

Appendix H

Implementation Agreement Among the U.S., the
La Jolla, Pala, Pauma, Rincon and San Pasqual
Bands of Mission Indians, the San Luis Rey Indian
Water Authority, the City of Escondido,
and the Vista Irrigation District

**IMPLEMENTATION AGREEMENT AMONG
THE UNITED STATES OF AMERICA,
THE LA JOLLA, PALA, PAUMA, RINCON AND SAN PASQUAL BANDS
OF MISSION INDIANS,
THE SAN LUIS REY INDIAN WATER AUTHORITY,
THE CITY OF ESCONDIDO, AND
THE VISTA IRRIGATION DISTRICT**

THIS IMPLEMENTATION AGREEMENT ("Implementation Agreement") is entered into as of this 18th day of January, 2001, among the United States of America ("United States"), acting by and through its Secretary of the Interior ("Secretary"); the San Luis Rey River Indian Water Authority, a permanent intertribal entity recognized and approved by Public Law 100-675 ("Indian Water Authority"); the La Jolla, Pala, Pauma, Rincon, and San Pasqual Bands of Mission Indians, acting through the governing bodies of each respective Band as duly recognized by the Secretary ("Indian Bands"); the City of Escondido, a general law city organized and existing under the laws of the State of California, acting on its behalf and as successor to the Escondido Mutual Water Company ("Escondido"); and the Vista Irrigation District, a public agency of the State of California organized and existing under the Irrigation District Act of the State of California ("Vista"); and each of which is at times referred to individually as "Party" and which are at times collectively referred to as "Parties." This Implementation Agreement is entered into pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto, all of which acts are commonly known and referred to as Federal Reclamation Law, including the Act of Congress approved December 21, 1928 (45 Stat. 1057), referred to as the "Boulder Canyon Project Act," and the Act of Congress approved November 17, 1988 (Public Law 100-675), and acts amendatory thereof or supplementary thereto, hereinafter referred to as "Public Law 100-675."

EXPLANATORY RECITALS

- A. WHEREAS, the United States has constructed the All-American Canal and its Coachella Branch ("Coachella Canal") in accordance with the Boulder Canyon Project Act; and
- B. WHEREAS, the Secretary, pursuant to Title II of Public Law 100-675 ("Title II"), is authorized to construct a new lined canal or to line the previously unlined portions of the All-American Canal, from the vicinity of Pilot Knob to Drop 4, or

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to construct seepage recovery facilities in the vicinity of Pilot Knob to Drop 4 ("All-American Canal Lining Project"), and to construct a new lined canal or to line the previously unlined portions of the Coachella Canal from Siphon 7 to Siphon 32 ("Coachella Canal Lining Project"), including measures to protect public safety; and

- C. WHEREAS, appropriate environmental review and compliance for the All-American Canal Lining Project and the Coachella Canal Lining Project have been or are being completed in accordance with state and federal law; and
- D. WHEREAS, the Congress has found the inadequacy of the San Luis Rey River, located in San Diego County, California, to supply the needs of both the Indian Bands, and Escondido, and Vista has given rise to litigation; and
- E. WHEREAS, litigation is pending in the United States District Court for the Southern District of California to determine the rights of the Indian Bands and Escondido and Vista to the water in the San Luis Rey River, related proceedings are pending before the Federal Energy Regulatory Commission, and on November 17, 1988, the President of the United States approved Title I of Public Law 100-675 ("Title I"), to provide for the settlement of this litigation; and
- F. WHEREAS, Title I authorized and directed the Secretary to: (1) arrange for the development of not more than a total of 16,000 acre-feet per year of supplemental water from public lands within the State of California outside the service area of the Central Valley Project; or (2) arrange to obtain not more than a total of 16,000 acre-feet per year either from water conserved by the works authorized in Title II, or through contract with the Metropolitan Water District of Southern California ("MWD"); and
- G. WHEREAS, Title I was amended on October 27, 2000, to require that in order to fulfill the trust responsibility to the Bands, the Secretary, acting through the Commissioner of Reclamation, shall permanently furnish annually 16,000 acre-feet of the water conserved by the works authorized in Title II, for the benefit of

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the Indian Bands and Escondido and Vista (together with the Indian Water Authority, the "San Luis Rey Settlement Parties") in accordance with the settlement agreement referred to in Title I ("Settlement Agreement"), along with power capacity and energy in amounts sufficient to convey said water from Lake Havasu through the Colorado River Aqueduct and to the places of use on the Bands' reservations or in the service areas of Vista and Escondido (the "Local Entities"); and

- H. WHEREAS, MWD, San Diego County Water Authority, the San Luis Rey Settlement Parties, and the United States are involved in the negotiation of the terms and conditions of an agreement which will provide the means to convey, exchange, or otherwise utilize the water conserved for the benefit of the San Luis Rey Settlement Parties; and
- I. WHEREAS, appropriate environmental review and compliance for this Implementation Agreement is being conducted in accordance with federal law.

NOW THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. In order to fulfill the trust responsibility to the Indian Bands, and in accordance with his authority under the Boulder Canyon Project Act, the 1964 Decree in *Arizona v. California*, and Title I of Public Law 100-675, as amended, the Secretary, acting through the Commissioner of Reclamation, shall permanently furnish annually 16,000 acre-feet of the water conserved by the works authorized by Title II of Public Law 100-675 to the Indian Water Authority (for the benefit of the Indian Bands), Escondido, and Vista.

