EXECUTIVE SUMMARY

COLORADO RIVER INTERIM SURPLUS CRITERIA FINAL ENVIRONMENTAL IMPACT STATEMENT

S.1 INTRODUCTION AND BACKGROUND

S.1.1 INTRODUCTION

The Secretary of the United States Department of the Interior (Secretary), acting through the United States Bureau of Reclamation (Reclamation), is considering the adoption of specific interim criteria under which surplus water conditions may be declared in the lower Colorado River Basin (see Map S-1) during a 15-year period that would extend through 2016.

The Secretary is vested with the responsibility of managing the mainstream waters of the lower Colorado River pursuant to applicable federal law. This responsibility is carried out consistent with a collection of documents known as the *Law of the River*, which includes a combination of federal and state statutes, interstate compacts, court decisions and decrees, an international treaty, contracts with the Secretary, operating criteria, regulations and administrative decisions.

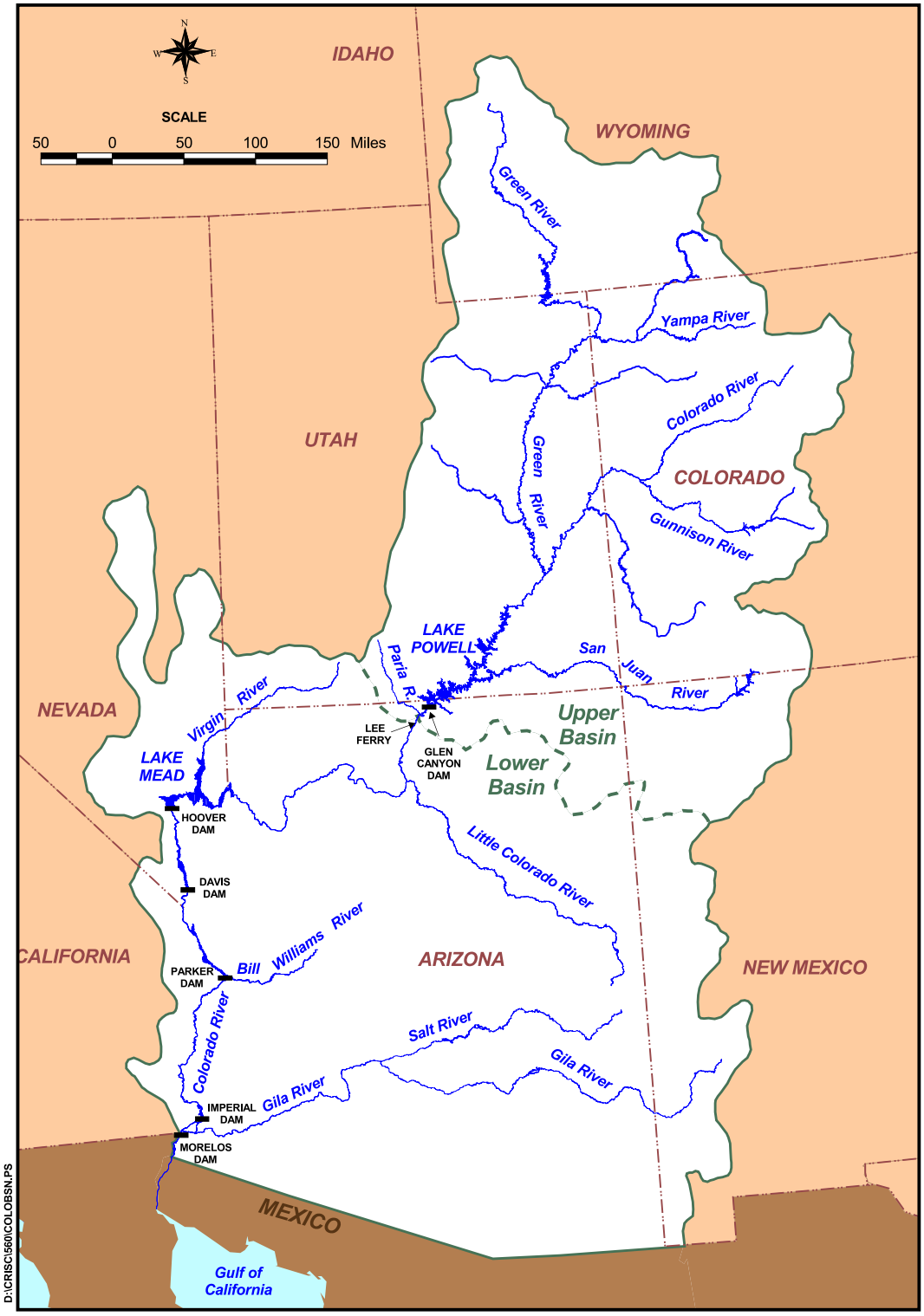
The long-term Colorado River system management objectives are to:

- Minimize flood damages from river flows;
- Release water only in accordance with the 1964 Decree in *Arizona v. California* (Decree);
- Protect and enhance the environmental resources of the basin;
- Provide reliable delivery of water for beneficial consumptive use;
- Increase flexibility of water deliveries under a complex allocation system;
- Encourage efficient use of renewable water supplies;
- Minimize curtailment to users who depend on such supplies; and
- Consider power generation needs.

As the agency that is designated to act on the Secretary's behalf with respect to these matters, Reclamation is the Lead Federal Agency for the purposes of National Environmental Policy Act of 1969 (NEPA) compliance for the development and implementation of the proposed interim surplus criteria. The National Park Service (NPS) and the United States Section of the International Boundary and Water

Commission (USIBWC) are cooperating agencies for purposes of assisting with the environmental analysis.

Map S-1 Colorado River Drainage Basin



A Final Environmental Impact Statement (FEIS), of which this document is a summary, has been prepared pursuant to NEPA, as amended, and the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500 through 1508). The FEIS has been prepared to address the formulation and evaluation of specific interim surplus criteria and to identify the potential environmental effects of implementing such criteria.

The FEIS addresses the environmental issues associated with, and analyzes the environmental consequences of, various alternatives for specific interim surplus criteria. The alternatives addressed in the FEIS are those Reclamation has determined would meet the purpose and need for the federal action and represent a broad range of the most reasonable alternatives.

In addition to this Summary, the FEIS contains three separate volumes. *Volume I* describes the proposed action, the alternatives considered, the analysis of potential effects of interim surplus criteria on Colorado River operation and associated resources, and environmental commitments associated with the action alternatives. *Volume II* contains attachments that are comprised of documents and other supporting material that provide detailed historical background and/or technical information concerning this proposed action. *Volume III* contains reproductions of comment letters from the public resulting from the public review of the Draft Environmental Impact Statement (DEIS) and Reclamation's responses to the comments received.

S.1.2 PROPOSED FEDERAL ACTION

The proposed federal action is the adoption of specific interim surplus criteria pursuant to Article III(3)(b) of the *Criteria for Coordinated Long-Range Operation of the Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968* (Long-Range Operating Criteria [LROC]). The interim surplus criteria would be used annually to determine the conditions under which the Secretary may declare the availability of surplus water for use within the states of Arizona, California and Nevada. The criteria must be consistent with both the Decree entered by the United States Supreme Court in 1964 in the case of *Arizona v. California* and the LROC. The interim surplus criteria would remain in effect for determinations made through calendar year 2015 regarding the availability of surplus water through calendar year 2016, subject to five-year reviews conducted concurrently with LROC reviews, and would be applied each year as part of the Annual Operating Plan (AOP).

S.1.3 BACKGROUND

Pursuant to Article II(B)2 of the Decree, if there exists sufficient water available in a single year for pumping or release from Lake Mead to satisfy annual consumptive use in the states of California, Nevada and Arizona in excess of 7.5 million acre-feet (maf), such water may be determined by the Secretary to be available as surplus water. The Secretary is authorized to determine the conditions upon which such water may be made available. The Colorado River Basin Project Act of 1968 (CRBPA) directs the

Secretary to adopt criteria for coordinated long-range operation of reservoirs on the Colorado River in order to comply with and carry out the provisions of the Colorado River Compact of 1922 (Compact), the Colorado River Storage Project Act of 1956 (CRSPA), the Boulder Canyon Project Act of 1928 (BCPA) and the United States-Mexico Water Treaty of 1944 (Treaty). These criteria are the LROC, discussed further below. The Secretary sponsors a formal review of the LROC every five years.

The LROC provide that the Secretary will determine the extent to which the reasonable consumptive use requirements of mainstream users in Arizona, California and Nevada (the Lower Division states) can be met. The LROC define a *normal year* as a year in which annual pumping and release from Lake Mead will be sufficient to satisfy 7.5 maf of consumptive use in accordance with the Decree. A *surplus year* is defined as a year in which water in quantities greater than normal (i.e., greater than 7.5 maf) is available for pumping or release from Lake Mead pursuant to Article II(B)2 of the Decree after consideration of relevant factors, including the factors listed in the LROC. Surplus water is available to agencies which have contracted with the Secretary for delivery of surplus water, for use when their water demand exceeds their basic entitlement, and when the excess demand cannot be met within the basic apportionment of their state. Water apportioned to, but unused by one or more Lower Division states can be used to satisfy beneficial consumptive use requests of mainstream users in other Lower Division states as provided in Article II(B)(6) of the Decree.

Pursuant to the CRBPA, the LROC are utilized by the Secretary, on an annual basis, to make determinations with respect to the projected plan of operations of the storage reservoirs in the Colorado River Basin. The AOP is prepared by Reclamation, acting on behalf of the Secretary, in consultation with representatives of the Colorado River Basin states (Basin States) and other parties, as required by federal law. The interim surplus criteria would serve to implement the provisions of Article III(3)(b) of the LROC on an annual basis in the determinations made by the Secretary as part of the AOP process.

S.1.3.1 LONG-RANGE OPERATING CRITERIA

The CRBPA required the Secretary to adopt operating criteria for the Colorado River by January 1, 1970. The LROC, adopted in 1970, control the operation of the Colorado River reservoirs in compliance with requirements set forth in the Compact, the CRSPA, the BCPA, the Treaty and other applicable federal laws. Under the LROC, the Secretary makes annual determinations in the AOP (discussed in the following section) regarding the availability of Colorado River water for deliveries to the Lower Division states (Arizona, California and Nevada). A requirement to equalize the active storage between Lake Powell and Lake Mead when there is sufficient storage in the Upper Basin is also included in Section 602(a) of the LROC, as required by the CRBPA.

Section 602 of the CRBPA, as amended, provides that the LROC can only be modified after correspondence with the governors of the seven Basin States and appropriate consultation with such state representatives as each governor may designate. The LROC call for formal reviews at least every five years. The reviews are conducted as a

public involvement process and are attended by representatives of federal agencies, the seven Basin States, Indian Tribes, the general public including representatives of the academic and scientific communities, environmental organizations, the recreation industry and contractors for the purchase of federal power produced at Glen Canyon Dam. Past reviews have not resulted in any changes to the criteria.

S.1.3.2 ANNUAL OPERATING PLAN

The CRBPA requires preparation of an AOP for the Colorado River reservoirs that guides the operation of the system for the water year. The AOP describes how Reclamation will manage the reservoirs over a 12-month period, consistent with the LROC and the Decree. The AOP is prepared annually by Reclamation in cooperation with the Basin States, other federal agencies, Indian Tribes, state and local agencies and the general public, including governmental interests as required by federal law.

As part of the AOP process, the Secretary makes annual determinations regarding the availability of Colorado River water for deliveries to the Lower Division states as described below. The Secretary is required to determine when normal, surplus or shortage conditions occur in the lower Colorado River, based on various factors including storage and hydrologic conditions in the Colorado River Basin.

Normal conditions exist when the Secretary determines that sufficient mainstream water is available to satisfy 7.5 maf of annual consumptive use in the Lower Division states. If a state will not use all of its apportioned water for the year, the Secretary may allow other states of the Lower Division to use the unused apportionment, provided that the use is covered under a contract with the consuming entity.

Surplus conditions exist when the Secretary determines that sufficient mainstream water is available for release to satisfy consumptive use in the Lower Division states in excess of 7.5 maf annually. This excess consumptive use is surplus and is distributed for use in California, Arizona and Nevada in allocations of 50, 46 and 4 percent, respectively. As stated above, if a state will not use all of its apportioned water for the year, the Secretary may allow other states of the Lower Division to use the unused apportionment, provided that the use is covered under a contract with the consuming entity. Surplus water under the Decree, for use in the Lower Division states, was made available by the Secretary in calendar years 1996, 1997, 1998, 1999 and 2000.

Deliveries of surplus water to Mexico in accordance with the Treaty were made in calendar years 1983-1988, 1997, 1998, 1999 and 2000.

Shortage conditions exist when the Secretary determines that insufficient mainstream water is available to satisfy 7.5 maf of annual consumptive use in the Lower Division states. When making a shortage determination, the Secretary must consult with various parties, as set forth in the Decree and consider all relevant factors as specified in the LROC (described above), including Treaty obligations, the priorities set forth in the Decree and the reasonable consumptive use requirements of mainstream water users in

the Lower Division. The Secretary is required to first provide for the satisfaction of the presented perfected rights (PPRs) in the order of their priority, then to users who held contracts on September 30, 1968 (up to 4.4 maf in California) and finally to users who had contracted on September 30, 1968, when the CAP was authorized. To date, a shortage has never been determined.

