through other agricultural transfers such as were considered in the Cumulative Analysis in the Final IA EIS, or by utilizing the "ISG Backfill" transfer. Assuming the additional reductions would occur, the amount of surplus water remaining in storage would be no less than that which was observed under the No Action conditions (i.e., the benchmarks would be met exactly, just as for the No Action conditions).

Therefore, the potential impacts to Lake Mead (and therefore to Lake Powell) that may result from the reduced rate of transfers considered in the Water Delivery Agreement fall within the range of impacts as described in the Final IA EIS.

Hoover to Parker Dam Reach

Under Normal conditions, the proposed water transfers will not increase or decrease the total amount of water that would be used by the California parties in future years. Rather, the transfers effectively change the point of delivery of the transferred water. In the Final IA EIS, transfers from IID to CVWD and transfers from IID to MWD/SDCWA were analyzed. The transfers from IID to CVWD would not change the point of delivery of the water. The transfers from IID to MWD/SDCWA would shift the point of delivery of the water from Imperial Dam to Parker Dam. However, this shift in the point of delivery would not affect the flows in the Hoover to Parker Dam reach under normal conditions. Since the Water Delivery Agreement considered essentially the same transfers, albeit at a slower rate, the amount of water available in the river reach between Hoover and Parker Dams would not change.

Under surplus conditions, river flows in this reach would be somewhat higher than during normal conditions due to the delivery of surplus water (primarily to MWD). Recall that the existence of surplus conditions is primarily dependent upon Lake Mead storage levels. As stated above, potential impacts to Lake Mead of the reduced rate of water transfers

² Under the assumptions used in this analysis, the "1st and 2nd 50 KAF" transfer is assumed to be transferred to MWD and the two 800 KAF transfers for Salton Sea restoration are not considered.

considered in the Water Delivery Agreement are within the range of impacts as described in the Final IA EIS. Therefore, the same conclusion is drawn for river flows under surplus conditions in this reach.

Parker Dam to Imperial Dam Reach

As noted above, under Normal conditions, the proposed water transfers will not increase or decrease the total amount of water that would be used by the California parties in future years, but would effectively change the point of delivery of the transferred water. In particular, the IID to MWD/SDCWA transfers would shift the point of delivery of the water from Imperial Dam to Parker Dam. In the Final IA EIS, it was determined that, under the IA, the transfers would shift diversion of between 183 KAF and 388 KAF from Imperial Dam to Parker Dam, decreasing flow in this reach. The analysis actually included 400 KAF of transfers, based on the previous analyses done for the Biological Assessment for Proposed Interim Surplus Criteria, Secretarial Implementation Agreements for California Water Plan Components and Conservation Measures on the Lower Colorado River (included as Appendix D of the Final IA EIS). The findings of this analysis determined that these transfers could result in lowering of median annual water levels by up to 0.4 feet in this reach. However, it was further determined that this reduction was well within the natural fluctuation due to the hydrologic variability in this reach. The conclusion in the Final IA EIS was that the transfers considered in the IA would not result in any significant impacts to this river reach.

The maximum amount of transfers considered in the Water Delivery Agreement is 391.2 KAF, an amount that is within the range of what was previously analyzed. Therefore, the potential impacts to this reach that may result from the implementation of the reduced rate of transfers considered in the Water Delivery Agreement are the same as described in the Final IA EIS.

Under surplus conditions, river flows in this reach would be somewhat higher than during normal conditions due to the delivery of surplus water. During Quantified Surplus conditions, additional water would be delivered to IID and CVWD, and during Flood Control surplus conditions, to IID, CVWD, and Mexico. Again, since the existence of surplus conditions is primarily dependent upon Lake Mead storage levels and the potential impacts to Lake Mead of the reduced rate of water transfers considered in the Water Delivery Agreement are within the range of impacts as described in the Final IA EIS, the same conclusion is drawn for river flows under surplus conditions in this reach.

Transboundary Effects (Excess Flows to Mexico)

As described in the Final IA EIS, excess flows to Mexico are largely the result of flood control releases originating at Hoover Dam. These flood control releases are dictated by the flood control criteria established by the Army Corps of Engineers and are primarily dependent upon the storage in Lake Mead and the forecasted hydrologic inflow into the River system. As stated above, potential impacts to Lake Mead of the reduced rate of water transfers considered in the Water Delivery Agreement are within the range of impacts as described in the Final IA EIS. Therefore, the same conclusion is drawn for excess flows to Mexico.

POTENTIAL HYDROLOGIC EFFECTS OF 2001/2002 OVERRUN PAYBACK

The 2001/2002 overruns and the related decrease in Lake Mead's storage have already occurred, and therefore, are not a part of the actions proposed under the Water Delivery Agreement. Further, these overruns and their payback are not specifically covered by the proposed IOP Policy. However, the payback for these overruns are scheduled to occur in the future, as specified by Exhibit C of the Water Delivery Agreement (Attachment A); therefore, an analysis of the potential hydrologic impacts of these paybacks is required.

As previously noted, the payback of the 2001 and 2002 overruns is separate from any future overrun paybacks as determined by the proposed policy. However, a brief review of the IOP Policy is helpful in understanding the analysis presented herein.