2. Until completion of the construction of the works authorized by Title II, the Secretary shall furnish annually 17% of any water conserved by said works up to a maximum of 16,000 acre-feet per year. After completion of construction, the Secretary shall permanently furnish annually 16,000 acre-feet of the water conserved by said works.

3. The water delivery obligations of the Secretary under paragraphs 1 and 2 above shall exist only when the following conditions are met:

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3.1 The United States, Escondido, Vista, and the Indian Bands have entered into a settlement agreement providing for the complete resolution of all claims, controversies, and issues involved in all of the pending proceedings among the parties in the United States District Court for the Southern District of California and the Federal Energy Regulatory Commission, and stipulated judgments or other appropriate final dispositions have been entered in said proceedings.

3.2 The Indian Water Authority, Indian Bands, Escondido, and Vista have entered into an agreement or agreements with appropriate parties which provide the means to convey, exchange, or otherwise utilize said 16,000 acre feet per year of water for the benefit of the Indian Bands, Escondido, and Vista.

3.3 The Indian Water Authority and the Local Entities shall pay their proportionate share of such costs as are provided by section 203(b) of Title II or are agreed to by them.

4. This Implementation Agreement is subject to and conditioned upon the completion of the pending environmental analysis and review as required by federal law of the effects of the conservation and delivery of water as provided herein. Information obtained from such review may, in the discretion of the Secretary, serve as the basis to modify the terms of this Implementation Agreement. If any of the other Parties to this Implementation Agreement do not agree to such modifications, this Implementation Agreement will be terminated and all Parties will be permitted to proceed as if this Implementation Agreement had never been executed.

IN WITNESS WHEREOF, the Parties have executed this Implementation Agreement as of the day and year first above written.

UNITED STATES OF AMERICA

By: 

Bruce Babbitt

Secretary of the Interior

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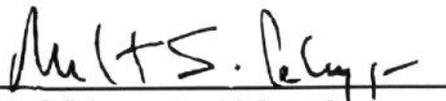
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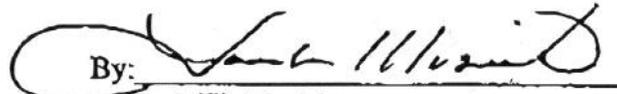
**SAN LUIS REY RIVER INDIAN WATER
AUTHORITY**

By: 
Benjamin A. Magante, Sr.
President

APPROVED AS TO FORM:

By: 
Robert S. Pelcyger, Special Counsel

LA JOLLA BAND OF MISSION INDIANS

By: 
Jack W. Musick
Chairman

PALA BAND OF MISSION INDIANS

By: 
Robert H. Smith
Chairman

PAUMA BAND OF MISSION INDIANS

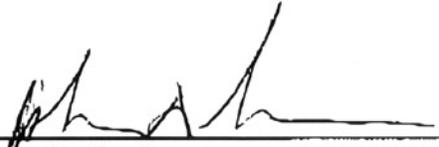
By: 
Chirstobal C. Devers
Chairman

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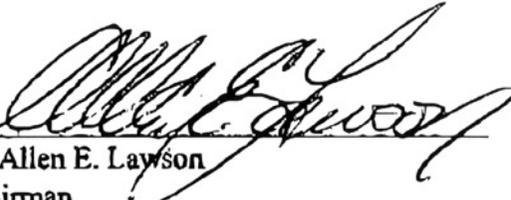
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**RINCON SAN LUISENO BAND OF MISSION
INDIANS**

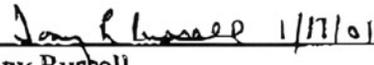
By: 
John D. Currier
Chairman

SAN PASQUAL BAND OF MISSION INDIANS

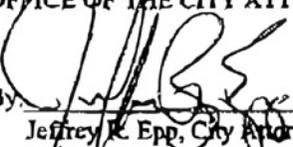
By: 
Allen E. Layson
Chairman

CITY OF ESCONDIDO

By: 
Lori Holt-Pfeiler
Mayor

By:  1/17/01
Tony Russell
Acting City Clerk

**APPROVED AS TO FORM:
OFFICE OF THE CITY ATTORNEY**

By: 
Jeffrey R. Epp, City Attorney

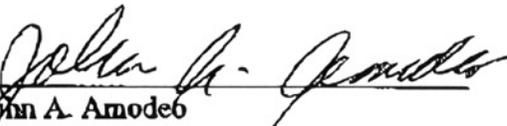
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VISTA IRRIGATION DISTRICT

By: 
Linden R. Burzell
President, Board of Directors

By: 
John A. Amodeo
General Manager and Chief Engineer

APPROVED AS TO FORM:

By: 
Kent H. Foster, General Counsel

Appendix I

Inadvertent Overrun and Payback Policy

APPENDIX I

INADVERTENT OVERRUN AND PAYBACK POLICY

SUMMARY

The Bureau of Reclamation (Reclamation) proposes a policy that will identify inadvertent overruns, will establish procedures that account for inadvertent overruns and will define subsequent payback requirements to the Lower Division States users of Colorado River mainstream, and invites comments on its draft proposal.