S.1.4 PURPOSE AND NEED FOR ACTION

To date, the Secretary has applied factors, including but not limited to those found in Article III(3)(b)(i-iv) of the LROC, in annual determinations of the availability of surplus quantities of water for pumping or release from Lake Mead. As a result of actual operating experience and through preparation of AOPs, particularly during recent years when there has been increasing demand for surplus water, the Secretary has determined that there is a need for more specific surplus criteria, consistent with the Decree and applicable federal law, to assist in the Secretary's annual decision making during an interim period.

For many years, California has been diverting more than its normal 4.4 maf apportionment. Prior to 1996, California utilized unused apportionments of other Lower Division states that were made available by the Secretary. Since 1996, California has also utilized surplus water made available by Secretarial determination. California is in the process of developing the means to reduce its annual use of Colorado River water to 4.4 maf. Arizona is approaching full use of its apportionment and Nevada was expected to reach its apportionment in 2000.

Additionally, through adoption of specific interim surplus criteria, the Secretary will be able to afford mainstream users of Colorado River water, particularly those in California who currently utilize surplus flows, a greater degree of predictability with respect to the likely existence, or lack thereof, of surplus conditions on the river in a given year. Adoption of the interim surplus criteria is intended to recognize California's plan to reduce reliance on surplus deliveries, to assist California in moving toward its allocated share of Colorado River water and to avoid hindering such efforts. Implementation of interim surplus criteria would take into account progress, or lack thereof, in California's efforts to achieve these objectives. The surplus criteria would be used to identify the specific amount of surplus water which may be made available in a given year, based upon factors such as the elevation of Lake Mead, during a period within which demand for surplus Colorado River water will be reduced. The increased level of predictability with respect to the prospective existence and quantity of surplus water would assist in planning and operations by all entities that receive surplus Colorado River water pursuant to contracts with the Secretary.

S.1.5 RELATIONSHIP TO UNITED STATES–MEXICO WATER TREATY

Under Article 10(a) of the Treaty, the United Mexican States (Mexico) is entitled to an annual amount of 1.5 maf of Colorado River water. Under Article 10(b) of the Treaty, Mexico may schedule up to an additional 0.2 maf when "there exists a surplus of waters

of the Colorado River in excess of the amount necessary to satisfy uses in the United States." This is in addition to surplus determinations for the Lower Division states made pursuant to Article II(2)(b) of the Decree and Article III(3)(B) of the LROC. The proposed action is not intended to identify, or change in any manner, conditions when Mexico may schedule this additional 0.2 maf. Under current practice, surplus declarations under the Treaty for Mexico are declared when flood control releases are made. Reclamation is currently engaged in discussions with Mexico through the IBWC on the effects of the proposed action.

S.1.6 RELATED AND ON-GOING ACTIONS

A number of ongoing and new actions proposed by Reclamation and other entities are related to the development of interim surplus criteria and the analysis contained in the FEIS. This section describes these actions and their relationship to the development of interim surplus criteria. The following actions have been described in environmental documents, consultation packages under Section 7 of the Endangered Species Act (ESA) or as project planning documents. Where appropriate, the FEIS incorporates by reference information contained in these documents. The documents described below are available for public inspection upon request at Reclamation offices in Boulder City, Nevada; Salt Lake City, Utah; and Phoenix and Yuma, Arizona.

S.1.6.1 CALIFORNIA'S COLORADO RIVER WATER USE PLAN

California's Colorado River Water Use Plan (CA Plan), which was formerly known as the California 4.4 Plan or the 4.4 Plan, calls for conservation measures to be put in place that will reduce California's dependency on surplus Colorado River water. Surplus water is required to meet California's current needs until implementation of the conservation measures can take place. During the period ending in 2016, the State of California has indicated that it intends to reduce its reliance on Colorado River water to meet its water needs above and beyond its 4.4-maf apportionment. It is important for the long-term administration of the system to bring the Lower Basin uses into accordance with the Lower Basin normal apportionment. In order to achieve its goals, California has expressed a need to rely in some measure on the existence of surplus Colorado River water through 2016. These interim surplus criteria could aid California and its primary Colorado River water users as California reduces its consumptive use to 4.4 maf while ensuring that the other Basin States will not be placed at undue risk of future shortages.

The CA Plan contains numerous water conservation projects, intrastate water exchanges and groundwater storage programs. The CA Plan is related to the implementation of the interim surplus criteria in the ways discussed below.

First, implementation of the CA Plan is necessary to ensure the Colorado River system can meet the normal year deliveries in the Lower Basin over the long term. Failure of California to comply with the CA Plan places at risk the objective of providing reliable delivery of water for beneficial consumptive use to Lower Basin users. Therefore, the

Secretary may condition the continuation of interim surplus criteria for the entire period through 2016 on a showing of satisfactory progress in implementing the CA Plan. Regardless of which alternative is ultimately selected, failure of California to carry out the CA Plan may result in termination or suspended application of the proposed interim surplus criteria. In that event, the Secretary would fashion appropriate surplus criteria for the remaining period through 2016.

Second, from the perspective of the State of California, because of the linkage between various elements of the CA Plan and the quantities of water involved, a reliable supply of interim surplus water from the Colorado River is an indispensable pre-condition to successful implementation of the CA Plan.

From the standpoint of environmental documentation and compliance, the CA Plan and its various elements have been, or will be, addressed under separate federal and/or state environmental reporting procedures.

S.1.6.1.1 Imperial Irrigation District/San Diego County Water Authority Water Transfer

The Imperial Irrigation District (IID)/San Diego County Water Authority (SDCWA) water transfer is one of the intrastate exchanges that is a part of the CA Plan. SDCWA has negotiated an agreement for the long-term transfer of conserved water from the IID. Under the proposed contract, IID customers would undertake water conservation efforts to reduce their use of Colorado River water. Water conserved through these efforts would be transferred to SDCWA. The agreement sets the primary transfer quantity at a maximum of 200 kaf/year. After at least 10 years of primary transfers, an additional discretionary component not to exceed 100 kaf/year may be transferred to SDCWA, the Metropolitan Water District of Southern California (MWD) or Coachella Valley Water District (CVWD) in connection with the settlement of water rights disputes between IID and these agencies. The initial transfer target date is 2002, or whenever the conditions necessary for the agreement to be finalized are satisfied or waived, whichever is later. This transfer is being addressed in an ongoing Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) and involves the change in point of delivery of up to 300 kaf/year from Imperial Dam to Parker Dam.

S.1.6.1.2 All-American and Coachella Canal Lining Projects

Two other components of the CA Plan having effects on the river are the All-American and Coachella Canal Lining Projects (the Coachella Canal is a branch of the All-American Canal). These two similar actions involve the concrete lining of unlined portions of the canals to conserve water presently being lost as seepage from the earthen reaches. Together the projects involve a change in point of delivery of 93.7 kaf/year from Imperial Dam for Parker Dam, 67.7 kaf/year for the All-American Canal and 26 kaf/year for the Coachella Canal. The effects of this change in point of delivery are being addressed in the Secretarial Implementation Agreement Environmental Assessment (EA) and Biological Assessment (BA). The Record of Decision (ROD) for

the All-American Canal Lining Project was approved on July 29, 1994. Construction is expected to begin in 2001. A draft EIS/EIR for the Coachella Canal Lining Project was released on September 22, 2000 for public review.

S.1.6.2 GLEN CANYON DAM OPERATIONS

Glen Canyon Dam is operated consistent with the CRSPA and the LROC, which were promulgated in compliance with Section 602 of the CRBPA. Glen Canyon Dam is also operated consistent with the 1996 ROD on the *Operation of Glen Canyon Dam FEIS* developed as directed under the Grand Canyon Protection Act of 1992.

The minimum release from Lake Powell, as specified in the LROC, is 8.23 maf per year. The LROC require that, when Upper Basin storage is greater than the storage required under Section 602(a) of the CRBPA, releases from Lake Powell will periodically be governed by the objective to maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell. Because of this equalization provision in the LROC, changes in operations at Lake Mead will, in some years, result in changes in annual release volumes from Lake Powell. It is through this mechanism that delivery of surplus water from Lake Mead can influence the operation of Glen Canyon Dam. Equalization is not required when there exists insufficient storage in the Upper Basin, per Section 602(a) of the CRBPA.

In acknowledgement that the operation of Glen Canyon Dam, as authorized, to maximize power production was having a negative impact on downstream resources, the Secretary determined in July 1989 that an EIS should be prepared. The *Operation of Glen Canyon Dam EIS* developed and analyzed alternative operation scenarios that met statutory responsibilities for protecting downstream resources and achieving other authorized purposes, while protecting Native American interests. A final EIS was completed in March 1995 and the Secretary signed a ROD on October 8, 1996. Reclamation also consulted with the United States Fish and Wildlife Service (Service) under the ESA and incorporated the Service's recommendations into the ROD.

The ROD describes criteria and plans for dam operations and includes other measures to ensure Glen Canyon Dam is operated in a manner consistent with the Grand Canyon Protection Act of 1992. Among these are an Adaptive Management Program, periodic releases for beach/habitat-building flows (BHBFs), beach/habitat-maintenance flows and further study of temperature control.

The ROD is based on the EIS, which contains descriptions and analyses of aquatic and riparian habitats below Glen Canyon Dam, effects of Glen Canyon Dam release patterns on the local ecology, cultural resources, sedimentation processes associated with the maintenance of backwaters and sediment deposits along the river, Native American interests, and relationships between release patterns and the value of hydroelectric energy produced. Analyses of effects on other resources within the affected area are also included. Additional information concerning the operation of Glen Canyon Dam is contained in Section 3.3.

S.1.6.2.1 Adaptive Management Program

The Adaptive Management Program provides a process for assessing the effects of current operations of Glen Canyon Dam on downstream resources and using the results to develop recommendations for modifying operating criteria and other resource management actions. This is accomplished through the Adaptive Management Work Group (AMWG), a federal Advisory Committee. The AMWG consists of stakeholders that are federal and state resource management agencies, representatives of the seven Basin States, Indian Tribes, hydroelectric power marketers, environmental and conservation organizations and recreational and other interest groups. The duties of the AMWG are in an advisory capacity only. Coupled with this advisory role are long-term monitoring and research activities that provide a continual record of resource conditions and new information to evaluate the effectiveness of the operational modifications.

S.1.6.2.2 Beach/Habitat-Building Flows and Beach/Habitat-Maintenance Flows

BHBF releases are scheduled high releases of short duration that are in excess of power plant capacity required for dam safety purposes and are made according to certain specific criteria. These BHBFs are designed to rebuild high elevation sandbars, deposit nutrients, restore backwater channels and provide some of the dynamics of a natural system. The first test of a BHBF was conducted in spring of 1996.

Beach/habitat-maintenance flow releases are releases at or near power plant capacity, which are intended to maintain favorable beach and habitat conditions for recreation and fish and wildlife, and to protect Tribal interests. Beach/habitat-maintenance flow releases can be made in years when no BHBF releases are made.

Both beach/habitat-building and beach/habitat-maintenance flows, along with the testing and evaluation of other types of releases under the AMP, were recommended by the Service to verify a program of flows that would improve habitat conditions for endangered fish. The proposed interim surplus criteria could affect the range of storage conditions in Lake Powell and alter the flexibility to schedule and conduct such releases or to test other flow patterns. The magnitude of this reduction in flexibility has been evaluated in the FEIS for each interim surplus alternative.

S.1.6.2.3 Temperature Control at Glen Canyon Dam

In 1994, the Service issued a *Biological Opinion on the Operation of Glen Canyon Dam* (BO). One of the elements of the reasonable and prudent alternative in the BO, also a common element in the Glen Canyon Dam EIS, was the evaluation of methods to control release temperatures and, if viable, implement controls. Reclamation agreed with this recommendation and included it in the *Operation of Glen Canyon Dam Final Environmental Impact Statement* and subsequent ROD.

Reclamation has issued a draft planning report and EA entitled *Glen Canyon Dam Modifications to Controls and Downstream Temperatures* (Reclamation, 1999). Based on comments to this draft EA, Reclamation is currently in the process of preparing a new draft EA on temperature control at Glen Canyon Dam.

Interim surplus criteria could result in new information related to temperature control at Glen Canyon Dam. Data and information made available from analysis related to interim surplus criteria will be utilized in the revised EA on temperature control at Glen Canyon Dam. Such information would also be considered in the development of an appropriate design for a temperature control device.