As stated in the Final IA EIS, the IOP Policy represents a variable year-to-year change to the river, sometimes increasing flow and sometimes decreasing flow, which is not consistent from one year to the next. The degree to which inadvertent overruns would occur depends largely on unplanned uses by individual water districts. In many years some water districts could use less than or equal to their normal apportionments. In other years districts may have inadvertent overruns. For this reason, the IOP Policy was modeled separately from the IA in the Final IA EIS. Within the impact analysis, both the average and the "worst-case" IOP Policy impacts were layered onto impacts of the IA. However, it should be stressed that impacts due to the IOP Policy could vary from year to year, that the worst-case change to river flows or reservoir elevations is the most extreme adverse change anticipated, and that this condition is expected to occur only once over the entire 75 years of analysis. Therefore, this methodology provides an overly conservative assessment of impacts due to the IOP Policy and the combination of the IOP Policy and the IA.

The additional effect of the 2001/2002 paybacks has been analyzed using a similar "layered approach".

Lake Mead and Lake Powell

As specified in the Water Delivery Agreement (Attachment A), the payback for the overruns that were incurred in 2001 and 2002 will begin in 2004 and extend over a maximum of eight years. In each year, each entity would decrease the amount of water it requested to be released from Lake Mead by the amount of the payback. That water would remain in Lake Mead and would be available to satisfy other beneficial uses or would increase the storage content of Lake Mead. Therefore, consistent with similar findings from the previous Final IA EIS analyses, the proposed payback schedule for the 2001 and 2002 overruns will result in more water remaining in Lake Mead, a positive effect on Lake Mead water levels and storage. Therefore, no additional analyses related to Lake Mead water levels and storage is required.

Similarly, equalization releases from Lake Powell may be affected by Lake Mead elevations. Due to the positive effect of the paybacks on Lake Mead, Lake Powell would not be required to release additional water for equalization and therefore, there would be a slight positive effect on the reservoir content of Lake Powell. Therefore, no additional analyses related to Lake Powell water levels and storage is required.

Hoover to Parker Dam Reach

As discussed in the Final IA EIS, river flows are increased when an entity incurs an overrun and decreased when that entity pays back the overrun (or a part thereof). When an entity enters into a payback year, the entity would decrease the water it requested released from Lake Mead, thus this would reduce the flows in the river by an amount of water equal to the payback amount. Therefore, the analysis for river flows is concentrated on those years in which paybacks are required.

As stated previously, the Final IA EIS analyzed the effect of payback from the IOP Policy “on top” of the effect of the IA (i.e., water transfers that would reduce the flows in the Hoover to Parker Dam reach). Under the proposed QSA and the Water Delivery Agreement, there are no transfers being considered that would affect the flow in this reach. Therefore, any reductions to flows in this reach would be due to paybacks, either from the 2001/2002 overrun payback or future IOP Policy paybacks, or both.

Based on modeling of the IOP Policy, the average decrease in flow in this reach was approximately 72 kaf. By adding the proposed payback schedule amount of approximately 39 kaf (from Exhibit C of the Water Delivery Agreement), a total reduction of flow of 111 kaf might be realized. This reduction is well within the natural fluctuation due to the hydrologic variability in this reach (as discussed in the Final IA EIS, page 3.1-3) and is approximately one percent less than average historical flows in the reach. Therefore, no further analysis is required.

Parker Dam to Imperial Dam

As stated previously, the Final IA EIS analyzed the effect of payback from the IOP Policy “on top” of the effect of the IA (i.e., water transfers from below to above Parker Dam) for the reach Parker Dam to Imperial Dam. The potential effects of up to 400 kaf of transfers were analyzed for this reach. Based on modeling of the IOP Policy, the average decrease in flow of approximately 63 kaf was then added to the effect of the water transfers (for a total combined decrease in flow in the reach of 463 kaf).

The 2001/2002 overruns will be paid back in eight years (beginning in 2004 and ending in 2011, as shown in Exhibit C of the Water Delivery Agreement). The IID and CVWD paybacks would affect this reach and total approximately 28 KAF per year. The water transfers proposed by the Water Delivery Agreement ramp-up over this time period (as shown in Table 2) and total 184.2 KAF by year 2011. The total reduction in this reach is then computed by adding the reduction due to the IOP (63 KAF) to the sum of the reductions due to the 2001/2001 paybacks and water transfers (approximately 275 KAF total). This amount is well within the range of flow reductions previously analyzed, and therefore, potential impacts to this reach are the same as described in the Final IA EIS.

Transboundary Effects (Excess Flows to Mexico)

As discussed previously, excess flows to Mexico are largely the result of flood control releases originating at Hoover Dam. These flood control releases are dictated by the flood control criteria established by the Army Corps of Engineers and are primarily dependent upon the storage in Lake Mead and the forecasted hydrologic inflow into the River system.

Due to the positive effect of the paybacks on Lake Mead storage, there would be a slight positive effect on the availability of excess flows to Mexico.

CONCLUSIONS

Based on the analysis conducted herein, it has been determined that the differences between the QSA previously analyzed in the Final IA EIS and the Water Delivery Agreement will not result in significant hydrologic effects or impacts to Lake Powell, Lake Mead, the Hoover Dam to Parker Dam river reach, the Parker Dam to Imperial Dam river reach, and Transboundary Effects (i.e., flows to Mexico in excess of their apportionment).