SUPPLEMENTARY INFORMATION

In its June 3, 1963 opinion in the case of *Arizona v. California* (373 U.S. 546), the Supreme Court of the United States held that the Congress has directed the Secretary of the Interior (Secretary) to administer a network of useful projects constructed by the Federal Government on the lower Colorado River, and it has entrusted the Secretary with sufficient power to direct, manage, and coordinate their operation. The Court held that this power must be construed to permit the Secretary to allocate and distribute the waters of the mainstream of the Colorado River within the boundaries set down by the Boulder Canyon Project Act (45 Stat. 1057, 43 U.S.C. 617) (BCPA). The Secretary has entered into contracts for the delivery of Colorado River water with entities in Arizona, California, and Nevada in accordance with section 5 of the BCPA. The Secretary has the responsibility of operating Federal facilities on the Colorado River and delivering mainstream Colorado River water to users in Arizona, California, and Nevada that hold entitlements, including present perfected rights, to such water.

Article V of the Decree of the Supreme Court of the United States in *Arizona v. California* dated March 9, 1964 (376 U.S. 340) requires the Secretary to compile and maintain records of diversions of water from the mainstream, of return flow of such water to the mainstream as is available for consumptive use in the United States or in satisfaction of the Mexican Treaty obligation, and of consumptive use of such water. Reclamation reports this data each year in the Decree Accounting Record.

Pursuant to the Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs developed as a result of the Colorado River Basin Project Act of September 30, 1968, the Secretary annually consults with representatives of the governors of the Colorado River Basin States, general public and others and issues an Annual Operating Plan (AOP) for the coordinated operation of the Colorado River reservoirs. Reclamation also requires each Colorado River water user in the Lower Basin to schedule water deliveries in advance for the following calendar year (calendar year is the annual basis for decree accounting of consumptive use in the lower Colorado basin) and to later report its actual water diversions and returns to the mainstream.

Pursuant to 43 CFR part 417, prior to the beginning of each calendar year, Reclamation consults with entities holding BCPA section 5 contracts (Contractor) for the delivery of water. Under these consultations, Reclamation makes recommendations relating to water conservation measures and operating practices in the diversion, delivery, distribution, and use of Colorado River water. Reclamation also makes a determination of the Contractor's estimated water requirements for the ensuing calendar year to the end that deliveries of Colorado River water to each Contractor will not

exceed those reasonably required for beneficial use under the respective BCPA contract or other authorization for use of Colorado River water. Reclamation then monitors the actual water orders, receives reports of measured diversions and return flows from major Contractors and federal establishments, estimates unmeasured diversions and return flows, calculates consumptive use from preliminary diversions and measured and unmeasured return flows, and reports these records on an individual and aggregate monthly basis. Later, when final records are available, Reclamation prepares and publishes the final Decree Accounting Record on a calendar year basis.

For various reasons, a user may inadvertently consumptively use Colorado River water in an amount that exceeds the amount available under its entitlement (inadvertent overrun). Further, the final Decree Accounting Record may show that an entitlement holder inadvertently diverted water in excess of the quantity of the entitlement that may not have been evident from the preliminary records. Reclamation is therefore considering an administrative policy that defines inadvertent overruns, establishes procedures that account for the inadvertent overruns and defines the subsequent requirements for pay back to the Colorado River mainstream.

Any effects of the proposed administrative policy decision on the environment will be addressed pursuant to the National Environmental Policy Act.

INADVERTENT OVERRUNS

Reclamation is proposing for the Lower Colorado River Basin an inadvertent overrun policy that would include the following features:

- a. Inadvertent overruns are those which the Secretary deems to be beyond the control of the water user; for example, overruns due to the discrepancy between preliminary and final stream flow and diversion records, or overruns due to an unanticipated but lawful use by a higher-priority water user.
- b. An inadvertent overrun is Colorado River water diverted, pumped or received by an entitlement holder of the Lower Division States that is in excess of the water user's entitlement for that year. The inadvertent overrun policy provides a structure to pay back the amount of water diverted, pumped or received in excess of entitlement. The inadvertent overrun policy does not create any right or entitlement to this water, nor does it expand the underlying entitlement in any way. An entitlement holder has no right to order, divert, pump or receive an inadvertent overrun. If, however, water is diverted, pumped or received inadvertently in excess of entitlement, and the Contractor's State's apportionment of Colorado River water for that year is exceeded, the inadvertent overrun policy will govern the payback. The IOP Policy cannot be applied to diversion or acreage based entitlements without appropriate methodology, nor does this policy apply in any manner to the deliveries made under the United States Mexico Water Treaty of 1944.
- c. Payback will be required to commence in the calendar year that immediately follows the release date of a Decree Accounting Record that reports uses that are in excess of an individual's entitlement.
- d. Payback must be made only from measures that are above and beyond the normal consumptive use of water (extraordinary conservation measures). Extraordinary