S.1.6.3 ACTIONS RELATED TO THE BIOLOGICAL AND CONFERENCE OPINION ON LOWER COLORADO RIVER OPERATIONS AND MAINTENANCE

Reclamation prepared a BA in accordance with Section 7 of the ESA, addressing effects of ongoing and projected routine lower Colorado River operations and maintenance (Reclamation, 1996). After formal consultation, a Biological and Conference Opinion (BCO) was prepared by the Service (Service, 1997). Pursuant to the reasonable and prudent alternative and 17 specific provisions provided in the BCO, Reclamation is taking various actions that benefit the riparian region of the lower Colorado River and associated species. In particular, these actions include: 1) acquisition, restoration and protection of potential and occupied Southwestern willow flycatcher habitat; 2) extensive life history studies for Southwestern willow flycatcher along 400 miles of the lower Colorado River and other areas; and 3) protection and enhancement of endangered fish species through risk assessments, assisted rearing and development of protected habitats along the lower Colorado River. This five-year BCO provides ESA compliance for Reclamation actions on the lower Colorado River until 2002.

The BA and BCO contain life histories/status of lower Colorado River species, descriptions of ongoing and projected routine operation and maintenance activities, the Secretary's discretionary management activities, operation and maintenance procedures, endangered species conservation program, environmental baseline, effects of ongoing operations, reasonable and prudent alternatives and supporting documentation useful in this FEIS. The 1996 BA and the 1997 BCO did not anticipate or address the effects of specific interim surplus criteria on the species considered. A separate Section 7 ESA consultation is in progress for the proposed action.

S.1.6.4 LOWER COLORADO RIVER MULTI-SPECIES CONSERVATION PROGRAM

Following the designation of critical habitat for three endangered fish species on nearly all of the lower Colorado River in April of 1994, the three Lower Basin states of Arizona, California and Nevada, Reclamation and the Service initiated the Lower Colorado River Multi-Species Conservation Program (LCRMSCP), which was one of the reasonable and prudent provisions of the five-year BCO received in 1997. The purpose of the LCRMSCP is to obtain long-term (50-year) ESA compliance for both federal and non-federal water and power interests. The LCRMSCP is a partnership of

federal, state, Tribal, and other public and private stakeholders with an interest in managing the water and related resources of the lower Colorado River Basin. In August 1995, Interior and Arizona, California and Nevada entered into a Memorandum of Agreement (MOA) and later a Memorandum of Clarification (MOC) for development of the LCRMSCP. The purpose of the MOA/MOC was to initiate development of an LCRMSCP that would accomplish the following objectives:

- Conserve habitat and work toward the recovery of threatened and endangered species and reduce the likelihood of additional species listing under the ESA; and
- Accommodate current water diversions and power production and optimize opportunities for future water and power development.

The LCRMSCP is currently under development and it is anticipated that the final EIS-environmental impact report will be finalized in 2001. Once the LCRMSCP is accepted by the Service, Reclamation and other federal agencies, as well as the participating non-federal partners, will have achieved ESA compliance for ongoing and future actions.

Since the interim surplus criteria determination is scheduled to be completed prior to the completion of the LCRMSCP, a separate Section 7 consultation is in progress with the Service on the anticipated effects of implementing the interim surplus criteria.

S.1.6.5 SECRETARIAL IMPLEMENTATION AGREEMENT RELATED TO CALIFORNIA'S COLORADO RIVER WATER USE PLAN

Within California, the allocation of Colorado River water is stipulated by various existing agreements among the seven parties with diversion rights. Recently, these parties have negotiated a *Quantification Settlement Agreement* that further defines the priorities for use of Colorado River water in California. This agreement provides a basis for various water conservation and transfer measures described in the CA Plan. The water transfers would require changes in the points at which the Secretary would deliver transferred water to various California entities, as compared with provisions in existing water delivery contracts. The operational changes caused by the water transfers are being addressed in separate NEPA and ESA documentation.

S.1.6.6 OFFSTREAM STORAGE OF COLORADO RIVER WATER AND DEVELOPMENT AND RELEASE OF INTENTIONALLY CREATED UNUSED APPORTIONMENT IN THE LOWER DIVISION STATES

The above titled rule establishes a procedural framework for the Secretary to follow in considering, participating in, and administering Storage and Interstate Release Agreements among the states of Arizona, California and Nevada (Lower Division states). The Storage and Interstate Release Agreements would permit state-authorized entities to store Colorado River water offstream, develop intentionally created unused apportionment (ICUA) and make ICUA available to the Secretary for release for use in

another Lower Division state. This rule provides a framework only and does not authorize any specific activities. The rule does not affect any Colorado River water entitlement holder's right to use its full water entitlement, and does not deal with intrastate storage and distribution of water. The rule only facilitates voluntary interstate water transactions that can help satisfy regional water demands by increasing the efficiency, flexibility and certainty in Colorado River management. A Finding of No Significant Impact was approved on October 1, 1999.

S.2 ALTERNATIVES

S.2.1 DEVELOPMENT OF ALTERNATIVES

The FEIS considers five interim surplus criteria alternatives as well as a No Action Alternative/baseline that was developed for comparison of potential effects. The five action alternatives considered include the Basin States Alternative (preferred alternative), the Flood Control Alternative, the Six States Alternative, the California Alternative and the Shortage Protection Alternative. The following section discusses the strategies and origins of the action alternatives. Other alternatives, including a proposal by the Pacific Institute, were considered but eliminated from further analysis. Those alternatives, and the reasons for their elimination from further analysis, are discussed in Chapter 2 of Volume I.

S.2.1.1 ORIGINS OF CALIFORNIA, SIX STATES AND BASIN STATES ALTERNATIVES

In 1997, California presented to the other Basin States its draft 4.4 Plan, a plan to achieve a reduction in its dependence on surplus water from the Colorado River, through various conservation measures, water exchanges and conjunctive use programs. One of the elements of the draft 4.4 Plan was the expectation that the Secretary would continue to determine surplus conditions on the Colorado River until 2015. California proposed criteria on which the Secretary would base his determinations of surplus conditions during the interim period.

In 1998, in response to California's proposal of interim surplus criteria, the other six states within the Colorado River Basin (Six States) submitted a proposal with surplus criteria that were similar in structure to those in California's proposal. Under the proposal from the Six States, use of surplus water supplies would be limited depending on the occurrence of various specified Lake Mead surface elevations. The interim surplus criteria proposed by the Six States were used to formulate the "Six States Alternative."

California subsequently proposed specific interim surplus criteria that were attached to the October 15, 1999 *Key Terms for Quantification Settlement Among the State of California, Imperial Irrigation District, Coachella Valley Water District, and Metropolitan Water District of Southern California*. California also updated, renamed and re-released its 4.4 Plan in May 2000. The revised plan is now known as California's Colorado River Water Use Plan (CA Plan). The interim surplus criteria

proposal stemming from the CA Plan and Quantification Settlement Agreement was used to formulate the "California Alternative."

In July 2000, during the public comment period on the DEIS, Reclamation received a draft proposal for interim surplus criteria from the seven Colorado River Basin States (Seven States). After a preliminary review of that proposal, Reclamation published it in the August 8, 2000 *Federal Register* for review and consideration by the public during the public review period for the DEIS. Reclamation published minor corrections to the proposal in a *Federal Register* notice of September 22, 2000. Reclamation derived the Basin States Alternative in the FEIS from the draft Seven States Proposal.

S.2.1.2 UTILIZATION OF PROPOSALS FROM BASIN STATES

Various proposals submitted by individual Colorado River Basin states or groups of states were used by Reclamation to formulate interim surplus criteria alternatives. In recognition of the need to limit the delivery of surplus water at lower Lake Mead water levels, these proposals specified allowable uses of surplus water at various triggering levels.

The Secretary will continue to apportion surplus water consistent with the applicable provisions of the Decree, under which surplus water is divided 50 percent to California, 46 percent to Arizona, and 4 percent to Nevada. The Secretary also intends to appropriately report the accumulated volume of water delivered to MWD under surplus conditions. The Secretary also intends to honor any forbearance arrangements made by various parties for the delivery of surplus water or reparations for future shortage conditions.

S.2.2 DESCRIPTION OF ALTERNATIVES

S.2.2.1 NO ACTION ALTERNATIVE AND BASELINE CONDITIONS

As required by NEPA, a No Action alternative must be considered during the environmental review process. Under the No Action Alternative, determinations of surplus would continue to be made on an annual basis, in the AOP, pursuant to the LROC and the Decree as discussed above. The No Action Alternative represents the future AOP process without interim surplus criteria. Surplus determinations consider such factors as end-of-year system storage, potential runoff conditions, projected water demands of the Basin States and the Secretary's discretion in addressing year-to-year issues. However, the year-to-year variation in the conditions considered by the Secretary in making surplus water determinations makes projections of surplus water availability highly uncertain.

The approach used in the FEIS for analyzing the hydrologic aspects of the interim surplus criteria alternatives was to use a computer model that simulates specific operating parameters and constraints. In order to follow CEQ guidelines calling for a No Action alternative for use as a "baseline" against which to compare project

alternatives, Reclamation selected a specific operating strategy for use as a baseline condition, which could be described mathematically in the model.

The baseline is based on a 70R spill avoidance strategy (as described in Section S.2.2.1.2). Reclamation has utilized a 70R strategy for both planning purposes and studies of surplus determinations in past years. While the 70R strategy is used to represent baseline conditions, it does not represent a decision by Reclamation to utilize the 70R strategy for determination of future surplus conditions in the absence of interim surplus criteria.

S.2.2.1.1 Approach to Surplus Water Determination

As discussed above, the 70R operating strategy is being used as a baseline to show possible future operating conditions in the absence of interim surplus criteria. The primary effect of simulating operation with the 70R operating strategy would be that surplus conditions would only be determined when Lake Mead is nearly full.

S.2.2.1.2 70R Baseline Surplus Triggers

The 70R baseline strategy involves assuming a 70-percentile inflow into the system, subtracting out the consumptive uses and system losses and checking the results to see if all of the water could be stored or if flood control releases would be required. If flood control releases would be required, additional water is made available to the Lower Basin states beyond 7.5 maf. The notation 70R refers to the specific inflow where 70 percent of the historical natural runoff is less than this value (17.4 maf) for the Colorado River basin at Lee Ferry.

The 70R trigger line rises from approximately 1199 feet msl in 2002 to 1205 feet msl in 2050. The gradual rise of the 70R trigger line is the result of increasing water use in the Upper Basin. Under baseline conditions, when a surplus condition is determined to occur, surplus water would be made available to fill all water orders by holders of surplus water contracts in the Lower Division states.

S.2.2.2 BASIN STATES ALTERNATIVE (PREFERRED ALTERNATIVE)

Reclamation has identified the Basin States Alternative as the preferred alternative in the FEIS. The Basin States Alternative is similar to, and based upon, information submitted to the Secretary by representatives of the governors of the states of Colorado, Wyoming, Utah, New Mexico, Arizona, Nevada and California. After receipt of this information (during the public comment period), Reclamation shared the submission with the public (through the *Federal Register* and Reclamation's surplus criteria web sites) for consideration and comment. Reclamation then analyzed the states' submission and crafted this additional alternative for inclusion in the FEIS. Some of the information submitted for the Department's review was outside of the scope of the proposed action for adoption of interim surplus criteria and was therefore not included as part of the Basin States Alternative (e.g., adoption of shortage criteria and adoption

of surplus criteria beyond the 15-year period) as presented in this FEIS. With respect to the information within the scope of the proposed action, Reclamation found the Basin States Alternative to be a reasonable alternative and has fully analyzed all environmental effects of this alternative in this FEIS. The identified environmental effects of the Basin States Alternative are well within the range of anticipated effects of the alternatives presented in the DEIS and do not affect the environment in a manner not already considered in the DEIS.

Reclamation selected the Basin States Alternative as its preferred alternative based on Reclamation's determination that it best meets all aspects of the purpose and need for the action, including the needs to remain in place for the entire period of the interim criteria, to garner support among the Basin States that will enhance the Secretary's ability to manage the Colorado River reservoirs in a manner that balances all existing needs for these precious water supplies, and to assist in the Secretary's efforts to insure that California water users reduce their over reliance on surplus Colorado River water. Reclamation notes the important role of the Basin States in the statutory framework for administration of Colorado River Basin entitlements and the significance that a seven-state consensus represents on this issue. Thus, based on all available information, this alternative appears to be the most reasonable and feasible alternative analyzed.

S.2.2.2.1 Approach to Surplus Water Determination

The Basin States Alternative specifies ranges of Lake Mead water surface elevations to be used through 2015 for determining the availability of surplus water through 2016. The elevation ranges are coupled with specific uses of surplus water in such a way that, if Lake Mead's surface elevation were to decline, the amount of surplus water would be reduced. The interim criteria would be reviewed at five-year intervals with the LROC (and additionally as needed), and revised as needed based upon actual operational experience.

S.2.2.2.2 Basin States Alternative Surplus Triggers

The surplus determination elevations under the Basin States Alternative consist of the tiered Lake Mead water surface elevations listed below, each of which is associated with certain stipulations on the purposes for which surplus water could be used. Proceeding from higher to lower water levels, the elevation tiers (also referred to as levels) are as follows:

Tier 1 - 70R Line (approximately 1199 to 1201 feet msl)
Tier 2 - 1145 feet msl
Tier 3 - 1125 feet msl

S.2.2.3 FLOOD CONTROL ALTERNATIVE

S.2.2.3.1 Approach to Surplus Water Determination

Under the Flood Control Alternative, a surplus condition is determined to exist when flood control releases from Lake Mead are occurring or projected to occur in the subsequent year. The method of determining need for flood control releases is based on flood control regulations published by the Los Angeles District of the United States Army Corps of Engineers (Corps) and the Field Working Agreement between the Corps and Reclamation.

S.2.2.3.2 Flood Control Alternative Surplus Triggers

Under the flood control strategy, a surplus is determined when the Corps flood control regulations require releases from Lake Mead in excess of downstream demand. If flood control releases are required, surplus conditions are determined to be in effect. The average flood control triggering elevation is approximately 1211 feet msl. In practice, flood control releases are not based on the average trigger elevation, but would be determined each month by following the Corps regulations. When a flood control surplus is determined, surplus water would be made available for all established uses by contractors for surplus water in the Lower Division states.

S.2.2.4 SIX STATES ALTERNATIVE

S.2.2.4.1 Approach to Surplus Water Determination

The Six States Alternative specifies ranges of Lake Mead water surface elevations to be used through 2015 for determining the availability of surplus water through 2016. The elevation ranges are coupled with specific uses of surplus water in such a way that, if Lake Mead's surface elevation were to decline, the amount of surplus water would be reduced. The interim criteria would be reviewed at five-year intervals with the LROC and as needed based upon actual operational experience.

S.2.2.4.2 Six States Alternative Surplus Triggers

The surplus determination elevations under the Six States Alternative consist of the tiered Lake Mead water surface elevations listed below, each of which is associated with certain stipulations on the purposes for which surplus water could be used. The tiered elevations are as follows, proceeding from higher to lower water levels:

Tier 1 - 70R Line (approximately 1199 to 1201 feet msl)
Tier 2 - 1145 feet msl
Tier 3 - 1125 feet msl

S.2.2.5 CALIFORNIA ALTERNATIVE

S.2.2.5.1 Approach to Surplus Water Determination

The California Alternative specifies Lake Mead water surface elevations to be used for the interim period through 2015 for determining the availability of surplus water through 2016. The elevation ranges are coupled with specific uses of surplus water in such a way that, if Lake Mead's surface elevation declines, the amount of surplus water would be reduced.

S.2.2.5.2 California Alternative Surplus Triggers

The Lake Mead elevations at which surplus conditions would be determined under the California Alternative are indicated by a series of tiered, sloping lines from the present to 2016. Each tiered line would be coupled with limitations on the amount of surplus water available at that tier. Each tier is defined as a trigger line that rises gradually year by year to 2016, in recognition of the gradually increasing water demand of the Upper Division states. The elevations associated with the three tiers are as follows:

Tier 1 - 1160 feet msl to 1166 feet msl
Tier 2 - 1116 feet msl to 1125 feet msl
Tier 3 - 1098 feet msl to 1102 feet msl

S.2.2.6 SHORTAGE PROTECTION ALTERNATIVE

S.2.2.6.1 Approach to Surplus Water Determination

The Shortage Protection Alternative is based on maintaining an amount of water in Lake Mead necessary to provide a normal annual supply of 7.5 maf for the Lower Division, 1.5 maf for Mexico and storage necessary to provide an 80 percent probability of avoiding future shortages.

S.2.2.6.2 Shortage Protection Alternative Surplus Triggers

The surplus triggers under this alternative range from an approximate Lake Mead initial elevation of 1126 feet msl to an elevation of 1155 feet msl at the end of the interim period. At Lake Mead elevations above the surplus trigger, surplus conditions would be determined to be in effect and surplus water would be available for use by the Lower Division states. Below the trigger-elevation, surplus water would not be made available.

S.3 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

S.3.1 USE OF MODELING TO IDENTIFY POTENTIAL FUTURE COLORADO RIVER SYSTEM CONDITIONS

To determine the potential effects of the interim surplus criteria alternatives, modeling of the Colorado River system was conducted. Modeling provides projections of potential future Colorado River system conditions (i.e., reservoir surface elevations, river flows, salinity, etc.). The modeling results allow a comparison of potential future conditions under the various interim surplus criteria alternatives and baseline conditions. As such, much of the analyses contained within the FEIS are based upon potential effects of changed flows and water levels within the Colorado River and mainstream reservoirs.

S.3.2 BASELINE CONDITIONS

As discussed above, the No Action Alternative does not provide consistent specific criteria for determining surplus conditions. As such, it is not possible to model the No Action Alternative. However, in order to provide a reasonable analytical projection of potential future system conditions without interim surplus criteria, a reasonable baseline surplus strategy (70R) was utilized. This baseline represents a definable surplus criteria based on recent operational decisions. The 70R strategy is based upon recent secretarial operating decisions and was modeled to develop a projection of baseline conditions for comparison with the alternatives in the FEIS.

S.3.3 IMPACT DETERMINATION APPROACH

The analysis of potential effects for each issue considered is based primarily upon the results of modeling. Following the identification of conditions important to each issue, the potential effects of various system conditions over the general range of their possible occurrence (as identified by the range of modeling output for various parameters) are identified for each issue. The potential effects of the various interim surplus criteria alternatives are presented in terms of the incremental differences in probabilities (or projected circumstances associated with a given probability) between baseline conditions and the alternatives.

S.3.4 PERIOD OF ANALYSIS

The FEIS addresses interim surplus criteria that would be used during the years 2001 through 2015 for determining whether surplus water would be available during the years 2002 through 2016. Due to the potential for effects beyond the 15-year interim period, the modeling and impact analyses extend through the year 2050. It is important to note that modeling output and associated impact analyses become more uncertain over time as a result of increased uncertainty of future system conditions (including hydrologic conditions), as well as uncertainty with regard to future operational decisions that will affect circumstances within the Colorado River system.

S.3.5 POTENTIALLY AFFECTED AREA

Interim surplus criteria could affect the operation of the Colorado River system (i.e., reservoir levels and river flow volumes) as a result of surplus determinations and associated water deliveries that may not have occurred in the absence of such criteria.

Interim surplus criteria are based on system conditions and hydrology. Water supply to the Lower Division states of Arizona, California and Nevada is achieved primarily through releases and pumping from Lake Mead. As a result of Lake Powell and Lake Mead equalization requirements, interim surplus criteria effects on Lake Mead surface elevations could also influence Lake Powell surface elevations and Glen Canyon Dam releases. However, operation of the other Upper Basin reservoirs is independent of Lake Powell. Therefore, the upstream limit of the potentially affected area under consideration in this FEIS is the full pool elevation of Lake Powell. The downstream limit within the United States is the Southerly International Boundary (SIB) between the United States and Mexico (see Map S-1). Also addressed in the FEIS are potential transboundary impacts in Mexico pursuant to Executive Order 12114 - Environmental Effects Abroad of Major Federal Actions, January 4, 1997, and the July 1, 1997 Council on Environmental Quality (CEQ) Guidelines on NEPA Analyses for Transboundary Impacts.

In addition to influencing conditions within the Colorado River system, it is recognized that continued delivery of surplus water that could result from interim surplus criteria would recognize ongoing and proposed state actions in the Lower Basin. These actions could result in environmental effects outside of the river corridor. However, these actions have independent utility and are not caused by or dependent on interim surplus criteria for their implementation. Environmental compliance would be required on a case-by-case basis prior to their implementation. Therefore, Reclamation determined that the appropriate scope of this analysis is to consider only those potential effects that could occur within the Colorado River corridor as defined by the 100-year flood plain and reservoir maximum water surface elevations.

S.3.6 COMPARISON OF SURPLUS ALTERNATIVES TO BASELINE CONDITIONS

S.3.6.1 EFFECTS ON RESERVOIR SURFACE ELEVATIONS AND RIVER FLOWS

Figures S-1 and S- 2 present the 90th, 50th and 10th percentile Lake Powell and Lake Mead surface elevations indicated through system modeling for baseline conditions and the interim surplus criteria alternatives. These figures can be used for comparing the relative differences in the general lake level trends that result from the simulation of future conditions under the baseline and the interim surplus criteria alternatives. A complete explanation of the modeling process and results can be found in Section 3.3 of the FEIS.

Figure S-1
Lake Powell End-of-July Water Elevations
Comparison of Surplus Alternatives to Baseline Conditions
90th, 50th and 10th Percentile Values

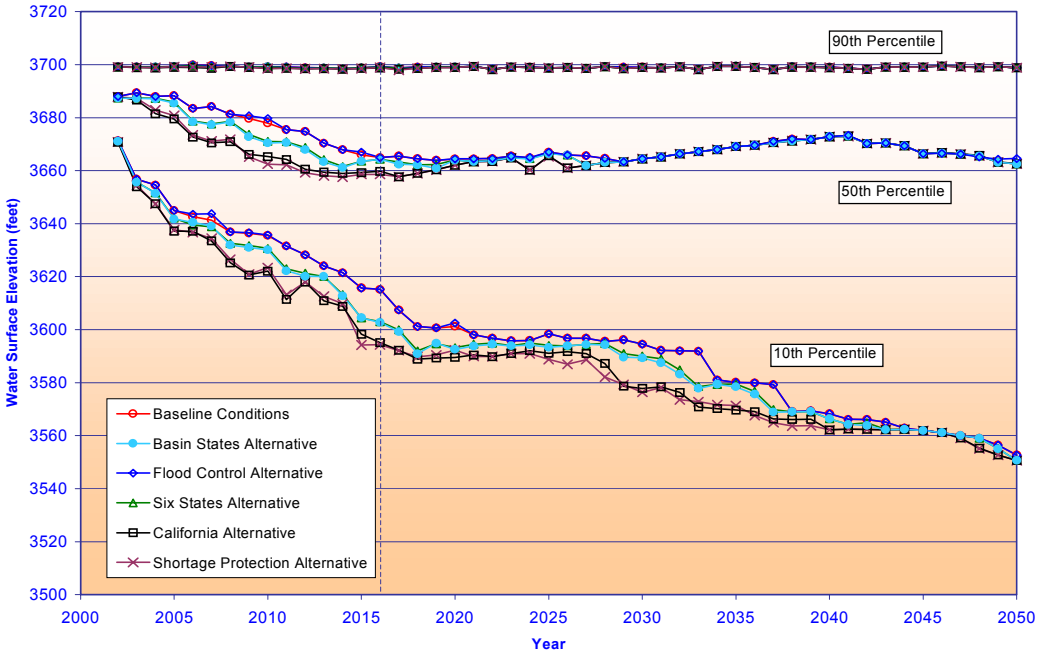
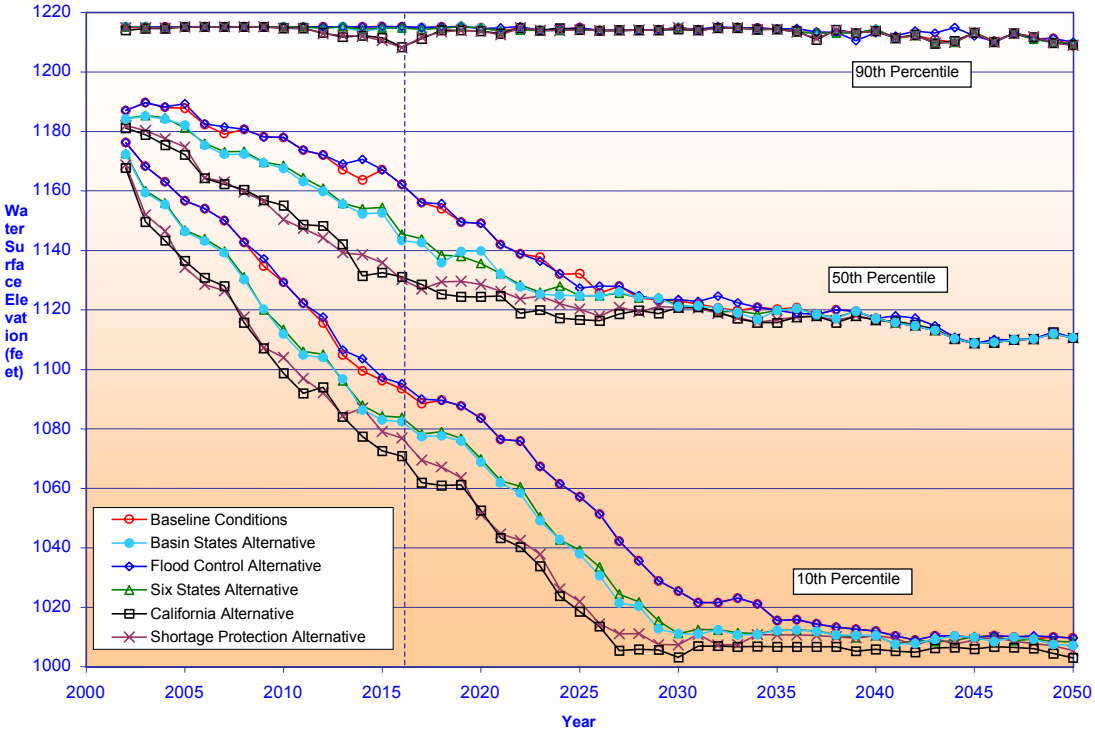


Figure S-2
Lake Mead End-of-December Water Elevations
Comparison of Surplus Alternatives and Baseline Conditions
90th, 50th and 10th Percentile Values



As illustrated in Figure S-1, the Flood Control Alternative could potentially result in the highest Lake Powell water levels. The Shortage Protection Alternative and the California Alternative could potentially result in the lowest water levels. The baseline conditions yield similar levels to those observed under the Flood Control Alternative. The water levels observed under the California Alternative are similar to those observed under the Shortage Protection Alternative. The results obtained under the Six States and Basin States alternatives are similar, and fall between baseline conditions and the Shortage Protection Alternative.