conservation measures mean actions taken to conserve water that otherwise would not return to the mainstream of the Colorado River and be available for beneficial consumptive use in the United States or to satisfy the Mexican treaty obligation. Any entitlement holder with a payback obligation must submit to Reclamation, along with its water order, a plan which will show how it will intentionally forgo use of Colorado River water by extraordinary conservation and/or fallowing measures sufficient to meet its payback obligation and which demonstrates that the measures being proposed are in addition to those being implemented to meet an existing transfer or conservation agreement, and are in addition to the measures found in its Reclamation approved conservation plan. Plans for payback could also include supplementing Colorado River system water supplies with non-system water supplies through exchange or forbearance or other acceptable arrangements, provided that non-system water is not physically introduced into the system. Water banked off-stream or groundwater from areas not hydrologically connected to the Colorado River or its tributaries are examples of such supplemental supplies. Water ordered but subsequently not diverted is not included in this policy in any manner. If such water is not charged against a user's entitlement, it will not be counted in any other manner with respect to decree accounting.

- e. Maximum cumulative inadvertent overrun accounts will be specified for individual entitlement holders as 10 percent of an entitlement holder's normal year consumptive use entitlement. With regard to a conservation transfer, the specific terms of the transfer would address whether or not the proportionate overrun account is also transferred. (Normal year means a year for which the Secretary has determined that sufficient mainstream Colorado River water is available for release to satisfy 7.5 maf of annual consumptive use in the States of California, Arizona and Nevada.)
- f. The number of years within which an overrun, calculated from consumptive uses reported in final Decree Accounting Records, must be paid back, and the minimum payback required for each year shall be as follows:
 - 1. In a year in which the Secretary makes a flood control release or a space building release, any accumulated amount in the overrun account will be forgiven.
 - 2. If the Secretary has declared a 70 R surplus in the AOP, any payback obligation will be deferred at the entitlement holder's option.
 - 3. In a year when Lake Mead elevation is between the elevation for a 70R surplus declaration and elevation 1125 feet above mean sea level on January 1, the payback obligation incurred in that year must be paid back in full within 3 years of the reporting of the obligation, with a minimum payback each that year being of the greater of 20 percent of the individual entitlement holder's maximum allowable cumulative overrun account amount or 33.3 percent of the total account balance.
 - 4. In a year when Lake Mead elevation is at or below elevation 1,125 feet above mean sea level on January 1, the total account balance will be paid back in full in that calendar year.

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5. For any year in which the Secretary declares a shortage under the Decree, the total account will be paid back in full that calendar year, and further accumulation of inadvertent overruns will be suspended as long as shortage conditions prevail.
- g. A separate inadvertent overrun account may be established in those limited cases in which a lower priority user is, or has agreed to be, responsible for consumptive uses by one or more un-quantified senior water entitlement or right holders having finite service area acreage. The separate inadvertent overrun account will be limited to a maximum cumulative amount of 10 percent of the senior right holders average consumptive use. Such inadvertent overrun accounts will be the assigned responsibility of the lower priority user in addition to their own entitlement based inadvertent overrun account. If, however, such senior entitlement or right holders' approved aggregate calendar year water orders are in excess of the specified amount above which the lower priority user will be responsible, such excess will not be deemed inadvertent and the lower priority user's water order for that year will be reduced accordingly by Reclamation.
- h. Each month, Reclamation will monitor the actual water orders, receive reports of measured diversions and return flows from Contractors and federal establishments, estimate unmeasured diversions and return flows, and project individual and aggregate consumptive uses for the year. Should preliminary determinations indicate that monthly consumptive uses by individual users, or aggregate uses, when added to the approved schedule of uses for the remainder of that year, exceed contract entitlements but are not exceeding the maximum inadvertent overrun account amount, Reclamation will notify in writing the appropriate entities that the preliminary determinations are forecasting annual uses in excess of their entitlements.
- i. During years in which an entitlement holder is forbearing use to meet its payback obligation, Reclamation would monitor the implementation of the extra-ordinary conservation measures, and require that the districts consumptive use be at or below their adjusted entitlement. Should the district actual monthly deliveries for about the first 5 months of the year exceed their forecasted orders, and projections indicate the district's end of year use is likely to be 5 percent above their adjusted entitlement, Reclamation will notify the district in writing. At the end of about 7 months if it continues to appear that the district is likely to be above their adjusted entitlement Reclamation will notify the district that they are at risk of exceeding their adjusted entitlement, and having their next years orders placed under enforcement proceedings. Reclamation will monitor the implementation of the extraordinary conservation measures and monitor the forbearance of consumptive use of Colorado River water. Should preliminary determinations of the implementation of extraordinary conservation or of monthly Colorado River consumptive uses indicate that sufficient extraordinary conservation or sufficient forbearance of Colorado River consumptive use is not projected to occur, Reclamation will notify the appropriate entitlement holders in writing that the preliminary determinations are forecasting that their annual payback obligations are not on target or being met. If this condition occurs for two consecutive years, in the second year Reclamation would enter enforcement proceedings, will advise the entitlement holder in writing by July 31, will consult with the entitlement holder on a modified release schedule and will limit releases to the entitlement holder for the remainder of the year such that by the end of the year the individual entitlement holder has met their payback obligation.