As illustrated in Figure S-2, the Flood Control Alternative could potentially result in the highest Lake Mead water levels. The California Alternative could potentially result in the lowest water levels. The water levels observed under the Shortage Protection Alternative are similar to those of the California Alternative, with some years slightly lower. The baseline conditions yield slightly lower levels than the Flood Control Alternative, but the differences are very small. The results obtained under the Six States and Basin States alternatives are similar, and fall between the Flood Control and Shortage Protection alternatives.

River flows would be affected to a limited degree by the interim surplus criteria alternatives. Flows from Glen Canyon Dam, which would be influenced by the adoption of interim surplus criteria, will remain within the range of flows analyzed in detail in the Glen Canyon Dam EIS. Therefore, effects of potential changes in the frequencies of these flows on downstream resources need no further analysis outside of the ROD for Glen Canyon Dam operations and the Adaptive Management Program.

River flows in the reaches between Hoover Dam and the SIB would also be affected to a limited degree by the interim surplus criteria alternatives. Flows to meet downstream demands would typically increase, but remain well within the current operational ranges for those reaches. The frequency of large flows in those reaches due to flood control releases at Hoover Dam would typically decrease. Detailed discussions of the potential effects on river flows are included in Sections 3.3 and 3.6 of the FEIS.

S.3.6.2 SUMMARY OF ENVIRONMENTAL IMPACTS

Table S-1 summarizes the potential effects of interim surplus criteria on the various resource issues analyzed in the FEIS.

S.3.6.3 ENVIRONMENTAL COMMITMENTS

Impacts are associated with changes in the difference between probabilities of occurrence for specific resource issues under study when comparing the action alternatives to baseline conditions. Reclamation has determined that most of the potential impacts identified are not of a magnitude that would require specific mitigation measures to reduce or eliminate their occurrence because the small changes in probabilities of occurrence are within Reclamation's current operational regime and

authorities under applicable federal law. In recognition of potential effects that could occur under baseline conditions or with implementation of the interim surplus criteria alternatives under consideration, Reclamation has developed a number of environmental commitments, described below, that will be undertaken if interim surplus criteria are implemented. Some commitments are the result of compliance with specific consultation requirements.

S.3.6.3.1 Water Quality

Reclamation will continue to monitor salinity and total dissolved solids on the Colorado River as part of the ongoing Colorado River Basin Salinity Control Program to ensure compliance with the numeric criteria on the river as set forth in the Forum's 1999 Annual Review.

Reclamation will continue to participate in the Lake Mead Water Quality Forum and the Las Vegas Wash Coordination Committee as a principal and funding partner in studies of water quality in the Las Vegas Wash and Lake Mead. Reclamation is an active partner in the restoration of the Las Vegas Wash wetlands.

Reclamation is acquiring and will continue to acquire riparian and wetland habitat around Lake Mead and on the Lower Colorado River related to ongoing and projected routine operations.

Reclamation will continue to participate with the Nevada Division of Environmental Protection and Kerr-McGee Chemical Company in the perchlorate remediation program of groundwater discharge points along Las Vegas Wash that will reduce the amount of this contaminant entering the Colorado River.

Reclamation will continue to monitor river operations, reservoir levels and water supply and make this information available to the Colorado River Management Work Group, agencies and the public. See also Reclamation's website (http://www.lc.usbr.gov and http://www.uc.usbr.gov).

S.3.6.3.2 Riverflow Issues

Reclamation will continue to work with the stakeholders in the Adaptive Management Program to develop an experimental flow program for the operations of Glen Canyon Dam which includes BHBFs and is designed to protect, mitigate adverse impacts to and improve the values for which GCNP and GCNRA were established.

S.3.6.3.3 Aquatic Resources

Reclamation will initiate a temperature monitoring program below Hoover Dam with state and other federal agencies to document temperature changes related to baseline and implementation of interim surplus criteria and assess their potential effects on listed

species and the sport fishery. The existing hydrolab below Hoover Dam will be modified as necessary to provide this temperature data.

S.3.6.3.4 Special-Status Species

Section 7 consultation is in progress and commitments will be identified in the Record of Decision.

S.3.6.3.5 Recreation

Reclamation is initiating a bathymetric survey of Lake Mead in fiscal year 2001 and will coordinate with the Lake Mead National Recreation Area to identify critical recreation facility elevations and navigational hazards that would be present under various reservoir surface elevations.

Reclamation will continue to monitor river operations, reservoir levels and water supply and make this information available to the Colorado River Management Work Group, agencies and the public. This operational information will provide the Lake Mead National Recreation Area and the Glen Canyon National Recreation Area with probabilities for future reservoir elevations to assist in management of navigational aids, recreation facilities, other resources and fiscal planning.

Reclamation will continue its consultation and coordination with the Glen Canyon National Recreation Area and the Navajo Nation on the development of Antelope Point as a resort destination.

S.3.6.3.6 Cultural Resources

Reclamation shall continue to consult and coordinate with the State Historic Preservation Officer, the Advisory Council on Historic Preservation (Council), Glen Canyon National Recreation Area, Lake Mead National Recreation Area, Tribes and interested parties with regard to the potential effects of the proposed action as required by Sections 106 and 110 of the National Historic Preservation Act following the Council's recommended approach for consultation for the Protection of Historic Properties found at 36 CFR 800.

S.3.6.3.7 Transboundary Impacts

It is the position of the United States State Department, through the United States Section of the International Boundary and Water Commission (USIBWC), that the United States does not mitigate for impacts in a foreign county. The United States will continue to participate with Mexico through the USIBWC Technical Work Groups to develop cooperative projects beneficial to both countries.

S.4 OTHER NEPA CONSIDERATIONS

S.4.1 CUMULATIVE IMPACTS

A cumulative impact is an impact that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Effects that could occur within the United States as a result of interim surplus criteria are each associated with potential changes in the probabilities for Lake Mead and Lake Powell surface elevation reductions and changes in Colorado River flows from Glen Canyon Dam to the SIB. Generally, other actions that could result in cumulative impacts when considered in tandem with the effects of interim surplus criteria have been incorporated into modeling of future system conditions. Such actions include future increases in consumptive use of Colorado River water in the Upper Division states, intrastate water transfers in the Lower Division states and various requirements and constraints applied to the operation of the Colorado River system.

The environmental effects of the various components of the CA Plan, including the various intrastate storage facilities (such as Cadiz, Hayfield/Chuckwalla and Desert/Coachella projects) and the other related and ongoing actions, are undergoing separate compliance. Where there is a federal nexus to actions in California, a combined California Environmental Quality Act (CEQA) and NEPA compliance document is being prepared.

Potential cumulative effects to the resources affected by surplus criteria were analyzed within the 100-year floodplain of the lower Colorado River from the full-pool elevation of Lake Powell to the Gulf of California in Mexico through year 2050. Only the issue area of “transboundary impacts” was identified as possibly experiencing cumulative effects.

No past, present or reasonably foreseeable actions in the United States are expected to result in cumulative impacts to the issue area of transboundary impacts. In addition to the direct and indirect effects on the physical and natural environment in Mexico from actions identified by Mexico, it is recognized that some future actions taken by Mexico may have a cumulative effect. Exactly what these action are is not known at this time. Any impacts of these projects are the responsibility of Mexico.

In addition, Reclamation is consulting with the Service on potential adverse effects to species found in both Mexico and the United States. For potentially affected species found only in Mexico, Reclamation is consulting with the National Marine Fisheries Service. Concurrent with these consultations, Reclamation is also continuing dialog with Mexico, through the IBWC’s Fourth Technical Work Group, to reach mutually agreeable solutions to address cumulative impacts.

S.4.2 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

Because the implementation of interim surplus criteria is a management action that would require no direct physical change to the environment, for the purposes of this discussion, short-term uses of resources are limited to potential changes in the probability for certain environmental effects to occur as a result of changed system conditions. Also for the purposes of this discussion, long-term productivity refers to the benefits that would be realized during and following the period in which interim surplus criteria would be in place.

The benefit sought by means of the interim surplus criteria alternatives consists of increasing the efficiency of the Secretary's annual decision-making process regarding the availability of Colorado River water. This would afford the mainstream users of this water a greater degree of predictability which would assist them in their water resources planning and operation.

The resources that may be affected in the short-term would be primarily those affected by lower reservoir levels. The effects of the interim surplus criteria on those resources would depend on the alternative selected for implementation. The Flood Control Alternative would result in insignificant changes in reservoir levels from baseline conditions. The other four alternatives would tend to cause lower average water levels than baseline conditions by 2016 and for a limited period of time thereafter. However, these alternatives would have a greater probability of surplus water than the Flood Control Alternative or baseline conditions through the year 2016. Long-term benefits that would be realized due to interim surplus criteria would include increased opportunities for making more efficient use of Colorado River water supplies.

S.4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments are decisions affecting renewable resources such as soils, wetlands and waterfowl habitat. Such decisions are considered irreversible because their implementation would affect a resource that has deteriorated to the point that renewal can occur only over a long period of time or at great expense or because they would cause the resource to be destroyed or removed.

The application of the interim surplus criteria would include reviews at five-year intervals to consider the workability of the criteria in light of the multiple purposes served by the operation of the Colorado River system, including environmental maintenance. Based on those reviews, interim surplus criteria could be revised or eliminated as needed. If California fails to meet its water conservation and management goals throughout the stipulated term of implementation of the criteria (through 2016), the Secretary may choose to terminate the interim criteria and revert to the 70R strategy. Finally, after 2016, determinations of the availability of surplus will revert to the AOP process.

None of the resources assessed in the FEIS would experience a deterioration in condition such that the resource would be destroyed or removed as a result of implementation of interim surplus criteria or under the No Action Alternative. The Colorado River System may also reset at any time in the future, due to high inflows resulting in full reservoirs. There would be no construction of facilities needed to facilitate the Secretary's determination of surplus water under the criteria.

Irretrievable commitment of natural resources means loss of production or use of resources as a result of a decision. It represents opportunities foregone for the period of time that a resource cannot be used.

All of the resources assessed in the FEIS would continue to be available for production or use under any of the alternatives; however, application of the interim surplus criteria may result in a determination for any given year that surplus water is available from the Colorado River. That water could also have been determined to be surplus in the absence of interim surplus criteria through the AOP process. Although water is a renewable resource, the delivery of surplus water under all of the alternatives, including no action, would irretrievably commit (to beneficial consumptive uses) the water declared to be surplus, but authorized by the *Law of the River*.

S.5 CONSULTATION AND COORDINATION

S.5.1 GENERAL PUBLIC INVOLVEMENT ACTIVITIES

The public involvement program leading to the FEIS consisted essentially of two phases: project scoping, and public hearings and public review of the DEIS.

S.5.1.1 PROJECT SCOPING

In 1999, Reclamation conducted a public scoping process that featured public scoping meetings to inform interested parties of the purpose and need for the development of interim surplus criteria, and to obtain public comment to assist in identifying the scope of the proposed action and environmental issues to be addressed in the DEIS. The scoping meetings were held in June 1999 at Las Vegas, Nevada; Phoenix, Arizona; Ontario, California; and Salt Lake City, Utah. The meetings were announced in Federal Register notices on May 18, 1999 and May 28, 1999, on Reclamation's Lower Colorado Region internet website, and by a press release on May 28, 1999. The press release was mailed not only to the media but also to hundreds of federal, state and local agencies, non-governmental organizations and private citizens known to have an interest in Colorado River operations. The public was asked to identify any concerns about development and implementation of the interim surplus criteria.

Public comments in the form of letters to Reclamation (35 letters) and oral responses at the scoping meetings (eight presenters) expressed numerous concerns regarding the effect of the proposed interim surplus criteria on the future quantity of water available from the Colorado River, and other resource issues. Based on the scoping comments,

Reclamation issued a Notice of Intent to prepare the DEIS in the *Federal Register* on December 7, 1999.

Reclamation also discussed the development of the proposed interim surplus criteria with various agencies and groups at their own regular meetings or at meetings set up by Reclamation. Included were Indian Tribes and Indian Communities having allocations of Colorado River water, Basin States water resource departments, various water agencies within the States, contractors for federal hydropower, environmental groups water agencies of the United Mexican States (Mexico). The coordination activities with each agency or group are summarized below. Table S-2 lists the agencies and organizations that were invited to such meetings by letter, and/or met with Reclamation regarding interim surplus criteria on other occasions.

S.5.1.2 PUBLIC REVIEW OF DEIS

The DEIS was distributed to interested Federal, Tribal, State and Local entities and members of the general public for a 60-day review when it was filed with EPA on July 7, 2000, and announced in the *Federal Register*. The DEIS was sent to 407 interested parties on Reclamation's mailing list, and a copy of the DEIS was made available for public viewing on Reclamation's Lower Colorado Region web site. Reclamation conducted a public technical meeting at Las Vegas, Nevada on August 15, 2000, to provide information and answer questions regarding the modeling process for analysis in the DEIS. Between August 21 and August 24, 2000, Reclamation conducted public hearings on the DEIS in Ontario, California; Las Vegas, Nevada; Salt Lake City, Utah; and Phoenix, Arizona.

When the public review period closed on September 8, 2000, Reclamation received 68 comment letters from the public which, along with Reclamation's responses, are included in Volume III of the FEIS. Individual comments from the public resulted in technical and editorial changes to the document. These included a change in the baseline operating strategy, better definition of Tribal water rights and diversions, inclusion of the Basin States Alternative and refinements in descriptions of alternatives and operational modeling results.

After the DEIS was completed and ready for public review and comment, Reclamation received the document "Interim Surplus Guidelines, Working Draft" from the Seven Basin States (Seven States Proposal). Reclamation made a preliminary review of the specific surplus criteria in the information presented by the basin states, and made a preliminary determination that the criteria were within the range of alternatives and impacts analyzed in the DEIS. After its review of the Seven States Proposal, Reclamation published it in the Federal Register of August 8, 2000, for review and consideration by the public during the public review period for the DEIS.

S.5.2 FEDERAL AGENCY COORDINATION

S.5.2.1 NATIONAL PARK SERVICE

NPS is a cooperating agency with Reclamation for the purpose of NEPA compliance for the interim surplus criteria, in recognition of its administration of national park and recreation areas along the Colorado River corridor. NPS staff participated in numerous meetings with Reclamation's project evaluation team and participated in internal document reviews as sections of the DEIS were being prepared. This facilitated close coordination with the NPS regarding resources and facilities potentially effected and the nature of the effects. The NPS offices involved in these activities are those at the GCNRA, Grand Canyon National Park and the LMNRA, under the coordination of the office at the GCNRA.

S.5.2.2 U.S. SECTION OF THE INTERNATIONAL BOUNDARY AND WATER COMMISSION

The United States Section of the IBWC (USIBWC) is a cooperating agency with Reclamation for the purposes of NEPA compliance for the interim surplus criteria, in recognition of its administration of Treaty obligations with Mexico. As such, USIBWC staff participated in numerous meetings with Reclamation's project evaluation team and participated in internal document reviews as sections of the DEIS were being prepared. This facilitated close coordination with the USIBWC in developing information needed for this FEIS and in Reclamation's participation in the consultation with Mexico. The USIBWC head office at El Paso, Texas was directly involved.

S.5.2.3 U.S. BUREAU OF INDIAN AFFAIRS

The Bureau of Indian Affairs (BIA) administers programs to promote Tribal economic opportunity, and to protect and improve Indian Trust Assets. The BIA assisted Reclamation with the Tribal consultation, and generally served in an advisory capacity to the Tribes. Through letters of comment on the DEIS, the BIA further amplified Tribal concerns regarding Colorado River operations and the interim surplus criteria.

S.5.2.4 U.S. FISH AND WILDLIFE SERVICE INCLUDING ENDANGERED SPECIES ACT COMPLIANCE

Under Section 7(a)(2) of the Endangered Species Act (ESA), 16 U.S.C. δ 1536 (a)(2), each Federal agency must, in consultation with the Secretary (either the Secretary of Commerce through the National Marine Fisheries Service or the Secretary of the Interior through the Fish and Wildlife Service), insure that any discretionary action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat. To assist agencies in complying with the requirements of Section 7(a)(2), ESA's implementing regulations set out a detailed consultation process

for determining the biological impacts of a proposed discretionary activity. The consultation process is described in regulations promulgated at 50 C.F.R. δ 402.

Adoption of specific interim surplus criteria by the Secretary is a discretionary federal action and is therefore subject to compliance with the ESA. On May 22, 2000, Reclamation provided the Service a memorandum identifying listed or proposed species and designated critical habitat that may be present in the action area. The Service provided a response to Reclamation on June 5, 2000, which concurred with Reclamation's list and added two species: Bald Eagle and Desert Pupfish. This information was used to assess potential effects of the proposed interim surplus criteria.

Reclamation prepared a biological assessment (BA) which addresses the effects of both interim surplus criteria and the California water transfers, to reduce the consultation time frame on these two independent operational actions on the lower Colorado River. The BA and memorandum requesting formal consultation were mailed to the Service on August 31, 2000.

The action area for the BA identified above is the 100-year floodplain of the Colorado River to the SIB and the full pool elevations of Lakes Mead, Mohave and Havasu. Implementation of the interim surplus criteria is not expected to effect any listed species upriver of Lake Mead (full pool elevation) nor impact implementation of any provisions of the existing BO on the operation of Glen Canyon Dam. Within the United States, implementation of interim surplus criteria is not anticipated to effect any listed species in areas beyond the 100-year floodplain of the lower Colorado River and the full pool elevations of lakes Mead, Mohave and Havasu. Consultation with the Service is in progress and the results of the consultation will be identified in the ROD.

Preliminary evaluations of the effects of adopting interim surplus criteria on listed species which may be present in the river corridor below Glen Canyon Dam led to the conclusion that there would be no affect. More recent output, resulting from refinement of the model used to predict future dam operations and riverflows, indicated that there would be a minor change in the frequency with which flows recommended by the 1995 biological opinion would be triggered, but that such changes would not adversely affect any listed species between Glen Canyon Dam and Lake Mead. Reclamation is consulting with the Service on these changes.

Reclamation is also consulting with the Service regarding special status species in Mexico. To facilitate consultation, Reclamation prepared a supplemental biological assessment (BA) addressing the potential effects of interim surplus criteria along the Colorado River corridor in Mexico from the SIB to the Sea of Cortez. Consultation is in progress and the results of the consultation will be identified in the ROD.

S.5.2.5 NATIONAL MARINE FISHERIES SERVICE

The National Marine Fisheries Service (NMFS) administers programs that support the domestic and international conservation and management of living marine resources.

Under Section 7(a)(2) of the ESA, NMFS is the responsible Federal agency for consultation on special-status marine species. Reclamation consulted with NMFS regarding the special-status fish at the upper end of the Sea of Cortez. The consultation was facilitated by a BA supplementing the BA described in Section S.5.2.4 on the Colorado River corridor in Mexico. Consultation is in progress and the results of the consultation will be identified in the ROD.

S.5.2.6 NATIONAL HISTORIC PRESERVATION ACT COMPLIANCE

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires all Federal agencies to take into account the effects of their actions on historic properties, and to afford the Advisory Council on Historic Preservation (Council) a reasonable opportunity to comment when an action will have an effect on historic properties. The Council's recommended approach for consultation for the Protection of Historic Properties is found at 36 CFR 800 (FR Vol. 64, No. 95, May 18, 1999, pages 27071-27084).

The first step of the Section 106 process, as set forth at 36 CFR 800.3(a), is for the Agency Official to determine whether the proposed Federal action is an undertaking as defined in §800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects to historic properties. Reclamation has determined development and implementation of interim surplus criteria meets the definition of an undertaking, but an undertaking that is without potential to effect historic properties. Reclamation's determination and the rationale for its decision are documented in Section 3.13 of the FEIS. Per 36 CFR 800.3(a)(1), if the undertaking does not have the potential to cause effects on historic properties, the Agency Official has no further obligations under Section 106 or this part, Reclamation has fulfilled its responsibilities to take into account the effects of the development and implementation of interim surplus criteria on historic properties.

The Nevada State Historic Preservation Officer (SHPO) submitted written comments on the cultural resources section of the DEIS. The SHPO has indicated they do not agree with Reclamation's position in the DEIS that development and implementation of interim surplus criteria is an undertaking without potential to affect historic properties, and so complying with the consultation requirements of the NHPA is not necessary.

The Nevada SHPO has stated that their opportunity to comment on effects to historic properties has been precluded by Reclamation and the Department's finding, and have asked that the matter be referred to the Council. Under the implementing regulations for Section 106, when there is a disagreement between an agency and a SHPO concerning the effect of an undertaking, the matter must be referred to the Council for comment and resolution. Reclamation believes the Council will agree with the Nevada SHPO that Section 106 compliance is necessary for this proposed action. Reclamation's position is that this is not an action requiring Section 106 compliance, but more appropriately falls under Section 110 of

the NHPA. Reclamation has prepared a memorandum discussing this issue and has forwarded it to the Council for review and further consultation.

S.5.3 TRIBAL CONSULTATION

Reclamation has been coordinating river operations with the Indian Tribes and communities who have entitlements to or contracts for Colorado River water, and those that may be affected by the proposed action. Representatives of various Tribes attended the scoping meetings in May 1999, and some provided Reclamation with written comments on the proposal for interim surplus criteria. Beginning in May 1999, Reclamation has had numerous meetings with the various Tribes who have an interest in the implementation of the interim surplus criteria. The Tribes and communities fall generally into four groups: 1) the Colorado River Basin Indian Tribes (Ten Tribes Partnership) who have diversion rights from the Colorado River main stream and various tributaries; 2) the Tribes and Communities of central Arizona; 3) the Tribes in the Coachella Valley Consortium of Mission Indians; and 4) other Tribes or Indian Communities who do not have a Colorado River water entitlement but nevertheless have an interest in the availability and distribution of Colorado River water. The individual Tribes and Indian Communities in each of these groups are listed on Table S-2 at the end of this chapter.

A primary concern of the Ten Tribes Partnership was that Tribal water rights be clearly acknowledged and that the diversion point(s) for each Tribe be included in the operational model so as to more accurately reflect tribal diversions in the modeling. Other concerns included overreliance on unused Tribal water allocations by non-Tribal diverters, and Lake Powell water level fluctuations with respect to resort development opportunity. Reclamation provided financial assistance to the Ten Tribes Partnership to assist the Tribes in cataloging their Colorado River depletion rights and conducting an active coordination process with Reclamation in connection with the interim surplus criteria. Using information provided by the Tribes, Reclamation added the diversion points to the model for the FEIS.

S.5.4 STATE AND LOCAL WATER AND POWER AGENCIES COORDINATION

Since the May 18, 1999 *Federal Register* notice announcing the development of interim surplus criteria, Reclamation has had various discussions with state and local water and power agencies regarding the proposed interim surplus criteria. However, the development of surplus criteria has been the subject of discussions for many years prior to 1999. Reclamation meets regularly with representatives of the Basin States, Indian Tribes and communities, environmental organizations, and other stakeholders as part of the Colorado River Management Work Group. Reclamation coordinates the development of the Annual Operating Plan (AOP) for the Colorado River system through this group as required by federal law. It was through such coordination actions that Reclamation originally presented the alternative surplus strategies.

The Basin States provided Reclamation with projections of the future depletions of the Colorado River water anticipated by water agencies in each state. The Upper Colorado River Commission compiled Upper Basin depletions, and the Lower Division states compiled their respective depletions. The projections were used as input to Reclamation's operational modeling analysis.

Reclamation also conducted coordination with water agencies in southern California regarding the environmental documentation being prepared for various components of California's Colorado River Water Use Plan.

In the early summer of 2000, the seven Basin States acting as a group, independently from Reclamation, formulated the Seven States Proposal for interim surplus criteria which they provided to Reclamation after the DEIS was prepared. Letters of comment on the DEIS from some of the Basin States contained additional commentary on the draft proposal.

S.5.5 NON-GOVERNMENTAL ORGANIZATIONS COORDINATION

Several environmental organizations have expressed interest in the project and have attended one or more public and independent meetings with Reclamation. The Pacific Institute for Studies in Development, Environment and Security (Pacific Institute), representing a consortium of environmental organizations, submitted an interim surplus criteria proposal to Reclamation in February 2000. The proposal included an additional allocation of water to Mexico for environmental purposes. The Pacific Institute's interest in the project and coordinating role among the other environmental groups contributed to the coordination with Reclamation by various other non-governmental organizations. In addition, through the Colorado River Management Work Group, and other mechanisms, Reclamation worked with various non-governmental organizations during the NEPA process. Specifically, Reclamation met with members of the organizations noted in Table S-2 at their request to discuss environmental and technical issues.

S.5.6 MEXICO CONSULTATION

Pursuant to an international agreement for mandatory reciprocal consultations, the United States section of the IBWC (USIBWC) is consulting with Mexico regarding the proposed interim surplus criteria. Reclamation has assisted USIBWC in conducting this consultation by providing information on the proposed interim surplus criteria and by participating in briefings with the Mexico Section of the IBWC and the Mexico National Water Commission. Meetings with representatives of Mexico were conducted in April and May 2000, at which representatives of Mexico provided their concerns regarding the potential effects of the interim surplus criteria. Coordination with Mexico during the DEIS review phase has consisted of several letters from the government of Mexico and public agencies in Mexico, which are reproduced in Volume III of the DEIS.

Discussion with Mexico took place on November 14, 2000 concerning comments from Mexico. There was understanding that the consultation with Mexico through IBWC in the form of technical working groups will continue a forum for technical discussion to carry out, in the context of international comity, joint cooperation projects in support of the Colorado River riparian ecology to the Gulf of California that could have a benefit to the United States and Mexico.

Executive Order 12114 instructs Federal agencies to investigate the effects of Federal actions in other countries. Reclamation has analyzed and documented the effects of the proposed interim surplus criteria on natural resources in Mexico. This analysis will provide an analytical tool for identifying those potential impacts that extend across the international border and affect Mexico's natural and physical environment. This approach is fully consistent with CEQ guidance on NEPA analyses for transboundary impacts, dated July 1, 1997.

S.5.7 SUMMARY OF COORDINATION CONTACTS

Table S-2 lists the agencies and organizations with which Reclamation coordinated through meetings and other personal contacts during the scoping and preparation period of this FEIS.

S.5.8 FEDERAL REGISTER NOTICES

Table S-3 lists the Federal Register Notices issued to inform the public about the formulation of interim surplus criteria alternatives and the preparation and availability of the DEIS. In addition to the notices issued, notices will be provided following the publication of this FEIS to announce its availability and the Secretary's ROD based on this FEIS.

Table S-1
Summary of Potential Effects of Implementing Interim Surplus Criteria[1]

Resource/Issue	Baseline Conditions/No Action	Effects of Alternatives[2]
Reservoirs Elevations and River Flows		
Lake Powell Water Surface Elevations Potential changes in Lake Powell water surface elevations.	Reservoir water levels exhibit a gradual declining trend during the interim surplus criteria period as a result of increasing Upper Division states consumptive use. The median water surface elevation in 2016 is 3665 feet msl. The probability of Lake Powell being full[3] in 2016 is 27%. After 2016, median levels stabilize, then rise and fall slightly, due to 602(a) storage requirements and less frequent equalization releases.	Median Elevations in 2016 for each of the alternatives are as follows: Basin States 3664 feet msl Flood Control 3664 feet msl Six States 3664 feet msl California 3660 feet msl Shortage Protection 3659 feet msl After 2016, Lake Powell water levels under all five alternatives tend to stabilize similar to baseline conditions. Water levels under the Basin States, Flood Control, Six States, California and Shortage Protection alternatives tend to converge with the baseline conditions by about year 2030.
Lake Mead Water Surface Elevations Potential changes in Lake Mead water surface elevations.	Reservoir water levels exhibit a gradual declining trend during the interim surplus criteria period as a result of Lower Basin consumptive use exceeding long-term inflow. The median water surface elevation in 2016 is 1162 feet msl. After 2016, median water surface elevations continue to decline, although at a lower rate, due to less frequent Lower Basin surplus deliveries.	Median Elevations in 2016 for each of the alternatives are as follows: Basin States 1143 feet msl Flood Control 1162 feet msl Six States 1146 feet msl California 1131 feet msl Shortage Protection 1130 feet msl After 2016, median surface elevations continue to decline. By about 2035, all alternatives converge to elevations similar to baseline conditions.
River Flows Glen Canyon and Hoover Dam releases and flows downstream of Lake Mead.	Flows downstream of Glen Canyon Dam would be managed in accordance with the 1995 Glen Canyon Dam EIS and the 1996 ROD. Flows downstream of Hoover Dam are governed by downstream demand or Hoover Dam flood control releases.	Flood Control Alternative: Similar to baseline conditions. Other alternatives: Flows below Glen Canyon Dam would be similar to baseline conditions. Flows from Hoover Dam to Parker Dam would be moderately higher until 2016 because of surplus deliveries. After 2016, flows would be similar to baseline conditions.

Table S-1
Summary of Potential Effects of Implementing Interim Surplus Criteria[1]

Resource/Issue	Baseline Conditions/No Action			Effects of Alternatives[2]
Water Supply				
California Water Supply Probabilities of normal, surplus and shortage[4] conditions.	Normal:	2002 through 2016 2017 through 2050	100% 100%	Flood Control Alternative: Similar to baseline conditions. Other Alternatives: Greater probability of surplus through 2016. The probability is similar to baseline conditions from 2017 through 2050. Deliveries less than the normal apportionment (4.4 mafy) do not occur under the alternatives at any time through 2050.
	Surplus:	2002 through 2016 2017 through 2050	47% 21%	
	Shortage:	2002 through 2016 2017 through 2050	0% 0%	
Arizona Water Supply Probabilities of normal, surplus and shortage[4] conditions.	Normal:	2002 through 2016 2017 through 2050	>96% 50%	Flood Control Alternative: Similar to baseline conditions. Other Alternatives: Greater probability of surplus through 2016 under the California and Shortage Protection alternatives and slightly lower (26%) under the Basin States and Six States alternatives. The probability of surplus under the alternatives is about the same as baseline from 2017 to 2050. The probability of shortage condition deliveries under the alternatives is slightly higher (7% to 14%) through 2016. From 2017 to 2050, the probability of shortages under the alternatives is similar to baseline conditions.
	Surplus:	2002 through 2016 2017 through 2050	29% 21%	
	Shortage:	2002 through 2016 2017 through 2050	< 4% 50%	
Nevada Water Supply Probabilities of normal, surplus and shortage[4] conditions.	Normal:	2002 through 2016 2017 through 2050	96% 50%	Flood Control Alternative: Similar to baseline conditions. Other Alternatives: Greater probability of surplus through 2015; same as baseline from 2017 to 2050. The probability of shortage condition deliveries is slightly higher (7% to 14%) for the alternatives through 2016. From 2017 to 2050, the probability of shortage condition deliveries is higher (3% to 5%) under the alternatives.
	Surplus:	2002 through 2016 2017 through 2050	47% 21%	
	Shortage:	2002 through 2016 2017 through 2050	< 4% 50%	
Mexico Treaty Delivery Probabilities of meeting Treaty delivery obligations.	Normal:	2002 through 2016 2017 through 2050	100% 100%	The Flood Control Alternative would provide slightly higher (1%) probabilities of surplus than under baseline conditions through 2016. The rest of the alternatives provide slightly lower (3% to 7%) probabilities of surplus through 2016 and about the same level as baseline through 2050. Deliveries less than the treaty apportionment (1.5 mafy) do not occur under the alternatives at any time through 2050.
	Surplus:	2002 through 2016 2016 through 2050	26% 19%	
	Shortage:	2002 through 2016 2017 through 2050	0% 0%	

Table S-1
Summary of Potential Effects of Implementing Interim Surplus Criteria[1]

Resource/Issue	Baseline Conditions/No Action	Effects of Alternatives[2]
Water Quality		
Colorado River Salinity Potential change in salinity below Hoover Dam.	Baseline projections assume compliance with numeric criteria along the river. The Basin States are committed to meeting the numeric criteria.	Modeling indicates potential for slight reductions in salinity under each alternative as compared to baseline.
Lake Mead Water Quality and Las Vegas Water Supply Contaminant concentrations in Boulder Basin of Lake Mead, in proximity to the SNWS intakes at Saddle Island.	Increased potential for lower Lake Mead levels and increased inflow channel lengths under baseline projections could increase potential of elevated contaminant concentrations.	The alternatives, except the Flood Control Alternative, result in slightly increased potential for increased contaminant concentrations in Boulder Basin, due to greater potential for lower Lake Mead levels than under baseline conditions.
Flow-Related Issues		
Beach/Habitat-Building Flow Releases Probability of BHBF release conditions from Glen Canyon Dam.	The average annual probability of BHBF releases is 16% through 2016 and 14% from 2017 through 2050.	The probability under the alternatives is typically less than under baseline conditions during the interim period, and converges with baseline conditions thereafter.
Low Steady Summer Flows Probability of requisite conditions for low steady summer flow releases from Glen Canyon Dam.	The average annual probability of conditions requisite for low steady summer flows is 38% through 2016 and 62% from 2017 through 2050.	The probability under the alternatives is typically less than under baseline conditions during the first seven years and similar to or slightly greater than under baseline conditions thereafter.
Flooding Downstream of Hoover Dam Probability of damaging flows below Davis and Parker Dams.	Average annual probability from 2002 through 2016: Davis Dam 9% Parker Dam 10% Average annual probability from 2017 through 2050: Davis Dam 5% Parker Dam 6%	The probability under the Flood Control Alternative is slightly greater than under baseline conditions. The probability under other alternatives is slightly less than under baseline conditions.
Aquatic Resources		
Lake Habitat and Sport Fisheries Potential effects on Lake Mead and Lake Powell fisheries and associated aquatic habitat.	Species are adapted to fluctuating reservoir levels. Therefore, increased potential for lower Lake Mead and Lake Powell surface levels is not expected to adversely affect aquatic species.	Compared with baseline conditions, slightly increased potential for higher reservoir levels under the Flood Control Alternative and increased potential for lower reservoir levels under the other alternatives would not be expected to result in substantial changes to lake habitat.

Table S-1
Summary of Potential Effects of Implementing Interim Surplus Criteria[1]

Resource/Issue	Baseline Conditions/No Action	Effects of Alternatives[2]
Special-Status Species		
Special-Status Plants Potential effects on special-status plants for areas influenced by Lake Powell and Lake Mead water levels.	Under baseline conditions, special-status plant species would continue to be affected by fluctuating water levels, which would periodically expose and inundate areas where the plants occur.	Although reservoir elevations would differ, the effects of all alternatives would be similar to baseline conditions.
Special-Status Wildlife Potential effects on special-status wildlife species associated primarily with potential effects on riparian habitat at the Lake Mead and Virgin River deltas, and the lower Grand Canyon.	Under baseline conditions, increased potential over time for lower reservoir levels could increase potential for development of temporary riparian habitat at the deltas, which would benefit special-status wildlife species that utilize such habitat.	The Flood Control Alternative would have slightly lower potential, while the other alternatives would have increased potential, for lower reservoir elevations and associated potential increases in delta habitat.
Special-Status Fish Potential effects of Lake Mead and Lake Powell reservoir level changes on special-status fish species.	Under baseline conditions, increased potential for lower elevations is not expected to have effects on special-status species fish different than those that occur at present.	Changes in potential for lower reservoir levels under the various alternatives would not change potential for effects.
Recreation		
Reservoir Marinas/Boat Launching Potential effects on shoreline recreation facilities from changes in Lake Mead and Lake Powell surface elevations.	Baseline condition projections indicate increased potential for reservoir levels lower than those considered within the normal operating range that some existing facilities may be able to accommodate. Such occurrence would likely result in modification of facilities to accommodate lower surface elevations.	The Flood Control Alternative has a slightly decreased potential for lower reservoir levels; each of the other alternatives have increased potential for lower levels and necessary relocations.
Reservoir Boating/Navigation Potential effects on reservoir boating that may result from changes in Lake Mead and Lake Powell surface elevations.	Baseline condition projections indicate an increased potential for the occurrence of lower Lake Mead and Lake Powell reservoir levels, which may result in potential increases in navigation hazards and decreased safe boating capacity (due to decreased reservoir surface area).	The Flood Control Alternative has slightly lower potential, and each of the other alternatives have higher potential, for each of navigation hazards and reduced carrying capacity.

Table S-1
Summary of Potential Effects of Implementing Interim Surplus Criteria[1]

Resource/Issue	Baseline Conditions/No Action	Effects of Alternatives[2]
River and Whitewater Boating Potential effects on river boating at Lake Powell and Lake Mead inflow areas.	Boaters may have reduced take-out opportunities due to increased potential for lower reservoir surface elevations.	The Flood Control Alternative has lower potential, and each of the other alternatives have increased potential, for reduced take-out opportunities resulting from lower reservoir elevations.
Reservoir Sport Fishing Potential effects on sport fishing in Lake Mead and Lake Powell.	Potential effects on sport fisheries are minimal under baseline conditions.	Changes in reservoir elevations under each of the alternatives would not be expected to adversely affect sport fisheries or fishing in either reservoir.
Recreation Facilities Relocation Costs Increased costs associated with relocating shoreline facilities to remain in operation at lower reservoir elevations.	Baseline condition projections indicate increased relocation costs associated with future increased potential for lower reservoir levels.	The Flood Control Alternative is similar to baseline conditions. Other alternatives have greater potential for increased relocation costs, based on an average cost per foot associated with relocating facilities.
Energy Resources		
Hydroelectric Power Production Potential for changes in energy production at Glen Canyon and Hoover powerplants.	Glen Canyon Powerplant average annual energy production: 4532 GWh through 2016; 4086 GWh from 2017 through 2050. Hoover Powerplant average annual energy production: 4685 GWh through 2016; 3903 GWh from 2017 through 2050.	The Flood Control Alternative is similar to baseline conditions. Average annual power production under the other alternatives is greater than under baseline conditions for the first six to eight years, then is less for the remaining years. Averaged from 2002 to 2050, Glen Canyon annual power production is from 12 to 30 GWh less than baseline conditions, while Hoover power production is from 51 to 127 GWh less.
Pumping Power Needs for SNWS Potential change in the cost of power to pump Lake Mead water through the SNWS.	Future lower average Lake Mead water levels would require more energy and increased pumping costs for the SNWS intake.	The increase over baseline conditions of annual pumping costs for each alternative follows: Basin States $229,395 Flood Control $ 32,685 Six States $214,779 California $544,843 Shortage Protection $532,635