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- j. Under enforcement proceedings, during the year, Reclamation would again monitor the implementation of the extra-ordinary conservation measures, and require that the districts consumptive use be at or below their re-adjusted entitlement. Should the district actual monthly deliveries for about the first 5 months exceed their forecasted orders, and projections indicate the district's end of year use is likely to be 5 percent above their re-adjusted entitlement, Reclamation will notify the district in writing that they are at risk of being subjected to enforcement proceedings. Should the district actual monthly deliveries for the first 7 months exceed their forecasted orders, and projections indicate the district's end of year use is likely to be above their adjusted entitlement Reclamation would advise the entitlement holder in writing by July 31, consult with the entitlement holder on a modified diversion schedule and then limit diversions to the entitlement holder for the remainder of the year such that by the end of the year the individual entitlement holder has met their payback obligation. Should preliminary determinations indicate that monthly consumptive uses by individual users, or aggregate uses, when added to the approved schedule of uses for the remainder of that year, exceed the individual entitlement holder's maximum cumulative overrun account amount, Reclamation will advise the entitlement holder in writing by July 31, will consult with the entitlement holder on a modified release schedule and will limit releases to the entitlement holder for the remainder of the year such that by the end of the year the individual entitlement holder's maximum cumulative overrun account amount has not been exceeded.
 - k. Procedures will be established for accounting for inadvertent overruns on an annual basis and for supplementing the final Decree Accounting Record. The procedures and measures for administering the IOP will be reviewed every 5 years.

For further information, contact Mr. John Redlinger, (702) 293-8592.

Appendix J

Further Explanation of the
Relationship of River Flow and Stage for the
Parker Dam to Imperial Dam Reach of the
Colorado River

Appendix J

Further Explanation of the Relationship of River Flow and Stage for the Parker Dam to Imperial Dam Reach of the Colorado River

INTRODUCTION

This appendix provides further explanation of the modeling methodology used to determine the relationship of river flow and stage in the Parker to Imperial reach. This information was previously presented in Reclamation’s Biological Assessment (BA) for Proposed Interim Surplus Criteria, Secretarial Implementation Agreements for California Water Plan Components, and Conservation Measures (USBR, 2000), included in this EIS as Appendix D. Some additional analyses have been conducted and a summary of the results of these analyses is also presented herein.

MODELING APPROACH USED IN THE BIOLOGICAL ASSESSMENT (BA)

To assess the impacts to open water, marsh habitat, and riparian habitat as a result of potential future changes in flow in the Parker Dam to Imperial Dam reach, a range of possible reductions to the annual flow releases from Parker Dam were analyzed. This flow reduction range (200 KAF to 1.574 MAF) was chosen to capture the most likely, as well as the maximum changes in annual releases from Parker Dam that might occur as the result of a variety of possible future actions, including the Implementation Agreement. The observed annual release volume from Parker Dam for 1996 (approximately 7.3 MAF) was used as the reference point, from which to apply the range of possible future reductions. This particular year was deemed representative at the time of the preparation of the BA as it was a year of above normal deliveries from Parker Dam, reflecting the increased possibility of surplus releases during the Interim Surplus Guideline period. The year was also chosen since the increased deliveries were not due to flood control releases from Hoover Dam. Eight possible future Parker Dam flow release reductions were analyzed within the range as shown in Table J-1.

Table J-1
Reductions from 1996 Annual Parker Dam Flow Release Modeled for River Stage Effects

Reduction (KAF)	0	200	300	400	500	675	948	1,553	1,574
Annual Volume (KAF)	7,300	7,100	7,000	6,900	6,800	6,630	6,350	5,750	5,730

Once the annual volumes were determined, the analysis was conducted in a multi-step process. In summary, the annual Parker release volumes are first disaggregated to monthly, daily, and hourly time steps. The hourly releases are then routed to four (4) sites downstream (Waterwheel gage at River Mile 152.0, Taylor Ferry gage at 106.6, Cibola gage at River Mile 87.3, and Imperial Dam at River Mile 49.2). The assumption was made that the routed flow at one location would remain the same until it reached the halfway point to the next downstream routing location. The resulting hourly flows are then aggregated to daily flows and the daily flows are then converted to river stage at each site, using a rating formula for each site derived from the output of a HEC-RAS water surface profile model (USBR, 1999). Both an “annual average analysis” and a “monthly min/max analysis” were performed, with the differences in the two analyses lying in the methodologies applied for the disaggregation/aggregation steps. Table J-2 presents the details of each analysis.

**Table J-2
Steps in River Flow and Stage Modeling**

Step in the Process	Annual Average Analysis	Monthly Min/Max Analysis
Disaggregate to monthly	Divide by 12	Use historical monthly data (1996 Parker monthly release and 1996 IID diversion pattern)
Disaggregate to daily	Divide by number of days in the month and convert to cfs	Same
Disaggregate to hourly	Use typical Parker hourly release pattern, depending upon the mean daily release (8 patterns used)	Same
Route downstream	Use the Muskingum technique	Same
Aggregate to daily	Sum hourly values and divide by 24 to get mean daily flow	Choose either the minimum or maximum hourly flow for the day
Convert to stage	Use flow-stage relationship for each site, determined from HEC-RAS water surface profile model	Same

Given the estimated change in stage at the various sites, subsequent analysis was performed to estimate the corresponding effects on backwater areas and groundwater levels. This technical appendix, however, is focused on the flow and stage analysis.

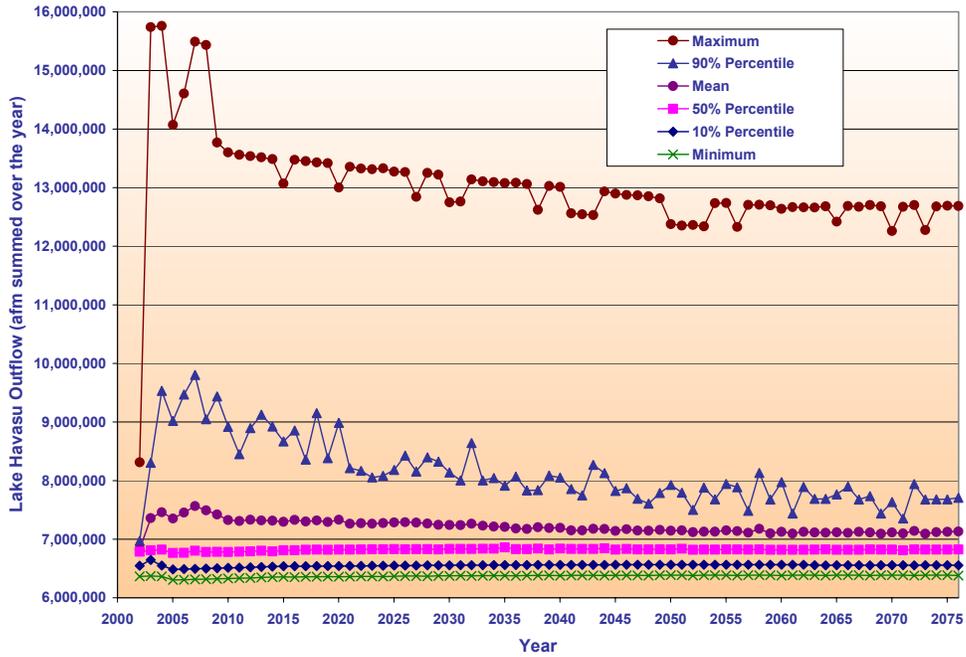
MODELED PARKER DAM RELEASES

Future Parker Dam releases were modeled for several operational scenarios (No Action, Implementation Agreement, Baseline for Cumulative Analysis, and Cumulative Analysis), as described in Appendix C in the EIS. Figure J-1 presents a graphical summary of the annual Parker Dam outflows observed under the modeled No Action conditions. The modeled flows for the No Action scenario assume no future water transfers due to the Implementation Agreement and can therefore be used to compare to the 1996 data chosen for the river analysis. As shown in Figure J-1, the observed annual Parker Dam outflows under this scenario ranged from a minimum of 6.3 maf to a maximum of 15.8 maf over the 75-year period of analysis. The observed trend of decreasing flows over time is due to increased use by the Upper Basin states and subsequently reduced surplus and flood control releases. Certainly, the upper limit of the flows analyzed in the BA (7.3 maf) falls within this range of modeled flows. More specifically, Table J-3 presents the data from Figure J-1 in tabular format for four selected years. As shown, the mean of annual Parker Dam outflows observed under the modeled No Action conditions in years 2016 and 2026 are approximately 7.3 maf. Further analysis showed that 7.3 maf was approximately the lower bound for the 85th percentile values over the entire 75-year period.

**Table J-3
Summary of Observed Parker Dam Outflows for Selected Years
Under Modeled No Action Conditions (KAF)**

	Minimum	10% Percentile	50% Percentile	Mean	90% Percentile	Maximum
2006	6,308	6,488	6,766	7,454	9,467	14,606
2016	6,353	6,536	6,807	7,328	8,856	13,475
2026	6,369	6,549	6,828	7,288	8,426	13,266
2050	6,384	6,564	6,825	7,142	7,925	12,377

**Figure J-1
Range of Observed Parker Dam Outflows Under No Action Modeled Conditions**



ADDITIONAL RIVER FLOW AND STAGE ANALYSIS

Table J-4 summarizes the effect (using the “annual average analysis” method) on water surface elevation for a 400 KAF reduction using 7.3 MAF as the mean annual flow from Parker Dam. The maximum observed river stage difference resulting from modeled reductions in Parker Dam release was approximately 0.4 feet and this occurred at river mile 116.5. The results of this analysis are also presented in graphical form in Figure J-2. River Mile 135.8 shows the backwater effects from Palo Verde Dam that tends to dampen out the effects on water surface elevation due to the flow reductions. It should be noted that this is the exact same data that was previously published in the BA (USBR, 2000).

Reclamation performed an additional analysis for 6.3 MAF as the mean annual flow from Parker Dam. Using this flow as the reference point, a subsequent reduction of 400 KAF was applied to yield an annual flow of 5.9 MAF. Table J-5 summarizes the modeling results (again using the “annual average analysis” method) on water surface elevation for this analysis. The maximum observed difference of approximately 0.4 feet once again occurred at river mile 116.5. These results are illustrated graphically in Figure J-3.