Table S-1
Summary of Potential Effects of Implementing Interim Surplus Criteria[1]

Resource/Issue	Baseline Conditions/No Action	Effects of Alternatives[2]
Intake Energy Requirements at Lake Powell Potential change in the cost of power to pump Lake Powell water to the Navajo Generating Station and the City of Page.	Future lower average Lake Powell water levels would require more energy and increased pumping costs for the Navajo Generating Station and the City of Page.	The increase over baseline conditions of annual pumping costs for each alternative follows: **Navajo Generating Station** Basin States $2,216 Flood Control $ 0 Six States $2,129 California $4,651 Shortage Protection $4,660 **City of Page** Basin States $ 529 Flood Control $ 0 Six States $ 508 California $1,110 Shortage Protection $1,112
Air Quality		
Fugitive Dust Emissions from Exposed Reservoir Shoreline Potential for fugitive dust emissions from shoreline exposure at Lake Mead and Lake Powell.	Increased potential for lower reservoir levels would increase potential for shoreline exposure under baseline conditions. Increases in fugitive dust emissions would be minimal due to low emission potential of shoreline.	Slightly decreased shoreline exposure under Flood Control Alternative would lower fugitive dust emission potential. Other alternatives would have slightly increased potential for increased fugitive dust emissions. Minimal changes in area-wide fugitive dust emissions would be expected.
Visual Resources		
Visual Attractiveness of Reservoir Scenery, Lake Mead and Lake Powell Potential effects of lower reservoir elevations on scenic quality.	Increased probability of temporary degradation in visual attractiveness of shoreline vistas resulting from increasing potential for lower water levels in Lake Mead and Lake Powell.	Flood Control Alternative: Same as baseline conditions. Other alternatives: Higher probability of degradation of visual attractiveness through 2016 due to accelerated decline of minimum reservoir levels.
Cultural Resources		
Effects on Historic Properties in Operational Zone of Reservoir and River Reaches.	Not significant due to past water level fluctuations. Impacts have already occurred.	Not significant due to past water level fluctuations. Impacts have already occurred.

Table S-1
Summary of Potential Effects of Implementing Interim Surplus Criteria[1]

Resource/Issue	Baseline Conditions/No Action	Effects of Alternatives[2]
Indian Trust Assets		
Effects on water supply for Indian Tribes and Communities	The water available to members of Ten Tribes Partnership would not be affected by future changes under baseline conditions. There is a probability of shortages of CAP priority water for tribes in central Arizona.	No effect on water available to members of Ten Tribes Partnership. Greater probability of shortages of CAP priority water for tribes in central Arizona under all alternatives with the exception of the Flood Control Alternative.
Environmental Justice		
Exposure of Minority or Low Income Communities to Health or Environmental Hazards	No effects are anticipated.	No effects anticipated.
Transboundary Effects		
Treaty Water Delivery Obligations Probabilities of meeting Treaty delivery obligations	Normal: 2002 through 2016 100% 2017 through 2050 100% Surplus: 2002 through 2016 26% 2016 through 2050 19% Shortage: 2002 through 2016 0% 2017 through 2050 0%	The Flood Control Alternative would provide slightly higher (1%) probabilities of surplus than under baseline conditions 2016. The rest of the alternatives provide slightly lower (3% to 7%) probabilities of surpluses through 2016 and about the same level as baseline through 2050. Deliveries less than the treaty apportionment (1.5 mafy) do not occur under the alternatives at any time through 2050.
Flow Below Morelos Dam Amount of excess flow that may reach the Colorado River delta.	Probability of excess flows below Morelos Dam would gradually decline under baseline conditions.	Flood Control Alternative: Similar to baseline. Other alternatives: Small reduction in probability of excess flows.
Potential Effects on Species and Habitat in Mexico	Probability of excess flows below Morelos Dam would gradually decline.	Under the Basin States Alternative there would be no effect on desert pupfish, Vaquita, Yuma clapper rail, California black rail, Clarks grebe; and there is not likely to be any adverse affect on totoaba, Southwestern willow flycatcher, Yellow-billed cuckoo, Elf owl or Bell's vireo.

1. Effects identified are based on probabilities developed through modeling of possible future conditions through 2050, discussed in detail in Chapter 3.
2. In general, the differences between the alternatives and baseline conditions would be greatest at or near 2016, the year in which the interim surplus criteria would terminate.
3. Lake Powell is considered to be essentially full when the lake elevation reaches 3695 feet msl (5 feet below the top of the spillway gates).
4. Probabilities of shortage are based on the modeling assumption of protecting a Lake Mead elevation of 1083 feet msl. There are no established shortage criteria for the operation of Lake Mead.

Table S-2
Participants with Reclamation Regarding the Interim Surplus Criteria Environmental Impact Statement Process

Agency or Organization Invited to or Requesting Meetings	Meetings
Federal Agencies	
National Park Service – *Cooperating Agency*	Various plan formulation and evaluation meetings
U. S. Section of the International Boundary and Water Commission – *Cooperating Agency*	Various plan formulation and evaluation meetings; Briefings for Mexico
Bureau of Indian Affairs	5/26/99, 12/15/99, 1/21/00, 2/24/00, 8/30/00
Environmental Protection Agency	6/15/99, 8/30/00
Fish And Wildlife Service	Various Consultation Meetings on ESA Compliance
National Marine Fisheries Service	Consultation on Special Status Species in the Sea of Cortez, 10/12/00
Geological Survey	6/15/99, 8/15/00
Western Area Power Administration	6/15/99, 8/15/00
Tribal Coordination – Ten Tribes Partnership	
Chemehuevi Tribe (10 Tribes member)	5/26/99, 6/15/99, 11/16/1999, 12/15/99, 2/24&25/00, 8/4/00
Cocopah Indian Tribe (10 Tribes member)	5/26/99, 6/15/99, 111/16/1999, 2/15/99, 2/24&25/00, 8/3/00
Colorado River Indian Tribes (10 Tribes member)	5/26/99, 6/15/99, 11/16/1999, 12/15/99, 2/24&25/00, 8/4/00
Fort Mojave Indian Tribe (10 Tribes member)	5/26/99, 6/15/99, 11/16/1999, 12/15/99, 2/24&25/00, 8/2/00
Jicarilla Apache Tribe (10 Tribes member)	5/26/99, 11/16/1999, 12/15/99, 2/24&25/00
Navajo Nation (10 Tribes member)	5/26/99, 11/16/1999, 12/15/99, 2/24&25/00, 9/27/00, 8/3/00
Northern Ute Tribe (10 Tribes member)	5/26/99, 11/16/1999, 12/15/99, 2/24&25/00, 8/17/00
Quechan Indian Tribe (10 Tribes member)	5/26/99, 6/15/99, 11/16/1999, 12/15/99, 2/24&25/00, 8/2/00
Southern Ute Indian Tribe (10 Tribes member)	5/26/99, 11/16/1999, 12/15/99, 2/24&2500
Ute Mountain Ute Tribe (10 Tribes member)	5/26/99, 11/16/1999, 12/15/99, 2/24&25/00, 8/3/00

Table S-2
Participants with Reclamation Regarding the Interim Surplus Criteria Environmental Impact Statement Process

Agency or Organization Invited to or Requesting Meetings	Meetings
Tribal Coordination –Tribes And Communities In Central Arizona	
Ak-Chin Indian Community	5/26/99, 6/15/99, 1/21/00, 8/3/00
Mojave-Apache Tribe	5/26/99, 1/21/00, 8/3/00
Gila River Indian Community	5/26/99, 6/15/99, 1/21/00, 8/3/00
Pasqua-Yaqui Tribe	5/26/99, 1/21/00
Salt River Pima-Maricopa Indian Community	5/26/99, 6/15/99, 1/21/00
San Carlos Indian Tribe	5/26/99, 6/15/99, 1/21/00, 8/3/00
Tohono O'Odham Tribe	5/26/99, 6/15/99, 1/21/00, 8/15/00, 8/3/00
Tonto Apache Tribe	5/26/99, 6/15/99, 1/21/00, 8/4/00
Yavapai-Apache Indian Community	5/26/99, 6/15/99, 1/21/00, 8/3/00
Yavapai-Prescott Indian Tribe	5/26/99, 6/15/99, 1/21/00
Tribal Coordination – Coachella Valley Consortium Of Mission Indians	
Agua Caliente Band of Cahuilla Indians	8/30/00, 9/6/00
Augustine Band of Mission Indians	[Contact attempted; DEIS sent]
Cabazon Band of Mission Indians	(Contact attempted; DEIS sent]
Morongo Band of Mission Indians	8/30/00
Torres-Martinez Desert Cahuilla Tribe	1/21/00, 8/30/00
Twenty-Nine Palms Band of Mission Indians	[Contact attempted; DEIS sent]
Tribal Coordination – Other Tribes	
Havasupai Indian Tribe	6/15/99, 5/26/99, 1/21/00
Hopi Tribe	6/15/99, 5/26/99, 1/21/00, 8/4/00
Hualapai Nation	6/15/99, 5/26/99, 1/21/00, 8/3/00
Kaibab Paiute Tribe	8/3/00
San Juan Southern Paiute Tribe	8/3/00
San Luis Rey Indian Water Authority	8/16/00
Zuni Indian Tribe	8/3/00

Table S-2
Participants with Reclamation Regarding the Interim Surplus Criteria Environmental Impact Statement Process

Agency or Organization Invited to or Requesting Meetings	Meetings
State and Local Water and Power Agencies	
Arizona Department of Water Resources	6/15/99, 12/16/1999,
Central Arizona Water Conservancy District	6/15/99, 8/15/00
Coachella Valley Water District	6/15/99, 6/6/00, 8/15/00
Colorado River Board of California	6/15/99, 12/16/1999, 6/6/00, 8/15/00,11/14/00
Colorado River Commission of Nevada	6/15/99, 12/16/1999,
Colorado River Water Conservation District	8/15/00
Colorado Water Conservation Board	12/16/99, 8/15/00
Utah Division of Water Resources	12/16/99,
Imperial Irrigation District	6/15/99, 6/6/00, 8/15/00, 11/14/00
Las Vegas Valley Water District	6/22/99
Metropolitan Water District, California	6/15/99, 6/6/00, 8/15/00
New Mexico Interstate Stream Commission	12/16/99, 8/15/00
Office of the State Engineer, Wyoming	12/16/99, 8/15/00
Parker Valley Natural Resources Conservation D.	12/16/99,
Upper Colorado River Commission	6/15/99, 8/15/00
San Diego County Water Authority	8/15/00
Southern Nevada Water Authority	12/16/99, 8/15/00
Non-Governmental Agencies	
Center for Biodiversity	12/15/99, 6/8/00
Defenders of Wildlife	12/15/99, 8/15/00
Environmental Defense	12/15/99, 8/15/00
Glen Canyon Action Network	8/22/00
Pacific Institute	12/15/99, 8/15/00
Southwest Rivers	12/15/99, 8/15/00

Table S-2
Participants with Reclamation Regarding the Interim Surplus Criteria Environmental Impact Statement Process

Agency or Organization Invited to or Requesting Meetings	Meetings
International Agencies	
International Boundary and Water Commission, Mexico Section	4/12/00, 5/11 & 12/2000, 9/30/00, 11/9/00, 11/14/00
National Water Commission, Mexico	4/12/00, 5/11 & 12/2000, 9/30/00, 11/9/00, 11/14/00
National Institute of Ecology, Mexico	4/12/00, 9/30/00, 11/9/00, 11/14/00
Secretariat of Environment, Natural Resources and Fish, Mexico	9/30/00, 11/14/00

Table S-3
Federal Register Notices Regarding Interim Surplus Criteria

Notice	Title
Volume 64, No. 95, Page 27008, May 18, 1999	Intent to Solicit Comments on the Development of Surplus Criteria for Management of the Colorado River and to Initiate NEPA Process.
Volume 64, No. 103, Page 29068, May 28, 1999	Public Meetings on the Development of Surplus Criteria for Management of the Colorado River and to Initiate NEPA Process
Volume 64, No. 234, Page 68373, December 7, 1999	Colorado River Interim Surplus Criteria; Notice of Intent to Prepare an Environmental Impact Statement
Volume 65, No. 131, Page 68373, July 7, 2000	Notice of availability of a draft environmental impact statement and public hearings for the propose adoption of Colorado River Interim Surplus Criteria
Volume 65, No. 149, Page 47516, August 2, 2000	Notice of revised dates for public hearings on the proposed adoption of Colorado River Interim Surplus Criteria
Volume 65, No. 153, Page 48531, August 8, 2000	Notice of public availability of information submitted on a draft environmental impact statement for the proposed adoption of Colorado river Interim Surplus Criteria (Colorado River Basin States: Interim Surplus Guidelines – Working Draft)
Volume 65, No. 185, Page 57371, September 22, 2000	Notice of correction to published Federal Register notice of availability (Colorado River Basin States: Interim Surplus Guidelines – Working Draft)