**Table J-4
Potential Impacts to River Stage Based on Parker Dam Annual Outflow Reduction from 7.3 maf to 6.9 maf**

River Mile	River Stage Elevation Coinciding With Parker Dam Outflow of 7.3 maf ¹	River Stage Elevation Coinciding With Parker Dam Outflow of 6.9 maf ¹	River Stage Elevation Difference (feet)	River Stage Elevation Difference (inches)
171.3	334.12	333.84	-0.28	-3.4
167.6	327.66	327.36	-0.30	-3.6
160.9	316.12	315.83	-0.29	-3.5
149.5	298.96	298.67	-0.29	-3.5
146.9	295.52	295.29	-0.23	-2.8
135.8	283.83	283.8	-0.03	-0.4
119.7	248.26	247.98	-0.28	-3.4
116.5	241.93	241.56	-0.37	-4.4
114.6	239.5	239.15	-0.35	-4.2
109.1	230.96	230.62	-0.34	-4.1
103.1	224.5	224.21	-0.29	-3.5
96.7	215.98	215.63	-0.35	-4.2
86.1	207.15	206.87	-0.28	-3.4
80.4	202.15	201.92	-0.23	-2.8
72.2	194.28	194.03	-0.25	-3.0
70.3	193.24	192.99	-0.25	-3.0
66.1	189.2	188.95	-0.25	-3.0

1. River Stage elevation based on NGVD29.

**Table J-5
Potential Impacts to River Stage Based on Parker Dam Annual Outflow Reduction from 6.3 maf to 5.9 maf**

River Mile	River Stage Elevation Coinciding With Parker Dam Outflow of 6.3 maf ¹	River Stage Elevation Coinciding With Parker Dam Outflow of 5.9 maf ¹	River Stage Elevation Difference (feet)	River Stage Elevation Difference (inches)
171.3	333.41	333.11	-0.30	-3.6
167.6	326.90	326.58	-0.32	-3.8
160.9	315.38	315.06	-0.32	-3.8
149.5	298.21	297.88	-0.33	-4.0
146.9	294.94	294.69	-0.25	-3.0
135.8	283.74	283.71	-0.03	-0.4
119.7	247.54	247.23	-0.31	-3.7
116.5	240.97	240.56	-0.41	-4.9
114.6	238.61	238.22	-0.39	-4.7
109.1	230.08	229.70	-0.38	-4.6
103.1	223.74	223.42	-0.32	-3.8
96.7	215.09	214.71	-0.38	-4.6
86.1	206.44	206.13	-0.31	-3.7
80.4	201.55	201.30	-0.25	-3.0
72.2	193.65	193.38	-0.27	-3.2
70.3	192.60	192.32	-0.28	-3.4
66.1	188.55	188.29	-0.26	-3.1

1. River Stage elevation based on NGVD29.

Figure J-2
Potential Impacts to River Stage Based on
Parker Dam Annual Outflow Reduction from 7.3 maf to 6.9 maf

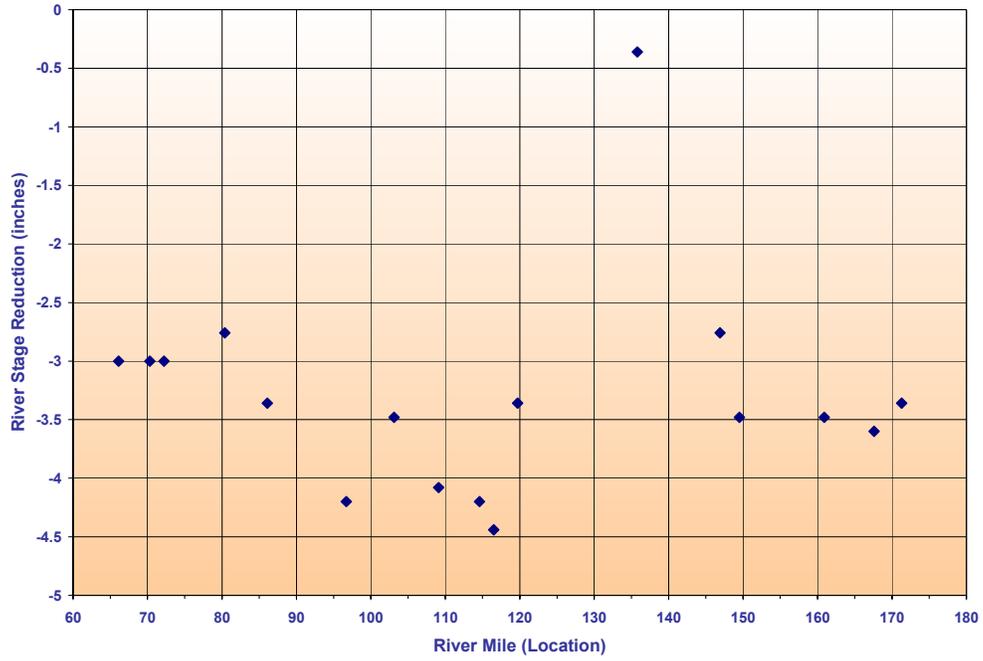
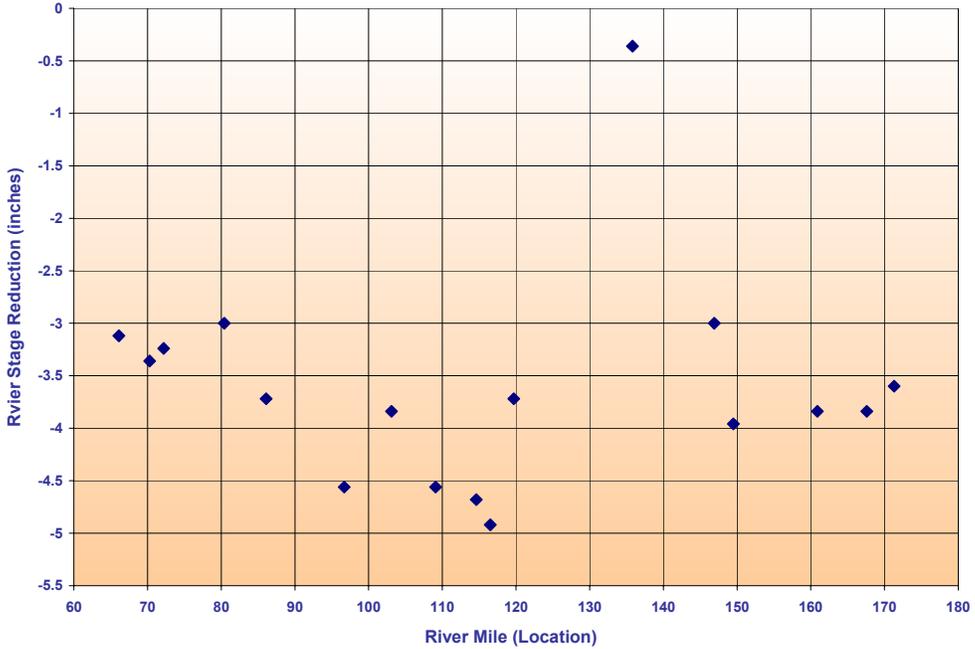


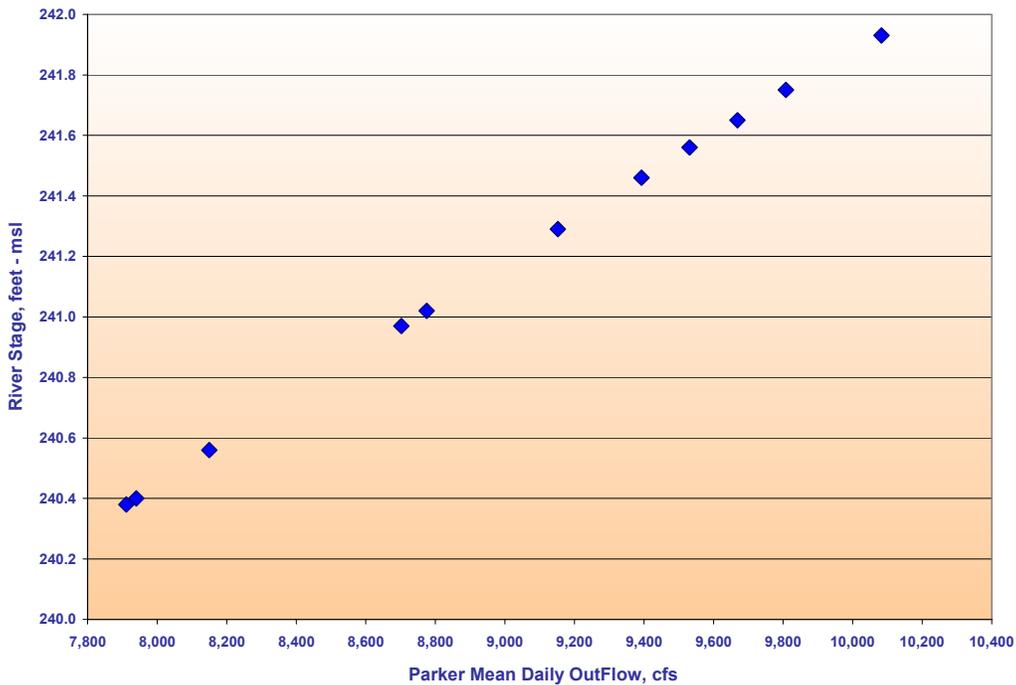
Figure J-3
Potential Impacts to River Stage Based on
Parker Dam Annual Outflow Reduction from 6.3 maf to 5.9 maf



CONCLUSIONS

From these results, it can be seen that using 6.3 MAF as the reference point from which a 400 KAF reduction is applied yields essentially the same effect as seen previously when using 7.3 MAF as the reference point. Figure J-4 graphically presents the relationship between Parker Dam outflow and river stage at River Mile 116.5. It should be noted that the data that was used to produce this Figure J-3 consists of the Parker dam outflow and river stage data that was presented in Tables J-4 and J-5.

Figure J-3
Relationship Of Parker Dam Outflow and River Stage At River Mile 116.5



REFERENCES

USBR, 1999, "MSCP Data: Water Surface Elevations and Flow/Stage Durations", draft report, U.S. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV

USBR, 2000, Biological Assessment (BA) for Proposed Interim Surplus Criteria, Secretarial Implementation Agreements for California Water Plan Components, and Conservation Measures, U.S. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV