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Memorandum

To: Regional Director, Southwest Region, Fish and Wildlife Service, Albuquerque, New Mexico (ARD-ES)
Regional Director, Lower Colorado Region, Bureau of Reclamation, Boulder City, Nevada (LC1200 ENV-1.10)

From: Field Supervisor

Subject: Biological and Conference Opinion on the Lower Colorado River Multi-Species Conservation Program, Arizona, California, and Nevada

This memorandum constitutes the attached biological and conference opinion (BCO) for the Lower Colorado River Multi-Species Conservation Program (LCR MSCP). This BCO addresses the effects to 27 species for which six Federal agencies and 24 Permit Applicants from Arizona, California, and Nevada requested incidental take coverage under section 7 and section 10 of the Endangered Species Act.

The BCO determined that the proposed actions described herein are not likely to jeopardize the continued existence of listed, candidate, or other covered species, and are not likely to destroy or adversely modify designated or proposed critical habitat.

Because this document is lengthy with many sections, we have provided a table of contents to assist in locating specific areas of the BCO. The official signature page for this BCO is located after the Reinitiation Notice on page 138.

We appreciate the efforts of the staff at the Bureau of Reclamation and the Southwest Regional Office of the Fish and Wildlife Service in preparing this document. If there are any questions concerning this BCO, please contact Jeff Whitney, Lesley Fitzpatrick, or me.

BIOLOGICAL AND CONFERENCE OPINION FOR THE LOWER COLORADO RIVER MULTI-SPECIES CONSERVATION PROGRAM

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INTRODUCTION

This biological and conference opinion (BCO) responds to the Fish and Wildlife Service (FWS) requirement for intra-Service consultation on the issuance of a section 10(a)(1)(B) permit pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq) (Act), for the Lower Colorado River Multi-Species Conservation Program (LCR MSCP). The permit application was certified as complete on June 9, 2004, and was officially transmitted by the Arizona Ecological Services Office (AESO) to the FWS Regional Office in Albuquerque, New Mexico. This BCO also responds to the Bureau of Reclamation's (Reclamation's) November 29, 2004, request for formal consultation with the FWS for the actions of six Federal agencies on the lower Colorado River (LCR) and the implementation through Reclamation of the LCR MSCP Conservation Plan. The LCR MSCP planning area is defined by the LCR and its historical floodplain from the full pool elevation of Lake Mead in the Grand Canyon to the Southerly International Boundary (SIB) with Mexico and includes portions of Mohave, La Paz, and Yuma counties in Arizona; San Bernardino, Riverside, and Imperial counties in California; and Clark County, Nevada.

The FWS worked closely with the LCR MSCP Federal and non-Federal participants to develop the Habitat Conservation Plan (HCP) and other documents.

On April 16, 2004, the AESO received the permit application and the LCR MSCP planning documents, all dated April 14, 2004, consisting of a draft HCP containing the Conservation Plan (LCR MSCP 2004a), a draft Biological Assessment (BA) for the Federal actions (LCR MSCP 2004b), a draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) (U.S. Department of Interior [USDOI] and The Metropolitan Water District of Southern California [Metropolitan] 2004a), and a separate volume of appendices (LCR MSCP 2004c). The LCR MSCP Conservation Plan (Conservation Plan) was described and included as the proposed action in both the draft BA and draft HCP. Minor modifications were made to the April 14, 2004, versions of these documents during the initial processing period. Versions of the documents dated June 18, 2004 (LCR MSCP 2004d, 2004e, 2004f; USDOI and Metropolitan 2004b), were provided to the public for review. Comments were received and considered in preparation of the final versions of the documents, which are dated December 17, 2004, (LCR MSCP 2004g, 2004h, 2004i, 2004j; USDOI and Metropolitan 2004c). We also used the updated river modeling contained in the "Evaluation of Effects Associated with Updated Hydrologic Information" (USBR 2004), which is contained in the appendices document (LCR MSCP 2004h). We used the information in the final versions of the LCR MSCP documents in our evaluation of the two Federal actions considered in this BCO: (1) the issuance of a section 10(a)(1)(B) permit by the FWS; and (2) specified actions of the other Federal agencies (with Reclamation as the lead agency for the consultation) including implementation of the Conservation Plan through Reclamation. The focus of our evaluation is to ensure that all Federal actions considered in this consultation do not appreciably reduce the likelihood of survival and recovery of the covered species, do not destroy or adversely modify proposed or designated critical habitat, and that the conservation plan minimizes and mitigates the effects of incidental take to the maximum extent practicable.

The LCR MSCP is a joint effort by Federal and non-Federal (state, local, and private) entities with management authority for storage, delivery, and diversion of water; hydropower generation, marketing, and delivery; and land management or Native American Trust responsibilities along the LCR, to address regulatory requirements under section 7, 9, and 10 of the Act for their activities. During the 10-year development of the Conservation Plan for the LCR MSCP, the FWS, working with the Federal and non-Federal agencies evaluated the effects (and resultant incidental take) of their actions on the LCR and its historical floodplain. Many of these activities, especially those related to water delivery and diversion, are interrelated and interdependent to the extent that separating out the effects of all specific actions and assigning them to a particular Federal or non-Federal agency is not feasible. The LCR MSCP participants determined it is more practical, and gives a more complete picture of the extent of effects, to address the effects of all Federal and non-Federal actions in one analysis and develop a conservation package that is sufficient to address all effects and provide additional conservation that would contribute to the recovery of listed species, and reduce the likelihood of listing for the non-listed species covered by the LCR MSCP. With a single analysis of effects to work from, the FWS has determined to complete one BCO to address the effects for both the Federal agencies' formal section 7 consultation and the section 10(a)(1)(B) permit application by the non-Federal parties (Permit Applicants).

In this combined BCO, the AESO will document the intra-Service consultation for our Federal action of issuance of a permit authorizing incidental take under section 10(a)(1)(B) of the Act for non-Federal actions involving water diversion, power deliveries, habitat restoration, and related actions by the Permit Applicants. A summary of the non-Federal actions is provided in the Description of the Proposed Actions section of this BCO, with the full text description in the HCP (LCR MSCP 2004g) and relevant appendices. Non-Federal Permit Applicants are listed in Table 1 (this list is subject to modification for the final permit issuance).

This BCO also serves as the biological opinion for the other Federal agency actions included in this consultation. Reclamation is the lead agency for the consultation on the other Federal actions described in the BA. Reclamation included its discretionary actions within the LCR MSCP planning area and implementation of the Conservation Plan in their request. Western Area Power Administration (Western), the Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), FWS, and National Park Service (NPS) have only included specific portions of their discretionary programs within the LCR MSCP planning area in the request for consultation. A summary of these Federal actions is provided in the Description of the Proposed Actions section of this BCO, with the full text description in the BA (LCR MSCP 2004i) and relevant appendices.

In the standard analysis to determine the amount of incidental take in a section 7 consultation on Federal actions, the FWS determines the amount of take that would occur, and provides reasonable and prudent measures with terms and conditions to minimize the amount of take. For issuance of a section 10(a)(1)(B) permit, the amount of incidental take must be minimized to the "maximum extent practicable." This is a more robust standard than for Federal agencies.

Table 1: Section 10(a)(1)(B) Permit Applicants

STATE	AGENCY
Arizona	• Arizona Department of Water Resources • Arizona Electric Power Cooperative • Arizona Game and Fish Department • Arizona Power Authority • Central Arizona Water Conservation District • Cibola Valley Irrigation and Drainage District • City of Bullhead City • City of Lake Havasu City • City of Mesa • City of Somerton • City of Yuma • Electrical District No. 3 • Golden Shores Water Conservation District • Mohave County Water Authority • Mohave Valley Irrigation and Drainage District • Mohave Water Conservation District • North Gila Valley Irrigation and Drainage District • Salt River Project Agricultural Improvement and Power District • Town of Fredonia • Town of Thatcher • Town of Wickenburg • Unit “B” Irrigation and Drainage District • Wellton-Mohawk Irrigation and Drainage District • Yuma County Water Users’ Association • Yuma Irrigation District • Yuma Mesa Irrigation and Drainage District
California	• Bard Water District • Coachella Valley Water District • City of Needles • Colorado River Board of California • Imperial Irrigation District • Los Angeles Department of Water and Power • The Metropolitan Water District of Southern California • Palo Verde Irrigation District • San Diego County Water Authority • Southern California Edison • Southern California Public Power Authority
Nevada	• Basic Water Company • Colorado River Commission of Nevada • Nevada Department of Wildlife • Southern Nevada Water Authority

Because this is a combined BCO and there is no separation of effects and the resultant incidental take for the Federal and non-Federal covered actions, this section 7 consultation will use the standard for reduction of incidental take to the "maximum extent practicable" as required for section 10(a)(1)(B) permits with the understanding that this standard does not apply to Federal agencies generally, and only applies to the Federal agencies as provided herein due to the unique and comprehensive nature of the LCR MSCP.

The Federal and non-Federal actions covered by this consultation and analyzed in the BA and HCP may affect the following federally listed species and designated or proposed critical habitat within the planning area for which a finding of "may affect, likely to adversely affect" listed species or designated critical habitat, or "may adversely modify proposed critical habitat" has been made:

Yuma clapper rail (*Rallus longirostris yumanensis*): endangered
Southwestern willow flycatcher (*Empidonax traillii extimus*): endangered with proposed critical habitat
Desert tortoise (G*opherus agassizii*): threatened with designated critical habitat
Bonytail (*Gila elegans*): endangered with designated critical habitat
Humpback chub (*Gila cypha*): endangered
Razorback sucker (*Xyrauchen texanus*): endangered with designated critical habitat

In their November 29, 2004, memorandum requesting formal consultation, Reclamation requested FWS concurrence with a finding of "may affect, not likely to adversely affect" for the Federal actions contained in their portion of the consultation for the bald eagle (*Haliaeetus leucocephalus*). The non-Federal agencies determined that there is no potential for incidental take of bald eagles from their activities, and are not requesting coverage for this species under the section 10(a)(1)(B) permit. However, the FWS must evaluate the effects of the action to all listed species that may be affected by the proposed action; therefore, the bald eagle is considered in this consultation. After review of the information, the FWS concurs with the finding of "may affect, not likely to adversely affect" for the bald eagle from the Federal actions under consultation. The information to support this concurrence is contained in Appendix B of this BCO.

In addition to the six federally listed species, the Federal and non-Federal actions analyzed in the BA and HCP may also adversely affect the yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and relict leopard frog (*Rana onca*), both candidates for listing under the Act, and 19 species of concern listed below for which mitigation and conservation are included in the Conservation Plan:

Western red bat (*Lasiurus blossevillii*)
Western yellow bat (*Lasiurus xanthinus*)
Desert pocket mouse (*Chaetodipus penicillatus sobrinus*)
Colorado River cotton rat (*Sigmodon arizonae plenus*)
Yuma hispid cotton rat (*Sigmodon hispidus eremicus*)

Western least bittern (*Ixobrychus exilis hesperis*)
California black rail (*Laterallus jamaicensis corturniculus*)
Elf owl (*Micrathene whitneyi*)
Gilded flicker (*Colaptes chrysoides*)
Gila woodpecker (*Melanerpes uropygialis*)
Vermilion flycatcher (*Pyrocephalus rubinus*)
Arizona Bell's vireo (*Vireo bellii arizonae*)
Sonoran yellow warbler (*Dendroica petechia sonorana*)
Summer tanager (*Piranga rubra*)
Flat-tailed horned lizard (*Phrynosoma mcalli*)
Flannelmouth sucker (*Catostomus latipinnis*)
MacNeill's sootywing skipper (*Pholisora gracielae*)
Sticky buckwheat (*Eriogonum viscidulum*)
Threecorner milkvetch (*Astragalus geyeri* var *triquetrus*)

Populations of the sticky buckwheat and threecorner milkvetch are located on Federal lands within the Lake Mead National Recreation Area (LMNRA) that are included in the LCR MSCP planning area. These plants are not listed under the Act, but are considered in this BCO because of the following reasons. Under the Act, section 9(a)(2)(B) prohibits the removal of listed plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of listed plants on non-Federal lands in violation of state law or regulation. These two plants are listed under Nevada law as critically endangered plants and are protected species for which the prohibitions under section 9(a)(2)(B) may someday apply.

Consistent with our policies for intra-Service consultations dealing with consideration for candidate species in those consultations, and those regarding treatment of unlisted species in applications for section 10(a)(1)(B) permits, for the purposes of this BCO, the 21unlisted animal and plant species included in the LCR MSCP are considered to be proposed for listing as threatened or endangered.

In addition to the 27 species proposed for coverage, the LCR MSCP contains conservation measures for 4 evaluation species. Incidental take coverage is not requested for these species at this time; however, based on the results of conservation measures for these species, the LCR MSCP may request coverage for these species in the future. The specific measures included in the Conservation Plan for these species focus on identifying habitat, life history, and management opportunities to benefit the species within the LCR MSCP planning area. The evaluation species are:

California leaf-nosed bat (*Macrotus californicus*)
Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)
Colorado River (Sonoran) toad (*Bufo alvarius*)
Lowland leopard frog (*Rana yavapaiensis*)

In preparing the 1997 BO, the FWS recognized the need to develop a comprehensive, long-term

program to address the broader and longer-term issues relating to water and power related activities on the LCR. Due to the complexities involved in the development of such a plan, the FWS worked with Reclamation to provide interim coverage through the 1997 BO for Reclamation's activities on the LCR for a 5-year period while the LCR MSCP was being developed. The development of the LCR MSCP proved more complex than envisioned, and the 5-year period of the 1997 BO was extended an additional three years to provide the time to complete the LCR MSCP. The FWS actively participated in the 10-year development of the LCR MSCP. FWS representatives served on the Steering Committee and all sub-committees and participated in discussions on all phases of the development. Draft documents prepared by the participants or their contractors were reviewed by the FWS. This extensive involvement contributed to the completeness and suitability of the Conservation Plan as presented by the Permit Applicants. This opinion was prepared using information from the final BA (LCR MSCP 2004i), HCP (LCR MSCP 2004g), EIS/EIR (USDOI and Metropolitan 2004c) and appendices (LCR MSCP 2004h, USBR 2004), information in our files including other documents previously prepared by the LCR MSCP containing biological information on the covered species, and other sources of information referenced herein. In preparing this BCO, we reviewed other published and unpublished literature pertaining to the covered species or the type of effects resulting from the covered actions in addition to that cited in this BCO. A complete administrative record of this consultation is on file in our office. We have assigned log number 02-21-04-F-0161 to this project. Please refer to that number in future correspondence on this consultation.

Consultation History

Along the LCR, a number of consultations have been undertaken, some regarding overall operations of the LCR, and others for specific Federal actions. Please see USBR 1996, USFWS 2001a, and Appendix E of this BCO for information on previous section 7 consultations.:

Relevant Previous Consultations and Development of the LCR MSCP[a]

- In 1995, U.S. Department of the Interior agencies including Reclamation, BIA, NPS, BLM, and FWS; water, power, and wildlife resource agencies from Arizona, California, and Nevada; Native American Tribes; environmental interests; and recreational interests agreed to form the LCR MSCP as a partnership to develop and implement a long-term endangered species compliance and management program for the historical floodplain of the LCR. Over the next 9 years, the active members of the LCR MSCP developed the Conservation Plan which is included as part of the BA and HCP. The intent is that this habitat-based program will be used by the Federal agencies as part of their proposed actions on the LCR during section 7 consultations, and would be part of the HCP package for a section 10(a)(1)(B) permit for the non-Federal agencies.

- While the LCR MSCP Conservation Plan was under development, Reclamation consulted with FWS in 1996 on their discretionary operations and maintenance activities

[a] All biological opinions prepared by FWS-AESO and referenced in this document are available in pdf format at http://arizonaes.fws.gov/

on the LCR and submitted a detailed BA (USBR 1996). The 1997 opinion (USFWS 1997) covered Reclamation activities for a 5-year period (1997-2002). The opinion found that the proposed actions were likely to jeopardize the continued existence of the southwestern willow flycatcher, bonytail, and razorback sucker, and would destroy or adversely modify designated critical habitat for the bonytail and razorback sucker. The FWS made this jeopardy call because there were no conservation measures contained in the proposed action to address the adverse effects. The opinion contained several reasonable and prudent alternatives and measures to address significant effects of Reclamation's discretionary actions during the consultation. Those documents are herein incorporated by reference. A critical component of the 1997 BO was the requirement that a comprehensive plan to address Federal and non-Federal activities on the LCR be developed. Initially, a five-year development period was included in the 1997 BO, and that was later extended to eight years due to the complexity of the LCR MSCP development. The completion of the LCR MSCP provides the comprehensive, long-term program to address the effects of water- and power-related activities on the LCR.

- In 2000, Reclamation requested formal consultation with the FWS for the Interim Surplus Criteria (ISC), Secretarial Implementation Agreements for the California 4.4 Plan, and conservation measures included as part of the proposed action. The BA for this project (USBR 2000a), the EIS (USBR 2000b), and the biological opinion (USFWS 2001a) are incorporated herein by reference. This consultation covered the implementation of a set of surplus guidelines for Lake Mead that would be in effect for 15 years and would define the conditions under which the Secretary would make water available to the Lower Division states (Arizona, Nevada and California) in addition to their basic apportionments. The transfers under the California 4.4 Plan covered in the consultation would move water from Imperial Irrigation District (IID) to San Diego County Water Authority (SDCWA) and other participants to meet existing water needs while reducing California's diversion of LCR water to its 4.4 million acre-foot (maf) apportionment from levels as high as 5.4 maf in past years. The Reclamation action under consultation provided for 400,000 acre-feet (af) of water per year (afy) to be transferred between California users, resulting in a change in point of diversion (a change in where water was diverted from the LCR), generally from the diversion at Imperial Dam, which is downriver from the new diversion point at the Metropolitan diversion in Lake Havasu. Analysis of the effects to river flows from this change in point of diversion required implementation of conservation measures to replace lost riparian, marsh, and backwater habitats and offset effects to listed fish species. Because the 400,000 afy is included in the non-Federal parties request for a section 10(a)(1)(B) permit, the conservation measures included in the Federal project have been credited against the mitigation contained in the LCR MSCP Conservation Plan. These measures include replacement of 372 acres of southwestern willow flycatcher habitat lost due to declining water levels and the stocking of 20,000 sub-adult razorback suckers below Parker Dam and are specifically identified in the BA (LCR MSCP 2004i). Upon approval by the Secretary of the Interior, the ISC were designated as the Interim Surplus Guidelines (ISG).

- On January 9, 2001, Reclamation submitted a supplemental biological assessment containing an evaluation of effects of the ISC on species listed under the Act that were found in Mexico (USBR 2001). This supplemental BA described potential effects to the desert pupfish, southwestern willow flycatcher, Yuma clapper rail, the vaquita, and the totoaba in Mexico from the proposed discretionary Federal action (adoption of the proposed ISG). Reclamation stated in the supplemental BA that, in providing the supplemental BA to the FWS and National Marine Fisheries Service (NMFS), they were not concluding that consultation on the effects of actions in the United States was required when there were trans-boundary effects to species listed under the Act in another country. Reclamation stated that this effort to consider effects to listed species in Mexico may exceed that required under the Act, and did not establish a precedent for future consultations. In the supplemental BA, Reclamation determined that implementation of the ISC would not affect the desert pupfish, Yuma clapper rail, or the vaquita. Reclamation requested FWS and NMFS concurrence with its findings of "may affect, not likely to adversely affect" the southwestern willow flycatcher and totoaba from implementation of the ISC. The FWS and NMFS concurred with the "may affect, not likely to adversely affect" findings in memoranda dated January 11, 2001 (USFWS 2001b) and January 12, 2001(NMFS 2001), respectively.

- In 2002, Reclamation requested a 3-year extension (to April 30, 2005) of the 1997 consultation due to the fact that the LCR MSCP Conservation Plan was not yet completed (USBR 2002). The FWS issued an amendment to the 1997 BO (USFWS 2002a) for Reclamation's discretionary operations and maintenance activities that would provide section 7 compliance for Reclamation through April 30, 2005, and allow for additional time to complete the LCR MSCP Conservation Plan. This amendment to the 1997 BO did not find jeopardy to the southwestern willow flycatcher, bonytail, or razorback sucker, or destruction or adverse modification of designated critical habitat because of improvements to the status of the species was realized through implementation of the RPAs and RPMs from the 1997 BO. In addition, these RPAs and RPMs were incorporated as conservation measures for the extension. Reclamation intends to incorporate any ongoing management actions related to the RPAs contained in the 1997 BO into their implementation of the LCR MSCP Conservation Plan. These management actions mainly involve the isolated native fish habitats, completion of stocking 50,000 sub-adult razorback suckers into the LCR below Parker Dam, and replacement of up to 570 acres of the 1,400 acres of flycatcher habitat that may lose protected status in the future.

Current Consultation

In developing the Conservation Plan, Federal agencies and the Permit Applicants first evaluated the extent of adverse effects and provided mitigation for that loss. In addition, participants looked to existing Recovery Plans to ensure that the mitigation would support efforts to recover the species as well as address their survival. The Conservation Plan as presented to the FWS fully mitigates for the adverse effects to all covered species and contains additional conservation

for most of the covered species.

On April 16, 2004, the FWS received the section 10(a)(1)(B) permit application package from the non-Federal parties. The permit application package included versions of the draft BA, draft HCP, draft EIS/EIR, and draft appendices dated April 14, 2004, with the application form and application fee. In initial reviews, the application package was judged incomplete and could not be certified due to a lack of funding certainty and issues related to the length of permit being requested. However, to assist in meeting the LCR MSCP processing schedule, the AESO transmitted the permit application package including all the April 14, 2004, draft documents to the FWS Regional Office on April 20, 2004, for initial review and processing. The permit applicants provided sufficient information on funding and permit duration to complete the application package in a letter to the FWS dated June 1, 2004, and the AESO certified the application package as complete in a memorandum to the FWS Regional Office dated June 9, 2004. Some issues regarding funding were not then resolved; however Reclamation and the Permit Applicants committed to developing a final funding agreement within the FWS' review period. During the public comment period, a number of commenters sought information regarding the financial assurances necessary to implement the LCR MSCP. While not structured as formal comment letters, the Secretary of the Interior received letters of financial commitment from representatives of the State of Arizona, California, and Nevada on August 17, 2004, during the public comment period for the Draft LCR MSCP documents. These letters provide a commitment to "share in the agreed upon LCR MSCP costs equally with the United States on a 50/50 Federal/non-Federal basis." These letters are included in Volume V of the final LCR MSCP documents (LCR MSCP 2004j).

Also on April 16, 2004, the FWS received a draft biological assessment dated April 14, 2004 and a request for formal consultation from Reclamation dated April 15, 2004, for their actions on the LCR, their implementation of the Conservation Plan, and specified actions by four other Federal agencies. This request was withdrawn by Reclamation in a letter dated June 7, 2004. The reason for the withdrawal was the determination by Reclamation that it was premature to enter into formal consultation on these actions until the LCR MSCP documents were finalized to include comments based on the public review and completion of discussions between Reclamation and the non-Federal parties on implementation issues. In the June 7, 2004, letter, Reclamation specifically stated that, for the purposes of processing the section 10(a)(1)(B) permit, the FWS should consider the Reclamation commitment to assume the role of implementing entity for the Conservation Plan as discussed in the draft LCR MSCP documents, especially the draft BA (LCR MSCP 2004e). The FWS replied to that letter with a memorandum dated June 9, 2004, acknowledging the withdrawal of request for formal consultation, and the commitment for processing purposes, of Reclamation to implement the Conservation Plan.

The public review period for the draft LCR MSCP documents began on June 18, 2004, with the publication in the Federal Register of the Notice of Availability and Notice of Receipt of a Permit Application. A 60-day public comment period was provided, and three public hearings were scheduled for July 20, 21, and 22, 2004, to receive comments. Comments received during the public review and public hearings were compiled, reviewed, addressed, and incorporated as

appropriate into the final LCR MSCP documents (LCR MSCP 2004g, 2004h, 2004i, 2004j, USDOI and Metropolitan 2004c). Subsequent to completion of the public review period and after making appropriate revisions to the draft BA to create a final BA, Reclamation requested formal consultation on their actions on the LCR, implementation of the final Conservation Plan, and the specified actions of the five other Federal agencies on November 29, 2004. The AESO acknowledged the initiation of formal consultation in a memorandum to Reclamation, dated November 29, 2004.

Prior to and during the consultation period, exchanges of e-mails, and meetings were held between Reclamation, FWS, and the permit applicants to discuss additional information needs for the final BA and HCP, consider and respond to public comments on the draft documents to finalize the BA, HCP, and EIS/EIR, discuss the results of meetings between Reclamation and the Permit Applicants relative to the Implementing Agreement (IA) and Funding and Management Agreement (FMA), and assess other information. Records of these events are in the administrative record. A draft of this BCO was shared for review with Reclamation and comments from that review were incorporated as appropriate. The draft BCO was provided to the Permit Applicants before it was finalized

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTIONS

The proposed Federal actions addressed in this consultation are specific programs or actions on or involving the LCR, undertaken by the six Federal agencies, including implementation of the Conservation Plan by Reclamation, as described in the BA and EIS/EIR. The non-Federal action involves the issuance of a section 10(a)(1)(B) incidental take permit to the Permit Applicants to permit incidental take resulting from the non-Federal actions described in the HCP on or involving the LCR on all 27 covered species. As the lead Federal agency, Reclamation is requesting coverage of its and the other Federal agencies' actions for 50 years. The permit applicants have also requested a 50-year term for their section 10(a)(1)(B) permit. The LCR MSCP planning area is shown in Figure 1.

This section of the biological opinion contains brief descriptions of the Federal agency actions for which section 7 consultation was requested, the non-Federal permit applicants actions proposed to receive incidental take coverage, the mitigation, conservation, and other critical sections of the Conservation Plan, and the amount and types of incidental take resulting from these actions. These brief descriptions are not intended to fully describe or document these actions. This consultation addresses the complete activities as described in detail in the final BA (LCR MSCP 2004i), final HCP (LCR MSCP 2004g), final appendices (LCR MSCP 2004h) and final EIS/EIR (USDOI and Metropolitan 2004c) for the LCR MSCP. All information contained in these final documents for the LCR MSCP is incorporated into this opinion by reference.

Notwithstanding the incorporation of the LCR MSCP documents by reference, the analysis and conclusions reached in this BCO are exclusively those of the FWS and this issuing office.

Figure 1: LCR MSCP Planning Area

Figure 1-1
Lower Colorado River MSCP Planning Area and River Reaches

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Federal Agency Actions

Reclamation's Actions

The Secretary of the Interior has statutorily-delegated responsibility for the operation and maintenance of major dams and associated facilities on the LCR. In execution of these duties, the Secretary and other officials of the United States are subject to an ongoing injunction issued by the U.S. Supreme Court in the case of *Arizona v. California.*

The Secretary has delegated responsibility for much of the routine operation and maintenance of these facilities to Reclamation. Reclamation acts for the Secretary of the Interior as "watermaster" for the LCR and has responsibilities including water operations, hydropower production, channel maintenance, and flood control. Reclamation has also included their implementation of the LCR MSCP Conservation Plan as described in the BA (LCR MSCP 2004i) and HCP (LCR MSCP 2004g) as an action for consultation. Please refer to these documents for a full discussion of Reclamation's covered actions and the Conservation Plan. Reclamation's actions include both ongoing and future flow and non-flow related actions. The Act requires Federal agencies to consult, as applicable, on their discretionary actions that may affect listed species. Reclamation has provided information on both discretionary and non-discretionary actions it undertakes on the LCR in order to present a complete picture of their activities, and specifically stated that this section 7 consultation was not a consultation on any identified non-discretionary activities. In addition, Reclamation stated that this approach did not imply that any future section 7 consultations by Reclamation or any other Federal agency on the LCR or elsewhere would include non-discretionary actions.
Categories of ongoing flow-related activities are paraphrased below. For more detail refer to Chapter 2 of the BA.

- Implementation of the *Water Control Manual for Lake Mead/Hoover Dam*. The U.S. Army Corps of Engineers (USACE) is the controlling agency for flood control on the LCR and is not a participant in the LCR MSCP or this consultation. Reclamation's discretionary actions for flood control involve management options available to them within the parameters of the *Water Control Manual* and the Field Working Agreement (Appendix P in LCR MSCP 2004h).
- Delivery of state apportionment water under water delivery contracts, miscellaneous present perfected rights, and Federal or Secretarial reservations of water, including delivery of water to Mexico.
- Annual operations including surplus and shortage-year declarations, revision of annual operations to reflect current hydrological conditions, determination and delivery of unused apportionment water and determinations made under other administrative actions.
- Daily operations for release of water below Hoover, Davis, and Parker dams within the parameters set by the non-discretionary delivery of state apportioned water. This includes setting releases to maximize hydropower generation within the confines of daily water delivery since water is not released solely for hydropower production. Operation of Senator Wash Reservoir to regulate over- and under-deliveries below Imperial Dam is

a fully discretionary operation.

- Current hydropower generation at Hoover, Davis, and Parker dams is a covered action Reclamation has included in their covered actions the assumption that future hydropower generation will be within the same operational constraints as present generation, and those constraints have been modeled into the effects analysis. This power is scheduled by Western but is generated as an incident of water release schedules, in accordance with specific agreements with Reclamation as described in the BA and Appendices J and S (LCR MSCP 2004h). If future hydropower generation occurs outside of the current operational constraints, additional consultation may be needed.
- Execution and administration of water contracts under the Lower Colorado Water Supply Project in California.
- Delivery of Mexico's 1.5 million-acre feet per year (mafy) allocation of LCR water under the 1944 Water Treaty. This action also has discretionary components for delivery of a portion of the water for Tijuana via LCR water contractors in California and routing of the LCR water through other canal systems.
- Operation and maintenance of wellfields and related facilities that manage groundwater levels in the Yuma area and are important components affecting flows in Reach 6 and in maintaining water quality for deliveries to Mexico.
- Decree accounting of annual water use on the LCR.

The completion of the 2000 consultation on the ISC and California 4.4 Plan (USBR 2000a, USFWS 2001a) results in a difference in the total amount of water considered under changes in points of diversion for Reclamation covered actions and those requested by the permit applicants. Reclamation has section 7 compliance for the changes in points of diversion resulting from 400,000 afy of water transfers for four listed species (Yuma clapper rail, southwestern willow flycatcher, bonytail and razorback sucker) through the 2001 biological opinion. In the description of Reclamation covered actions, the future changes in points of diversion totals 1.174 maf of water, and for the non-Federal parties, the total is 1.574 mafy. In order to achieve Federal and non-Federal coverage for all 27 species, the analysis of the effects of these changes in flows contained in the BA and HCP is based on 1.574 mafy and thus subsumes the effects of the 400,000 afy within the analysis.

Future flow-related actions involve changes to river flows that result from Reclamation's discretionary actions to implement the largely non-discretionary delivery of water as described in the previous paragraphs. In the future, water will continue to be delivered to water rights holders as it is currently except where there are specific changes, such as a transfer. These flow-related actions include:

- Development of shortage guidelines that would determine when less than the normal 7.5 maf of water is delivered to users in the United States. The covered action for the LCR MSCP includes effects to Lake Mead elevations from a range of potential shortage criteria based on protection of specified Lake Mead elevations and reductions in flows downstream that result from shortage determinations. For purposes of analysis, a first level shortage would be declared at 1,050 above mean sea level (msl) and would protect

this level 80% of the time. The second level shortage would be declared at 950 msl and protected 100% of the time. At the time the shortage guidelines are adopted, Reclamation will complete an analysis to determine if the effects are within the range of effects analyzed in the BA. If they are not, additional consultation may be required. The modeling analysis of effects due to the 1.574 mafy of water transfers includes the potential reductions in flow below Hoover Dam from implementation of shortage criteria. If this reduction would be in excess of the 1.574 mafy, at the time the shortage is declared and the reduction in the amount of water delivered downstream is determined, Reclamation would evaluate the effects and may enter into additional section 7 consultations.

- Extension of the ISG through 2051. This extends the implementation period for the ISG from 2016 as described in the 2001 consultation (USFWS 2001a). All restrictions included in the 2000 BA are assumed to be included in the analysis of effects of the extension. At the time surplus guidelines are adopted that extends beyond 2016, Reclamation will complete an analysis to determine if the effects are within the range of effects analyzed in the BA. If they are not, additional consultation may be required.
- Execution of flood release contracts to state entities to allow them to take additional water during periods of flood releases from Hoover Dam.
- Administrative actions and requests from the states that result in changes to the storage and delivery of state allocations or entitlements, including changes in points of diversion for up to 1.574 mafy of LCR water (analysis on 400,000 afy has been completed for four listed species), and Reclamation also wishes to cover the remaining covered species in this consultation. The specific existing use area and future use area of this water is not now known; however, based on projections from the states, the amount of water that would change its point of diversion has been estimated for each reach of the LCR. Administrative actions include, but are not limited to, actions to encourage water conservation under the Water Conservation Field Services Program, execution of new water service contracts for remaining unallocated waters in Arizona, resolution of unauthorized use of LCR water, changes in delivery location due to water transfers and off-stream storage, changes in use, and contract terminations.
- Operation of programs to ensure LCR water delivered to Mexico meets the salinity standards established by Minute No. 242 of the 1944 Mexican Water Treaty.
- Operation and maintenance of wellfields and other facilities in the Yuma area as described in the BA.

In addition to flow-related actions, Reclamation is responsible for operating and maintaining various facilities on the LCR and for maintaining the river channel under the Colorado River Front Work and Levee System Act (CRFWLSA) of 1927, as amended, and the Colorado River Floodway Protection Act (CRFPA) of 1986. These are referred to as the non-flow related actions. While compliance with the CRFWLSA and CRFPA are non-discretionary actions, the specific actions Reclamation takes to meet the requirements of those laws contain a considerable amount of discretion. For example, removal of a specific wash fan in the river, or the location of a levee, is a discretionary action to implement the Federal statutes. These non-flow related actions include:

- Under CRFWLSA, Reclamation currently maintains approximately 275 miles of river channel, 336 miles of protected banklines, 114 miles of levees, and associated river control structures including, but not limited to 102 jetties and 28 training structures. Maintenance of these structures may include dredging or land-based removal of materials from the channel, and addition of riprap to banklines, levees, and river control structures. Stockpiles of rocks are maintained along the river corridor for use in these programs. The facilities maintained under this program also include access roads, boat ramps, diversion structures, drainage pump outlet channels, weirs, siphons, several drains, and measurement structures and devices. Grading of roads, vegetation clearing, removal of sediments from drains, and maintenance of gates are examples of the types of work performed.
- Maintenance through dredging or land-based excavation of inlet and outlet structures for 42 backwaters is included, as is dredging of 31 backwaters required as mitigation for past activities and 65 backwaters where Reclamation has a maintenance responsibility.
- Reclamation uses settling basins to collect sediments moving downstream for removal from the river channel. The three established basins; Laguna, Imperial, and Topock, total 445 acres and are periodically dredged to remove accumulated sediments. Frequency of dredging in the basins ranges from every 3-5 years at Laguna and Imperial to 20 years at Topock.
- Maintenance of the 242 Wellfield and Lateral near the Southerly International Border (SIB) and the Boundary Pumping Plant and associated facilities is largely limited to grading roads, cleaning the lateral canal, and repairs to equipment.
- Reclamation, either directly or through contracts with non-Federal entities, is also responsible for maintaining the large and small dams on the LCR, powerplants, diversion facilities including drains and siphons, drainage pump outlet channels, and other small projects such as line-of-sight clearings, gaging stations, boat ramps, and survey markers.

Future non-flow related activities will involve the operation and maintenance of the existing facilities as mentioned above and fully discussed in the BA and associated appendices. Reclamation is also asking for coverage of the following new projects related to their non-flow related programs:

- Restoration and habitat improvement at Topock Marsh to meet mitigation commitments at this location. The extent or frequency of this work has not been determined, but would likely involve dredging and vegetation control activities.
- The Laguna Reservoir Enhancement and Maintenance Project involves restoring the capacity of the Laguna Settling Basin, within the Laguna Division. Within the expanded settling basin, dredging to remove sediment may be required periodically. The plans for this project have not yet been finalized; however, an alternative has been identified and is included in the BA.
- Stabilization of up to 13.9 miles of currently unprotected bankline through the placement of riprap, construction of jetties, or other means. Up to 41 new jetties may be constructed.

- Establishment of one or more new stockpiles for rock used in repairs to existing stabilized banks or levees or for new projects is proposed. Each stockpile will require approximately 1 acre for rock storage and 0.6 mile of access roads. Previously disturbed areas with a minimum of vegetation are preferred for stockpile locations.

Western's Actions

Western is requesting coverage through Reclamation for current power operating conditions and practices at Hoover, Davis, and Parker dams. As discussed under the Reclamation actions, hydropower generation, as incident of water release requirements, for the next 50-years would be accomplished within the existing operational parameters developed by Western and Reclamation and memorialized in various agreements (see the BA and Appendices J and S in LCR MSCP 2004h). Western is requesting coverage for continued power operations, and transmission, and maintenance of its facilities within the LCR MSCP planning area. Existing contracts, renewal of existing contracts, extended contracts and new contracts do not change LCR operations and do not determine the availability of generation resources. When hydropower generation is insufficient to fulfill contractual commitments, Western purchases power from other sources.

BIA Actions

The United States through the BIA owns water rights in trust for the benefit of the five Indian tribes along the LCR pursuant to the decree in *Arizona v. California*. Tribal water rights are based in part on the Winters Doctrine (*Winters vs United States* 1908), and the Supreme Court Decrees issued in 1979, 1984, and 2000. The five tribes within the LCR MSCP planning area, the Fort Mojave, Chemehuevi, Colorado River, Fort Yuma/Quechan, and Cocopah tribes, have present perfected Federal reserved water rights to 925,840 afy of LCR water within the 7.5 mafy allocations for Arizona, California, and Nevada[b]. The ordering, diversion, and return flows associated with the full Tribal allocations of their water rights are included in the state apportionments under the HCP for the LCR MSCP.

The BIA provides funding and assistance for Indian irrigation projects within the LCR MSCP planning area on five Indian reservations. These are non-flow related actions. Ongoing operation and maintenance of the existing irrigation systems and operations and maintenance of new irrigation systems for new agricultural lands are the BIA actions included in this consultation. Development of new agricultural lands on the reservations in Arizona and California (except as noted for the Chemehuevi Reservation) is a covered action for all 27 covered species. Provisions to address the potential loss of honey mesquite (*Prosopis glandulosa*) type IV habitat (defined in section 3.3.1 of the HCP) of up to 610 acres from agricultural development for Arizona Bell's vireo is included.

[b] The Quechan Tribe will receive additional water under a supplemental decree in *Arizona v. California* pursuant to a water settlement pending among the United States, the states of Arizona and California, the Quechan Tribe, and certain water users in California. The supplemental decree will provide an additional 20,000 af from California's apportionment and an additional 6,350 af from Arizona's apportionment.

On the Fort Mojave Indian Reservation, BIA does not maintain the existing irrigation facilities, but does propose to line the remaining 16 miles of unlined laterals on the existing Tribal farm. BIA funding would be used for the proposed 3,745-acre expansion of the Tribal farm, which would require subjugation of 4,160 acres of undeveloped land and the creation of 20 miles of lined canals. BIA encourages water conservation programs for Tribal water resources, and Reclamation and the Tribe jointly fund ongoing investigations for measuring devices at the pump stations that take water from the LCR.

On the Chemehuevi Indian Reservation, BIA funding partially supports the ongoing development of a Tribal farm (45 acres are currently under irrigation). Up to 1,855 additional irrigated acres may be developed, requiring 2,020 acres of undeveloped land. The conversion of this undeveloped land for agricultural purposes is not a covered action under the LCR MSCP because the proposed agricultural development is outside of the LCR historical floodplain. The effects analysis for loss of covered species habitats did not include this acreage, and thus mitigation is not provided in the LCR MSCP. The diversion of water for the agricultural area is a covered action. BIA also provides support for the development of efficient drip and sprinkler technology and operation on the existing Tribal farm.

The BIA is responsible for operating and maintaining the Colorado River Indian Irrigation Project on the Colorado River Indian Tribes Reservation. In addition to operation and maintenance of the primary diversion dam, Headgate Rock, and its powerplant, these actions include operations and maintenance of all irrigation system components including, but not limited to, diversion structures, canals, drains, turnouts, gates, pumps, and access roads. Work on these components generally occurs within the existing disturbed right-of-way. Mechanical removal and subsequent annual treatment with Diurex and spot treatments with Roundup will be used for vegetation control on the right-of-way. BIA also requests coverage for the lining of 135 miles of existing unlined canals, the development of 25,000 acres of new irrigated agriculture using a total of 27,620 acres of undeveloped land, and creation of 60 new miles of lined canals. Operation and maintenance of these new facilities would be similar to that for existing facilities. BIA is also working with the Tribe on water conservation practices to increase efficient use of water. These actions include use of data loggers and improvements to scheduling and delivery of water within the system.

The Fort Yuma Irrigation Project is on the Fort Yuma Indian Reservation, home of the Quechan Tribe. The irrigation project is owned by Reclamation and is operated and maintained by the Bard Irrigation District under contract from Reclamation. BIA actions are predominantly oversight of leases and collection of assessments. BIA proposes lining 60 miles of existing unlined canals and creation of an additional 650 acres of irrigated agriculture on 730 acres of undeveloped land. Future investigations into water conservation practices are also included as a covered action.

The Tribe and lessees manage the agricultural areas on the Cocopah Indian Reservation, with BIA providing administrative oversight of operations and maintenance through lease-compliance activity. BIA proposes lining of 8 miles of existing unlined canals and the creation of an

additional 500 acres of irrigated agriculture on 635 acres of land. Future investigations into water conservation practices are also included as a covered action.

The Fort Yuma homesteads are Tribal lands a part of the Cocopah reservation. Operations and maintenance of these agricultural areas are the responsibility of the farmers/lessees. The United States owns these lands in trust for the benefit of the Tribe, and this is a BIA covered action. Future investigations into water-conservation practices are also included as a covered action.

In addition to work with the Tribes on irrigation and agricultural issues, BIA also provides guidance and funding for riparian habitat rehabilitation and restoration on Tribal lands. Most of these actions have involved small grants for woodland development, planning for post-wildfire restoration programs, establishment of plant nurseries, and development of habitat-enhancement plans. These programs also contribute to recreational development, such as beaches. Continuation of these programs is included as a covered action.

BIA also works with the Tribes on wildland fire-management programs. Management plans will be developed that will have independent environmental compliance. Included in this consultation are approximately 400 acres of fuels-management projects on the Colorado River, 100 acres on the Fort Mojave, 45 acres on the Fort Yuma, and an undetermined (likely small owing to the extensively developed nature of the reservation) amount on the Cocopah Indian Reservation. Fuel-management projects in excess of these amounts are not covered by this consultation. Other fire-management activities not specifically mentioned in the BA are not covered by this consultation.

BLM Actions

The BLM has completed section 7 consultations for its existing and ongoing operations and management of its lands within the LCR MSCP planning area. The only BLM action included in this consultation is the ordering, diversion, and return flows for their Federal water right to LCR water. This is an ongoing action with no changes anticipated. BLM allocations are included within the 7.5 mafy total for the states and the effects of ordering, diversion of, and return flows are not separated out from the overall flow analysis. BLM uses this water to support their recreational operations and agricultural leases within the LCR MSCP planning area. BLM lands may, in the future, be considered for use in implementing the habitat restoration component of the Conservation Plan, but are not specifically proposed for such use under this consultation.

FWS Actions

The FWS has LCR water rights for the Havasu, Cibola, and Imperial National Wildlife refuges (NWRs) that are included as covered actions under this consultation. FWS allocations are included in the 7.5 mafy total for the states and the effects of ordering, diversion of, and return flows are not separated out from the overall flow analysis. Only the ordering, diversion, and applicable return flows are included as covered actions. This is an ongoing action with no changes anticipated. Management of the refuges, including the use to which the water is put on

the refuge, is not included as a covered action.

NPS Actions

The NPS operates the LMNRA, which encompasses much of the land area around lakes Mead and Mohave. Recreational management on the LMNRA was addressed in a recent consultation (USFWS 2002b) and generally is not included here. The NPS actions include:

- Restoration of 600 acres of riparian habitat along the shorelines of the lakes. Restoration would involve removal of existing non-native vegetation such as saltcedar (*Tamarix* spp.) and planting with cottonwood (*Populus fremontii*), willow (*Salix* spp.), and other native riparian trees and shrubs.
- Construction of 4 new fishing docks, approximately 600 square feet each, and placement of up to 2 acres per site of underwater fish attractors such as brush piles adjacent to the new docks.
- Creation of up to 20 acres of coves to be used to grow-out native fish species for stocking back into the river or reservoir.
- Maintenance and improvements to 13 existing boat ramps.
- Ordering, diversion, and return flow for LCR water rights held by NPS. NPS allocations are included in the 7.5 mafy total for the states and the effects of ordering, diversion of, and return flows are not separated out from the overall flow analysis. This is an ongoing action with no changes anticipated.

Implementation of the Conservation Plan

In addition to its river operation and management actions, Reclamation will be the implementing entity for the Conservation Plan. As designed, the Conservation Plan provides a significant amount of conservation benefits for the listed species over and above that required for mitigation of adverse effects of the covered actions. This additional conservation will improve the status of the covered species beyond that currently present on the LCR. The Conservation Plan was also developed using biological and conservation principles as described in the HCP, including efforts to provide conservation areas along the entire reach of the LCR MSCP planning area. Implementing the restoration programs in the Conservation Plan may also have some limited adverse effects to the covered species due to the conversion of undeveloped lands from non-native dominated land cover types and maintenance of conservation areas, and the analysis of those effects is included in this consultation. A brief description of the conservation components of the Conservation Plan is provided here. Please refer to the BA (LCR MSCP 2004i) and HCP (LCR MSCP 2004g) for full details of the Conservation Plan.

The Conservation Plan conservation components include:

- Establishment of 5,940 acres of cottonwood-willow habitat suitable for the covered species that use this habitat type in amounts described in Table 2-55 of the BA and Table 5-5 of the HCP.

- Establishment of 1,320 acres of honey mesquite type III habitat (defined in section 3.3.1 of the HCP) suitable for the covered species that use this habitat type in amounts describe in Table 2-55 of the BA and Table 5-5 of the HCP.
- Establishment of 512 acres of cattail (*Typha domingensis*)/bulrush (*Scirpus* spp.) marsh habitat for the covered species that use this habitat type in amounts described in Table 2-55 of the BA and Table 5-5 of the HCP.
- Establishment of 360 acres of backwaters for the covered species that use this habitat type in amounts describe in Table 2-55 of the BA and Table 5-5 of the HCP.
- Perpetual maintenance of habitat created to replace that lost to permanent impacts of implementing the covered actions. The remaining habitat acreage would be maintained for at least the 50-year period covered by the permit and consultation. Created habitat lost to fire, drought, or flooding would be restored to suitable condition or replaced elsewhere to ensure the total acreage of habitat is provided for the term of the LCR MSCP.
- Contributions to river-wide fire protection efforts by other Federal and state agencies.
- Description of a process to select suitable sites for habitat restoration.
- Introduction and augmentation through stocking of hatchery-reared bonytail and razorback sucker to the LCR planning area to establish or enhance populations and provide for subsequent research and management programs.
- Provision of a total of $500,000 to the Glen Canyon Dam Adaptive Management Work Group (AMWG) to support unfunded conservation needs of the humpback chub.
- Provision of a total of $400,000 for conservation measures in support of the flannelmouth sucker in the LCR.
- Provision of $10,000 per year for 10 years to support planned, but unfunded, conservation actions to contribute to the recovery of the relict leopard frog.
- Provision of $10,000 per year until 2030 (25 years of funding) to the Clark County Multi-Species Habitat Conservation Plan Rare Plant Workgroup to support conservation measures for the sticky buckwheat and threecorner milkvetch that are beyond the permit requirements of the Clark County MSHCP.
- Directed research into covered and evaluation species and their habitats, management actions and restoration technology for habitat restoration, and monitoring of species and their habitats.
- Establishment of a $25 million dollar fund to support maintenance actions for existing covered species habitats on the LCR.
- Provision for specific avoidance and minimization measures to reduce the potential for take of covered species, and specific mitigation measures to offset take that has occurred. There are both general and species-specific measures included. In addition to these, there are monitoring and research measures that provide information on the species, their distribution, and habitat use to provide focus for the development of habitats. The general measures are listed below and are detailed in Chapter 5 of the HCP:

    1. Avoidance and Minimization Measure (AMM) 1: To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP (Conservation Plan) on existing covered species habitats.

2. AMM 2: Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh.
3. AMM 3: To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season.
4. AMM 4: Minimize contaminant loads in runoff and return irrigation flows from LCR MSCP-created habitats to the LCR.
5. AMM 5: Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area.
6. AMM 6: Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities, and other river-management actions.
7. Monitoring and Research Measure (MRM) 1: Conduct surveys and research to better identify covered and evaluation species habitat requirements.
8. MRM 2: Monitor and adaptively manage created covered species and evaluation species habitats.
9. MRM 3: Conduct research to determine and address the effects of nest-site competition with European starlings on reproduction of covered species.
10. MRM 4: Conduct research to determine and address the effects of brown-headed cowbird nest parasitism on reproduction of covered species.
11. MRM 5: Evaluation of selenium concentrations in created marshes and backwaters.
12. Conservation Area Management Measures (CMM) 1: Reduce risk of loss of created habitat due to wildfire.
13. CMM 2: Replace created habitat affected by wildfire.

Responsibilities to complete and maintain RPAs under the 1997 BO are also included in the Conservation Plan. Specifically, maintenance of the minimum of 300 acres of isolated impoundments for native fish is a responsibility of the LCR MSCP. If Reclamation has not completed these impoundments before the LCR MSCP is established, it must complete them in addition to the 360 acres of backwaters called for in the Conservation Plan. The protection of 1,400 acres of flycatcher habitat that were required under the 1997 BO is a permanent responsibility. However, if up to 570 acres loses its current protected status, an additional 570 acres above that contained in the Conservation Plan will not be required since there is sufficient additional conservation acres included in the Conservation Plan to cover the possible loss of these acres

Non-Federal Covered Actions

The action by the FWS to issue an incidental take permit under section 10(a)(1)(B) of the Act requires the permit applicants to list the actions for which coverage under the permit is requested. The amount of incidental take that results from the implementation of these actions is then determined. As part of the analysis in this BCO, the FWS then evaluates the effect of that level of incidental take along with the avoidance, minimization, and mitigation measures contained in the Conservation Plan to make findings under the Act as required by section 7(a)(2). Only the

effects relating to incidental take of the covered species under the Act are included in this consultation. Future implementation of the covered actions may require additional environmental compliance under other statues (i.e., National Environmental Policy Act, Clean Water Act).

The permit applicants include water users, power interests, and state wildlife agencies from Arizona, California, and Nevada. Each state provided the list of covered actions for which incidental take coverage is sought to the LCR MSCP and described them in detail in the HCP and relevant appendices. Each state is discussed separately below. For modeling and assessment purposes, the combined state and Federal proposal for changes in points of diversion for LCR water was used to determine the flow-related losses to cottonwood-willow, marsh, and backwater habitats. The analysis used 1.574 mafy of water as the maximum amount that could be transferred within and among states and associated with administrative actions by Reclamation. As discussed earlier in this section, this figure is 400,000 afy larger than that included for Reclamation because formal section 7 consultation was completed for the transfer of that water within California. The applicants are seeking coverage for the full amount of the proposed transfers for the full list of 27 covered species, which requires evaluation of the 1.574 mafy amount. For a complete discussion of the non-Federal actions, please refer to Chapter 2 of the HCP (LCR MSCP 2004g).

Arizona

Permit Applicants from Arizona are seeking coverage for the ongoing and future diversion of up to 2.8 maf of Arizona's full annual entitlement, plus surpluses, plus Arizona's share of any unused apportionment, plus the volume of return flow as applicable. Future changes (permanent or temporary) in points of diversion for portions of Arizona's entitlement up to 200,000 afy, and changes to water permittees are included as flow-related covered actions. Water quality of any return flow is not included as a covered action.

Coverage is also requested for non-flow related ongoing and future operations, maintenance, and replacement of facilities within the LCR MSCP planning area to include:

- The facilities and equipment through which water is diverted and conveyed, including diversion structures and canals;
- The facilities through which flows are returned to the river, including drains;
- The facilities and equipment through which electric power is generated and transmitted;
- The appurtenant works that support these facilities, including access and service roads, electric power and communication transmission lines and substations, docks, boat ramps, and bankline protection.

Contracting for, ordering, and scheduling of hydropower generated by Hoover, Davis, and Parker dams for the next 50-years is a covered action. The generation of that power will be accomplished under the current operating parameters as described under Reclamation and Western's covered actions.

The Arizona Game and Fish Department (AGFD) is requesting coverage for several ongoing and future categories of activities they undertake on the LCR. These include:

- Habitat-management or restoration activities in riparian, marsh, and aquatic habitats to benefit fish and wildlife species. Up to 10 acres of fish attractor structures in any 5-year period could be placed in the river, reservoirs, or backwaters (for a total of 100 acres over 50 years). Up to 10 acres in any 5-year period of riparian or marsh restoration or maintenance projects could be accomplished (for a total of 100 acres over 50 years).
- Surveys for game and non-game fish that have the potential to inadvertently result in adverse effects to covered fish species. Surveys specifically for the covered species would be addressed through ESA section 10(a)(1)(A) permits and are not covered here.
- Limited stocking of rainbow trout (*Oncorhyncus mykiss*) in the LCR.
- Maintenance of aids to navigation and boating access.
- Law enforcement patrol activities.

California

Permit Applicants from California are seeking coverage for the ongoing and future diversion of up to 4.4 maf of California's full annual entitlement, plus surpluses, plus California's share of any unused apportionment, plus the volume of return flow as applicable. Future changes (permanent or temporary) in points of diversion for portions of California's entitlement; up to 800,000 afy and changes to water permittees are included as flow-related covered actions. Water quality of any return flow is not included as a covered action.

Coverage is also requested for non-flow related ongoing and future operations, maintenance, and replacement of facilities within the LCR MSCP planning area to include:

- The facilities and equipment through which water is diverted and conveyed, including diversion structures and canals;
- The facilities through which flows are returned to the river, including drains;
- The facilities and equipment through which electric power is generated and transmitted;
- The appurtenant works that support these facilities, including access and service roads, electric power and communication transmission lines and substations, docks, boat ramps, and bankline protection.

Contracting for, ordering, and scheduling of hydropower generated by Hoover, Davis, and Parker dams for the next 50-years is a covered action. The generation of that power will be accomplished under the current operating parameters as described under Reclamation and Western's covered actions.

California Department of Fish and Game (CDFG) has not requested coverage for any of their activities on the LCR. Although CDFG participated in the development of the LCR MSCP, they determined their interests did not extend to obtaining coverage for their actions under the

program. CDFG did provide comments on the draft EIS/EIR (see Volume 5 of the LCR MSCP documents [LCR MSCP 2004j]), which were considered in finalizing the documents. CDFG is working with the California Permit Applicants to meet the requirements of the California Endangered Species Act and other state statutes as appropriate.

Nevada

Permit Applicants from Nevada are seeking coverage for the ongoing and future diversion of up to 0.3 maf of Nevada's full annual entitlement, plus surpluses, plus Nevada's share of any unused apportionment, plus the volume of return flow as applicable. Future changes (permanent or temporary) in points of diversion for portions of Nevada's entitlement of up to 233,000 afy, and changes to water permittees are included as flow-related covered actions. Water quality of any return flow is not included as a covered action.

Coverage is also requested for non-flow related ongoing and future operations, maintenance, and replacement of facilities within the LCR MSCP planning area to include:

- The facilities and equipment through which water is diverted and conveyed including diversion structures and canals;
- The facilities through which flows are returned to the river, including drains;
- The facilities and equipment through which electric power is generated and transmitted;
- The appurtenant works that support these facilities, including access and service roads, electric power and communication transmission lines and substations, docks, boat ramps, and bankline protection.

Contracting for, ordering, and scheduling of hydropower generated by Hoover, Davis, and Parker dams for the next 50-years is a covered action. The generation of that power will be accomplished under the current operating parameters as described under Reclamation and Western's covered actions.

The Nevada Department of Wildlife (NDOW) is requesting coverage for several categories of actions they take on the LCR, including:

- Habitat management or restoration activities in riparian, marsh, and aquatic habitats to benefit fish and wildlife species. Up to 20 acres of fish attractor structures in any 5-year period could be placed in the river, reservoirs, or backwaters (for a total of 200 acres over 50 years). Up to 10 acres in any 5-year period of riparian or marsh restoration or maintenance projects could be accomplished (for a total of 100 acres over 50 years).
- Maintenance of aids to navigation and boating access.
- Law enforcement patrol activities.

Amount and Types of Incidental Take

The Federal actions under consultation may result in the take of six species currently listed as threatened or endangered and 21 non-listed species. A full description of effects and amount of

incidental take are described in the HCP (LCR MSCP 2004g), as well as mitigation to be provided. Incidental take authorization for the non-listed species would become effective if and when the species are listed as threatened or endangered, in accordance with regulations and policy for section 10(a)(1)(B) permits.

Pursuant to the provisions of section 7 of the ESA and its implementing regulations, incidental take statements contained in biological opinions apply only to species listed as endangered or threatened under the ESA. In the event an unlisted covered species becomes listed in the future, the FWS shall give due consideration to, and full credit for, those Conservation Measures provided in the Conservation Plan that benefit such species as part of any section 7 consultation regarding the covered actions. The FWS will review this BCO and, barring new information, would confirm the incidental take contained herein. Due to the wide range and scope of the covered actions, the amount and types of take included in this consultation are varied and require separate enumeration. Some types of take can be quantified, such as that resulting from permanent or long-term loss of habitat that results in harm or harassment to covered species, while others cannot be definitively quantified, such as take from implementation of the covered actions and conservation measures that may result in harassment of individuals of the species but does not entail a permanent loss of habitat. The uncertainty about the number of individuals in locations where disturbances or operations could occur for any particular action, and the fact that these actions will extend over a 50-year period, does not allow definitive calculation of the amount of take from disturbance or operations. The information used to develop the Conservation Plan and select the covered species documented the presence of the covered species within the LCR MSCP planning area and in the habitats that would be affected. Some covered species are migratory and are not present in the area all year, but their seasonal presence has been confirmed by past biological monitoring. There is also a dynamic nature to habitat use by all species, in which occupancy of a particular area may vary significantly from year to year but the species is expected to occur wherever suitable habitat exists. Given this variation in occupancy, it is reasonable to assume that individuals of that species will over the course of 50-years, occupy any area in the LCR MSCP planning area that contains habitat for a covered species. This level of certainty of species presence and use of available habitats is sufficient to assume that incidental take will occur. The amounts and types of take are more fully discussed in Chapter 5 of the BA (LCR MSCP 2004i) and Chapter 4 of the HCP (LCR MSCP 2004g); and that information is incorporated herein by reference.

Flow-Related Incidental Take

This take is the result of changes to points of diversion for 1.574 mafy of LCR water over the next 50 years and changes that result from other flow-related actions. Since the number of individuals of the covered species present on these habitats cannot be predicted, the surrogate measure for the amount of the take is the total loss of suitable habitat for the covered species that utilize cottonwood-willow, marsh, and backwaters resulting from the changes in points of diversions, extension of the ISG and implementation of shortage criteria and is listed in Table 2. Specific effects to flows in Reach 6 and 7 from the Yuma Division Operations was not separated out and are not expected to change over the current pattern. Also, although changes to flows

Table 2: Quantified incidental take in acres and miles of river resulting from habitat loss due to implementation of the Federal and non-Federal covered actions

Species Name	Flow Related Actions	Non-Flow Related Actions	Restoration Loss	Total Acres/Miles Lost
Yuma clapper rail^	133 acres	100 acres	10 acres	243 acres
Southwestern willow flycatcher^	1,734 acres	59 acres	10 acres	1,853 acres
Desert tortoise	0 acres	192 acres	0 acres	192 acres
Bonytail	399 acres	0 acres	0 acres	399 acres
Humpback chub +	62 miles	0 miles	0 miles	62 miles
Razorback sucker	399 acres	0 acres	0 acres	399 acres
Western red bat *	161 acres	604 acres	0 acres	765 acres
Western yellow bat *	161 acres	604 acres	0 acres	765 acres
Desert pocket mouse #	0 acres	0 acres	0 acres	0 acres
Colorado River cotton rat	59 acres	3 acres	5 acres	67 acres
Yuma hispid cotton rat	0 acres	71 acres	5 acres	76 acres
Western least bittern	133 acres	100 acres	10 acres	243 acres
California black rail	37 acres	61 acres	5 acres	103 acres
Yellow-billed cuckoo^	1,425 acres	99 acres	10 acres	1,534 acres
Elf owl	161 acres	590 acres	0 acres	751 acres
Gilded flicker	1,425 acres	99 acres	10 acres	1,534 acres
Gila woodpecker	819 acres	26 acres	10 acres	855 acres
Vermilion flycatcher^	1,890 acres	714 acres	10 acres	2,614 acres
Arizona Bell's vireo^	1,654 acres	1,309 acres	20 acres	2,983 acres
Sonoran yellow warbler^	2,929 acres	183 acres	10 acres	3,122 acres
Summer tanager^	161 acres	14 acres	0 acres	171 acres
Flat-tailed horned lizard	0 acres	128 acres	0 acres	128 acres
Relict leopard frog #	0 acres	0 acres	0 acres	0 acres
Flannelmouth sucker	85 acres	0 acres	0 acres	85 acres
MacNeill's sootywing skipper	172 acres	50 acres	0 acres	222 acres
Sticky buckwheat ^	ND	0 acres	0 acres	ND
Threecorner milkvetch ^	ND	0 acres	0 acres	ND

Notes:

+: the maximum amount of riverine habitat in Grand Canyon when Lake Mead is at 950 msl elevation.

*: habitat lost is riparian areas with large trees used as roosts.

#: no habitat loss from covered actions is anticipated.

^: the amount of habitat periodically gained and lost around Lake Mead has not been determined.

released from Hoover Dam will occur as a result of the flow-related actions, Reclamation determined there were no significant effects to the riverine reach of Reach 2 or to operation of Lake Mohave because the operational aspects of the water releases would not change and the decrease in flows would not have effects to habitats of covered species. Additional habitat losses from ongoing water deliveries may occur, but the amounts are limited and cannot be quantified. During the life of this consultation and permit, as long as the Conservation Plan is being properly implemented, the Federal agencies and permittees may, in carrying out the actions described in the BA and HCP, incidentally take species within the LCR planning area in the form of harm or harassment, measured by the acreage or miles of habitats shown in Table 2 for flow-related actions.

The figures in Table 2 do not include aquatic habitats for razorback sucker and shoreline habitats for southwestern willow flycatcher, other riparian birds, Yuma clapper rail, sticky buckwheat, and threecorner milkvetch affected by the fluctuating reservoir levels in Lake Mead. An estimate of the miles of river above Lake Mead that could at various times provides habitat for the humpback chub is included in Table 2. There may be some use of these areas by flannelmouth suckers, but this is uncertain. These habitats will be potentially gained and lost many times over the next 50 years depending on water level elevations in the lake. Models based on documented past inflows and releases can compare various future operational scenarios but are not predictive, so the yearly effect cannot be determined. An explanation of how these models operate is in Appendix J and Appendix M (LCR MSCP 2004h). The type of take is described below. Aquatic habitat in the reservoir itself for razorback sucker would periodically be lost and restored through fluctuating water levels at Lake Mead. This discussion is contained in Appendix M and USBR 2004 in LCR MSCP 2004h. Known spawning habitats are in shoreline areas that could be inundated or left dry depending on water levels. When these areas are dry, other suitable areas for spawning may exist in the same general location in the new shallow water areas. An estimate of the amount of suitable habitat for razorback suckers that would be affected by water-level fluctuations at Lake Mead is not feasible. Razorback suckers may also use the confluence and riverine habitat in the lower portion of the Grand Canyon that is within the full-pool elevation of Lake Mead. This use is not quantified, but likely is a subset of that for the humpback chub.

Riparian and marsh habitats formed around the perimeter of Lake Mead, particularly at wash or tributary inflows, provide habitat for covered species including the southwestern willow flycatcher and Yuma clapper rail. Due to the fluctuation in Lake Mead elevations, these areas may be created, inundated, or dried out depending on their location relative to the water level. Because these riparian and marsh habitats may take several years to develop at a particular site, and the range of water level fluctuations that would nurture or eliminate them is uncertain, the precise amount and location of these habitats that could be created or eliminated is not known. However, it can be assumed that these types of habitat would be present in varying amounts over the next 50 years and, when present, will be used by the covered species.

The same condition exists for the sticky buckwheat and threecorner milkvetch shoreline habitats around Lake Mead. Newly exposed shorelines provide opportunities for these plants to colonize

the area, and those colonies would be removed by rising water levels. Habitat for these species does exist above the full-pool elevation of Lake Mead to provide a seed source for colonizing populations.

Direct mortality of individuals of the covered species is not anticipated from implementation of flow-related actions. Changes in flows due to changes in points of diversion will be gradual and not noticeable over the short-term. Water levels in Lake Mead will not fluctuate rapidly enough to result in stranding of humpback chub, razorback sucker, or flannelmouth sucker, or desiccation of spawning or nursery areas within the annual use period for these habitats. Inundation or drying of marshes could eliminate habitat for Yuma clapper rail within a year; however riparian trees would persist for some period after inundation or retreat of water levels. Sticky buckwheat and threecorner milkvetch are annual plants, and rising water levels may kill individual plants before they would have died. Seeds in the soil within the inundation areas would also be lost, but seeds would be available from plants outside of the inundated area.

Non-Flow Related Incidental Take (Footprint Actions)

This take is the result of permanent actions within the planning area where construction of new agricultural lands, new bankline stabilization, and other "footprint" actions would remove habitat for covered species. This take is defined in terms of habitat lost. Existing CRFWLSA facilities were determined not to contribute any significant additional habitat losses over the term of the consultation for this category, although equilibrium within the system resulting from these actions has not yet occurred. The nature of the indirect effects resulting from channelization and bankline stabilization results in the expression of those effects to the physical conditions of the river may take decades to fully manifest. For example, sediment inputs are reduced due to dams and bank stabilization at the same time that flows continue to transport sediments already in the system downstream. Over time, upstream reaches become sediment deficient, and the extent that this happens downstream is affected by flows over many years. This temporal aspect of when an effect is fully expressed is a complex concept but is fully supported by the river management literature (Brooks 1988, Hunt 1988). This category also includes habitat for some covered species lost as a result of habitat restoration efforts for other species included in the covered actions. The acreage of this take is also listed in Table 2. During the life of this consultation and permit, as long as the Conservation Plan is being properly implemented, the Federal agencies and permittees may, in carrying out the actions described in the BA and HCP, incidentally take species within the LCR planning area in the form of harm or harassment, measured by the acreage of habitats shown in Table 2 for non-flow-related actions because of the avoidance, minimization, and mitigation provided by the Conservation Plan.

Direct mortality of individuals of the covered species may result from implementation of these covered actions. Examples of this take would be mortality to desert tortoise or flat-tailed horned lizards from creation of new roads, and loss of birds and nests from clearing of construction sites. This amount of direct take through mortality for individuals cannot be precisely determined. The number of such individuals at risk over 50 years, the variation in habitat quality that results in different numbers of individuals present, and changes in population size over time, precludes any

meaningful estimate. Implementation of these actions contains avoidance and minimization measures that will reduce the risk of injury or mortality to individuals during construction and maintenance activities, for example, land clearing activities would generally not take place during the breeding season of covered bird species to avoid taking nests and young birds.

During the life of this consultation and permit, as long as the Conservation Plan is being properly implemented, the Federal agencies and permittees may, in carrying out the actions described in the BA and HCP, incidentally take species within the LCR planning area in the form of harm or harassment, measured by the acreage or miles of habitats shown in Table 2 for non-flow-related actions because of the avoidance, minimization and mitigation provided by the Conservation Plan.

Other Non-Flow Related Incidental Take (Continuing Actions)

This category of incidental take results from the continuing actions needed to maintain existing facilities and structures as well as maintenance of new structures once they have been completed. In some cases, maintenance actions do not involve the loss of habitat because habitat is not permitted to develop on the site as in the case of roads, parking lots and the immediate area around facilities. In other cases, suitable habitat does develop and is removed periodically as is the case in irrigation drains. In those cases, there is a loss of habitat as well as a factor of potential harm and harassment to any individuals of the covered species present. As discussed previously for new construction, there is a risk of mortality to individuals of covered species utilizing habitat features of the area to be maintained. The extent of this take is not precisely determined in terms of number of individuals for the same reasons stated earlier. There are avoidance and minimization measures included in the implementation of these actions to reduce the risk to individuals.

Maintenance of existing facilities associated with water delivery, power generation, and transmission is included as a covered action. New facilities addressed under the previous heading will also require maintenance in the future. Maintenance activities on these facilities is not likely to have effects on cottonwood-willow or honey mesquite habitats, but will affect marsh and aquatic habitats that support covered species. Because of the nature of this work, and the 50-year span of the program, no estimate of numbers of individuals that could be taken can be made. The estimate of incidental take is based on the acreage or number of such sites. For the most part, these activities will prevent suitable habitats for the covered species from becoming established over the long-term, but allow for some establishment of habitat, particularly marsh type habitats, over the short-term (1-5 years). Table 3 lists the types and, where available, the acreage or miles of facilities affected by maintenance actions.

A total of 557 miles of canals and drains are included as covered actions in Arizona and California. Management of canals in the Yuma area and canals and drains on the Tribal irrigation projects precludes the establishment of marsh vegetation, and continuing this maintenance will not result in take. New canals and drains constructed for the expansion of Tribal irrigation project areas will also be maintained to preclude the development of habitat for

Table 3: Extent of existing and new facilities that will require maintenance activities over the life of the consultation and permit.

Type of Activity	**Existing Area**	**New Area**	**Total**
River channel (dredging, wash fan removal)	275 miles	0	275 miles
Stabilized bankline (repair riprap)	336 miles	13.9 miles	349.9 miles
Levees (grade roads, repair riprap)	114 miles	0	114 miles
Settling basins: basin area disposal sites	445 acres 1,900 acres	0 0	445 acres 1,900 acres
Stockpiles Associated roads	864 acres 380 miles	1 acre 1 mile	864 acres 381 miles
Jetties (clear access, dredge, replace rock)	102 jetties	41 jetties	143 jetties
Training structures (clear access, replace rock)	25 structures	0	25 structures
Drainage pump outlet structures (remove vegetation and sediment)	122 acres	0	122 acres
Drains and siphons (remove vegetation and sediment)	7.5 acres	0	7.5 acres
Yuma Mesa Conduit (vegetation removal)	4.5 acres	0	4.5 acres
Boat ramps (vegetation trimming)	3.5 acres	0	3.5 acres
Backwaters: inlets and outlets (dredged) mitigation responsibility maintenance responsibility	42 backwaters 31 backwaters 65 backwaters	0 0 0	42 backwaters 31 backwaters 65 backwaters
Canals and drains (vegetation and sediment removal)	557 miles	0 *	557 miles
Fish habitat enhancement	0 ^	308 acres	308 acres

Notes:
* The extent of new canals and drains developed for the Conservation Plan has not been determined. It is assumed that they would be maintained to prevent marsh and riparian vegetation from establishing in them.
^ There are existing areas of fish habitat-enhancement structures within the LCR MSCP planning area; however, the agencies responsible for placing the structures have not requested coverage for their maintenance or replacement except as described in the BA and HCP

covered species so there is no take associated with those future operations. Drains conveying water back to the LCR are more likely to support the 30 acres of marsh vegetation that may be removed by dredging or burning multiple times over the course of the 50-year span. This type of work would, to the maximum extent practicable, be done outside the breeding season for the marsh species to reduce the risk of harm. Similarly, the maintenance dredging of backwaters by Reclamation may reduce the amount of riparian or marsh habitat that has grown into the

backwater. There are 96 backwaters Reclamation has included in the covered actions that may require dredging on one or more occasions over the 50-year span. The design for these backwaters does provide for areas of marsh habitat to remain after the project is completed, so there is not a complete loss of marsh habitats and, over time, these areas will expand. Work would be timed to avoid, to the maximum extent practicable, the breeding season of marsh species to reduce the risk of mortality to any individuals.

Aquatic habitats in canals, drains, and backwaters would also be affected by these actions. Individuals of the covered fish species inhabiting these areas could be harmed or harassed by the actions described above as well as other operations such as annual canal drying. Breeding seasons for these fish species will, to the maximum extent practicable, be avoided by these operations, which will reduce the risk to individuals. Other minimization and avoidance measures described in the Conservation Plan will also reduce the risk of mortality to individual fish utilizing the area. Dredging in the settling basins occurs on a regular cycle depending on the amount of sediment collected. The Topock basin requires dredging every 20 years, the Imperial basin every 3-5 years, and the Laguna basin every 10 years. Habitat for covered fish species is present in the Topock and Imperial basins, and habitat for covered marsh species is present at all three. The removal of sediment temporarily eliminates shallow-water habitat and removes marsh vegetation, but is necessary for the long-term maintenance of these facilities. Between dredging periods, emergent marsh vegetation does return. Dredging activities will, to the extent practicable, avoid breeding seasons for covered species potentially harmed by the action. Dredge spoil is deposited on existing disposal areas that do not contain suitable habitat for covered species. Reclamation maintenance of existing stabilized banklines, levees, jetties, training structures, and rights of way/lines of sight for gaging stations and other operational sites generally has a limited effect on existing riparian or marsh habitat types since maintenance is directed to prevent suitable habitat from developing over the short-term.

In addition to these facilities, the covered actions include placement of fish habitat-enhancement structures/fish attractors into the river, reservoirs and backwaters. The total acreage proposed for these structures is 308 acres; however, this should be considered a high estimate. Because natural materials used in creating these enhancements, such as used Christmas trees, lose their value after a few years; future placement of structures is likely to be in the same areas previously treated. Artificial materials last longer but still require some replacement or maintenance.

Physical habitat for the covered fish species may be enhanced by these structures, but the concentration of non-native fish around them may offset the benefit through increased risk of predation or competition for resources. Direct mortality of covered fish species would not be anticipated from the placement of these structures. For the purposes of this consultation, the 308 acres will be used as a measure to quantify the take from this activity.

During the life of this consultation and permit, as long as the Conservation Plan is being properly implemented, the Federal agencies and permittees may, in carrying out the actions described in the BA and HCP, incidentally take within the LCR planning area in the form of harm or harassment, marsh and fish species in the repeated maintenance of facilities summarized in the

text and in Table 3 of this BCO and described more fully in the BA and HCP under Federal and non-Federal covered actions. The avoidance and minimization measures contained in the Conservation Plan reduce the amount of this incidental take below significant levels.

Incidental Take Related to Creation of Restoration Sites

The Conservation Plan will create 8,132 acres of habitat for the covered species as mitigation for the adverse effects of covered actions and as additional conservation for the species. An additional 81 acres will contain infrastructure (roads, canals, drains, fire breaks) needed to create and maintain the habitats. The total land involved in this portion of the Conservation Plan is 8,213 acres. The HCP (LCR MSCP 2004g) describes the process involved in selecting and designing conservation sites and the potential for incidental take that may occur as a result of the creation and long-term maintenance of the habitat. The covered actions also include Federal and non-Federal actions that would restore native vegetation communities to be used by covered species. This acreage was described in the BA (LCR MSCP 2004i) as a total of 600 acres for the NPS actions and 200 acres for AGFD and NDOW actions and is additive to the 8,132 acres of habitat that would be created under the Conservation Plan.

As with construction and maintenance of covered actions, there is a risk of mortality to individuals of the covered species from the creation of restoration sites. Restoration sites would not be placed in areas of existing high-value habitat for the covered species. During the development of the Conservation Plan, using biological data, certain non-native plant-dominated land cover types (i.e., dry saltcedar, saltcedar-mesquite) were determined to be of low value to covered species. The loss of these low value habitats was determined not to result in incidental take from loss of habitat, but there was a recognition that a few individuals of the covered species may use these areas, and there was a potential for take of these individuals from the removal of these low value areas. This mortality cannot be precisely determined to a number of individuals for the same reasons stated previously. Avoidance and minimization measures will be in place to reduce this risk. The measure for incidental take in this category is provided in terms of affected habitat acreage for the covered species, although, as described in the Conservation Plan, it is not expected that removal of these low-value habitats would have effects significant enough to rise to the level of incurring incidental take from loss of habitat. This acreage is included in the amount of take considered in this BCO to ensure complete coverage is obtained with the understanding that the incidental take is based on harassment of individuals, not the loss of habitat.

The cost estimates in the Conservation Plan assume that 60% of the 7,260 acres of cottonwood-willow and honey mesquite and associated infrastructure would take place on agricultural land where there are no existing values for covered species. There is no take that would result from this conversion because there is no existing habitat for species on these sites. The actual amount of the habitat that would be created on existing agricultural land will not be known until all restoration sites have been selected. The 4,356 acres of habitat assumed in the Conservation Plan is a reasonable minimum for analysis of effects. The significantly lower costs of conversion of agricultural lands to riparian habitats (approximately $7,000 per acre) versus subjugation of

undeveloped lands (approximately $30,000 per acre) are an incentive to select agricultural lands where available or feasible. The costs of developing marsh and backwater habitats on agricultural lands versus undeveloped lands are not significantly different owing to the need for extensive excavation needed to create these habitats in both situations.

The effects analysis in the Conservation Plan assumes that development of the remaining 2,904 acres of conservation infrastructure, cottonwood-willow, and honey mesquite habitat under the Conservation Plan and the 800 acres of other restored riparian habitats included as covered actions and covered activities would not occur where existing native and non-native vegetation (including saltcedar) provides suitable habitat for the covered species. However, a significant, but unquantified, portion of these 3,704 acres may be created on undeveloped lands containing dry saltcedar-dominated land cover types that have a low value to the covered species. In the development of species habitat models for the LCR MSCP, land cover types not specifically identified as providing suitable habitat for covered species were not included as habitat areas that could be affected by the covered actions. Incidental take in these areas would be the result of harassment, not loss of habitats, because, as discussed previously, use of these low-value areas was seen as transient and a very minor component of overall habitat use. Large areas of this low-quality habitat are adjacent to potential restoration sites so that the immediate loss of these low-quality areas would not be significant for any of the covered species at the time of project development, as individuals present on the site could relocate. As part of the AMMs, clearing of such areas would, to the extent possible, be done outside of the breeding season for covered bird species to minimize any potential for loss of nests and direct mortality of individuals of the covered species. Once established, the native riparian habitats that replace the saltcedar will provide higher quality habitat for covered and other migratory or resident wildlife species. This assessment assumes no take measured by loss of this habitat since the value of the dry saltcedar-dominated areas that would be considered for conversion is very low and this land cover type is well represented in the LCR MSCP planning area such that this degree of loss is not significant even if more than 3,704 acres are eliminated due to changes in site selection that results in less agricultural land and more undeveloped lands being used for conservation. However, because there is not an absolute ban on clearing activities in this land cover type during the breeding season, there is a risk of loss to individuals and their nests from clearing of vegetation on the sites. This risk is very small due to the implementation of the AMMs.

For the creation of marsh habitats, the Conservation Plan assumes that some amount of the required habitat could be created in areas that once contained marsh or a backwater and have since degraded so that suitable habitat may be marginally present or is now completely absent. This analysis assumes that for covered marsh-dwelling species, up to 512 acres of degraded marsh that could still provide a low level of suitable habitat may be disturbed by construction actions required to restore it to suitability and meet the mitigation requirements. The Conservation Plan assumes that no backwaters or marsh that still provide suitable habitat would be eliminated; however, such areas could be expanded to create additional acreage for the mitigation requirement. For the covered fish species, this consultation assumes that up to 360 acres of degraded backwaters that could still provide a low level of suitable habitat could be temporarily lost due to construction activities needed to restore the area as suitable habitat. New

backwater habitat could be added onto existing suitable backwaters, or backwaters that have degraded beyond use by the species could be rehabilitated. No additional habitat mitigation is required for these losses, as the new habitat will be of suitable quality for the affected species once the restoration is complete. However, if individuals of the covered species occupy these areas at the time of the reconstruction, they could be harmed or harassed during the restoration work. For marsh dwelling species, construction actions will, to the maximum extent practicable, avoid the breeding season, thus reducing the risk of mortality or injury to individuals. For fish species, efforts to find and remove any individuals from the area prior to construction will reduce the risk of mortality or injury to individuals. During the life of this consultation and permit, as long as the Conservation Plan is being properly implemented, the Federal agencies and permittees may, in constructing the habitats required under the Conservation Plan, incidentally take covered species within the LCR planning area in the form of harm or harassment, measured by activities on up to 512 acres of degraded marsh and up to 360 acres of degraded backwaters.

All habitats created through the Conservation Plan or other covered restoration projects will require a variety of maintenance actions over the 50-year term to ensure they remain suitable habitat for the covered species. These maintenance actions include, but are not limited to, use of prescribed burns in marshes, re-dredging marshes or backwaters, chemical treatment to remove non-native fish species from isolated backwaters being managed for covered fish species, tree trimming or thinning in riparian areas, and secondary replanting of desirable plant species. These actions would take place in the 8,132 acres of LCR MSCP restoration habitats and 800 acres of other restoration habitats over the 50-year term. A temporary loss of habitat components is likely to result from these actions. These management actions would, to the maximum extent practicable, avoid the breeding seasons for the covered species, and other avoidance and minimization measures as described in the Conservation Plan and other LCR MSCP documents would be implemented. The incidental take would be in the form of harm from temporary habitat losses during the maintenance period, and the risk of some mortality to individuals from some types of maintenance actions. For example, limited tree thinning or replanting in cottonwood-willow stands is not likely to result in the mortality of individuals of covered bird species. Burning dead vegetation masses out of a cattail marsh carries some risk to marsh birds living in the area. Because burning would be done out of the breeding season, and areas to be burned would have few birds living there due to habitat degradation, this risk is minimized. The extent of this take cannot be quantified. The cycle of maintenance needed for the various created habitat types is not known, but is likely to occur on each acre at least once during the 50-year period. The surrogate measure for the take is the acres of habitat involved.

During the life of this consultation and permit, as long as the Conservation Plan is being properly implemented, the Federal agencies and permittees may, in carrying out the actions described in the BA and HCP, incidentally take within the LCR planning area, in the form of harm or harassment, covered species due to maintenance of 8,132 Conservation Plan-created habitat acres, 81 acres of new infrastructure, and 800 acres of other covered restoration projects as often as needed to maintain these areas.

Incidental Take Resulting from Harassment

This take would result from implementation of some covered actions and implementation of the Conservation Plan. This take is largely harassment of individuals during implementation of the covered actions or the Conservation Plan. "Harassment" is defined as intentional or negligent acts or omissions which creates the likelihood of injury to wildlife by annoying it to such and extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Some examples of how incidental take from harassment would occur are:

- Disturbance (noise, dust) from land-clearing operations for restoration sites or new facilities/agricultural developments adjacent to suitable habitat for covered species may cause individuals to leave the area.
- Maintenance actions on facilities such as diversion structures, canals, and drains that cause noise and dust that may affect adjacent suitable habitat for covered species.
- Use of roads and facilities that create noise and dust on habitat areas created under the Conservation Plan during ongoing management of the conservation areas.
- Implementation of covered actions for recreation and other related purposes as described in the HCP and BA (examples are fish stocking by AGFD, construction of fishing access points, general fish and wildlife surveys, and law enforcement actions) where listed fish may be displaced from an area stocked with non-native fish, or enhanced for non-native fish. General fish and wildlife surveys are not those that target listed species; however, individuals of listed species may be observed/captured during that work. Law enforcement actions may create boat wakes or increase access to sensitive areas that affect breeding birds or fish.
- Restoration of existing bank stabilization and placement of up to 13.9 miles of new stabilized bankline.
- Activities at the 242 Wellfield and related operations where vehicles access sites for work projects. Use of roads, equipment and other monitoring may result in flat-tailed horned lizards temporarily moving out of preferred areas until the disturbance is past.

The number and extent of such actions over the 50-year term cannot be reasonably estimated, nor can an amount of incidental take be associated with these actions. The avoidance and minimization measures contained in the Conservation Plan will reduce the risk of take from these activities such that the extent of the incidental take is not expected to be significant and has been avoided, minimized, and mitigated to the maximum extent practicable through the avoidance and minimization measures contained in the Conservation Plan.

Incidental Take due to Water Operations

The movement of water through the LCR also has a risk of taking aquatic species. This incidental take is the result of flows through dam power plants, water diversions from the river and reservoirs where fish may be entrained into the canal or pipeline, and stranding or desiccation effects due to changes to water levels below dams due to varying release rates over

the 24-hour cycle for generation of hydropower. There is evidence that at least some razorback suckers entrained in the power plant intakes at Davis Dam can safely pass through and reach the river below the dam. At least four individuals stocked into Lake Mohave have been found alive in the river below Davis Dam (Mueller 2000). The amount of such take cannot be determined for several reasons:

- The number of bonytail and razorback suckers in the LCR will increase significantly over time with the implementation of augmentation and management programs under the Conservation Plan, thus increasing the number of individuals potentially affected.
- The risk of entrainment into diversion structures via pumps is dependent on the location of the diversion relative to habitats in the area preferred by the species. Large pump diversions such as the Saddle Island intake on Lake Mead and the Metropolitan and CAP intakes in Lake Havasu have a different degree of risk than a small pump feeding an irrigation canal or municipal intake. There is less likelihood of individual fish being in the deeper open reservoir area than in shoreline or backwater habitats where smaller pumps are located. Even within the large intakes, entrainment is less likely at the Metropolitan intake due to the water depth at that location, than at the CAP intake, which is in shallow water. Razorback suckers have been found in the CAP canals that were entrained from Lake Havasu. Changing water elevations at Lake Mead affect the degree of risk at the Saddle Island pumping plant. Lower water levels may have an increased risk since the intake would be in shallower water more likely used by razorback suckers. Small pumps tend to be at the edge of the main channel, in constructed embayments, or in backwaters more likely frequented by fish. The degree of risk at these sites also varies with the size of the individual fish, as adults are more likely to be able to avoid entrainment than larval or other small life stages. The smaller life stages are at highest risk from pumps in shallow backwaters, but the degree of that risk is limited due to behavior of the small fish in keeping to underwater cover, which is discouraged at pumps due to the maintenance requirements. Most small pump intakes are screened to prevent debris from entering and that further reduces the risk for juvenile or sub-adult fish. Seasonality of highest pumping is also a factor, since the time period for the very small life stages of the fish to be present is limited.
- The most likely risk of entrainment comes from diversions into canals. These may be associated with a small inlet from the main channel or a diversion dam such as Palo Verde or Imperial. The openness of the inlet entrance to the river, the velocity of the intake, and the lack of structures within the canal system determine the risk of entrainment and the ability of the individual fish to re-enter the river. High-volume, high-velocity systems like those for the irrigation districts are more likely to entrain and keep fish from returning to the river than the smaller intakes. Because of the ponding effect behind the diversion dams, there is also a greater likelihood that larval and other small life stages will be present in those areas and drawn to the intake. Small razorback suckers found in the CRIT canals are examples of this type of entrainment. Individual fish can successfully live in canals as long as they don’t enter the smaller laterals and distribution networks where water is transferred to the fields.
- The degree of risk of entrainment, and the related risk of mortality to the individual,

varies significantly between dam power plants due to the depth of the withdrawal point, rate of water removal, and types of intervening equipment or facilities (Burke 1999).

- The amount of habitat affected by hourly and daily fluctuation in water levels in the rivers caused by releases managed for power generation is unknown. This analysis presumes no changes to hydropower fluctuations over the current condition; however, the reduction in flows from changes in points of diversion may result in additional areas affected by these fluctuations. The increase in bonytail and razorback sucker populations over time would increase the number of spawning and nursery areas that could be affected.
- Water releases, pass-through flows, and diversions and return flows are, even for established water users, subject to considerable change over a year and between years that reduces the certainty of the amount of water involved in the diversion.

In an effort to determine the amount of incidental take related to movement of water, the volume of water diverted from Lake Mead, the volume of all power plant pass-through at all hydroelectric facilities, the amount of water released from Lake Mead, and that diverted by entities in the three states was considered for use as a metric to reflect the incidental take. However, this metric is not feasible because the amount of water released, passed-through, or diverted cannot be assigned a degree of risk that reflects the potential for take. Combined with the increase in the number of bonytail and razorback suckers that could potentially be taken as a result of augmentation and management programs, water volume is not a definitive enough metric to identify a level of fish that could be taken. In addition, the level of monitoring needed to detect and quantify such take would be excessive relative to the amount likely to occur. During the course of species monitoring under the Conservation Plan, situations that could result in take may be detected, and if this occurs, further investigations and measures to reduce or eliminate the risk would be evaluated. The amount of incidental take for bonytail, razorback sucker, and flannelmouth sucker related to movement of water through the LCR and associated risk of entrainment, stranding, or desiccation, cannot be determined with any reasonable certainty; however, we do not believe this amount of take would be significant over the term of the consultation and permit. This determination is based on the limited risk identified for individuals, and that with the augmentation programs, many more fish will be in the system than could, we believe, ever be lost from the system due to entrainment or desiccation due to stranding caused by fluctuating water levels.

During the life of this consultation and permit, as long as the Conservation Plan is being properly implemented, specifically the avoidance and minimization measures for covered species and the proposed mitigation, the Federal agencies and permittees may, in carrying out the actions described in the BA and HCP, incidentally take within the LCR planning area in the form of harm or harassment from all types of intakes, an unspecified number of individuals of covered species due to covered actions and implementation of the Conservation Plan. The amount of such take is not expected to be significant over the 50-year term and because it will be offset by proposed mitigation measures, including augmentation, monitoring, and management actions developed as a result of monitoring, leading to a net benefit for covered species.

Incidental Take Resulting from Effects of Ongoing Actions

Many of the covered actions by the Federal agencies and non-Federal applicants are ones that were initiated in the past and continue to occur each year, for example, repairing existing bank stabilization, and will continue through the 50-year period covered by this BCO. Some of the physical and biological effects to the LCR that are caused by these continuing actions are not yet manifested. These include loss of native riparian habitats, marshes, and backwaters; channel morphology effects from disruption of sediment transport; and other effects that are described in the environmental baseline section of this BCO, the BA, and the 1997 BO. The events that set this take in motion are in the past; however, the continuation of those actions into the future results in a continuation of the effects that result in the take. There is no measurement available for the amount of this take that would occur during the next 50 years; however, the amount would be small relative to the changes to the LCR that have already occurred, since the bulk of the physical effects to the river corridor have been manifested over the last 60-years and those effects, while analyzed, are part of the baseline. The take associated with the effects caused by ongoing covered actions into the future will be offset by the proposed mitigation measures in the Conservation Plan.

During the life of this consultation and permit, as long as the Conservation Plan is being properly implemented, the Federal agencies and non-Federal permittees may, in carrying out the actions described in the BA and HCP, incidentally take within the LCR MSCP planning area an amount of covered species habitat that results from projects in the environmental baseline that are also included as covered actions. The amount of this take over and above the conditions of the environmental baseline in 2004 is not expected to be significant.

II. STATUS OF THE SPECIES RANGEWIDE

The LCR MSCP documents contain basic status information on 27 covered species and four evaluation species (LCR MSCP 2004h). This section of the BCO presents brief summaries of the rangewide status of the listed species and does not reference all recent literature or other available documents containing information on life history, population status and distribution, threats, or recovery actions pertaining to the species. The amount of information available on each species is voluminous, and the important aspects that relate to the effects of the covered actions are provided here. Literature cited in this section is fully incorporated by reference.

This BCO does not rely on the regulatory definition of “destruction or adverse modification” of critical habitat at 50 C.F.R. 402.02. Instead, we have relied on the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

Listed Species

Yuma clapper rail

The Yuma clapper rail was listed as an endangered species on March 11, 1967, under

endangered species legislation enacted in 1966 (Public Law 89-669). Only populations in the United States were listed, those in Mexico were not. There is no critical habitat for the species. The Yuma Clapper Rail Recovery Plan (USFWS 1983) was signed in 1983. The Yuma clapper rail is protected under the Migratory Bird Treaty Act (MBTA).

The Yuma clapper rail is a marsh bird found in dense cattail or cattail-bulrush marshes along the LCR from the Southerly International Boundary to the lower Muddy River and Virgin River in Utah above those rivers' confluence with Lake Mead. Significant populations are found in the Imperial Valley near and around the Salton Sea in California, and along the lower Gila River and Phoenix Metropolitan area in Arizona. The populations in Mexico are found along the LCR in the delta, marshes associated with tributaries to the LCR, and the Cienega de Santa Clara (Hinojosa-Huerta *et al*. 2000). Survey detections for the United States habitats have fluctuated between 467 and 809 over the last 10 years (USFWS survey data). Those figures represent birds counted, and are not statistical population estimates. The population in Mexico was estimated statistically at 6,300 birds in 2000 (Hinojosa-Huerta *et al.* 2001), but declined to 4,850 by 2002, likely due to overgrowth of cattails (Hinojosa-Huerta *et al*. 2003). Changes in water flow between 2002-2003 improved habitat quality and counts of rails increased.

Yuma clapper rails may be somewhat migratory, although the extent to which birds move seasonally is not known. They are capable of significant movements, and dispersal away from existing population centers is a source of individuals to augment or initiate outlier populations. Life history information for the species is summarized in the Recovery Plan (USFWS 1983) and other papers (Todd 1986, Eddleman 1989). No significant new life history information has been developed since these papers were published; however, basic information on the potential of adverse effects to reproductive success relating to selenium concentrations in habitats occupied by clapper rails has been developed (Andrews *et al.* 1997, Garcia-Hernandez *et al.* 2001, King *et al.* 1993, 2000, 2003; Roberts 1996).

Threats to the Yuma clapper rail population in the United States include the loss of marsh habitats to channelization or other river maintenance, lack of long-term management of existing marshes to maintain their suitability as habitat, lack of protection for habitat areas related to land ownership and water supply issues, and the presence of environmental contaminants such as selenium in the LCR and Salton Sea.

Since 1983, AESO has processed 35 formal section 7 consultations involving the Yuma clapper rail (Appendix C). Of the 33 formal consultations, 15 were completed prior to 1991, and most of these involved Reclamation dredging, bank stabilization, and dike construction projects, and general management plans by BLM along the LCR and lower Gila River. Habitat losses due to Reclamation activities were offset by the creation of mitigation areas and backwaters as part of these projects. From 1991-2004, the 20 formals involved use of prescribed fire to benefit habitat and management plans for wildfire, permits under section 404 of the Clean Water Act, and large-scale agency plans by Reclamation, BLM, and Environmental Protection Agency (EPA). There was one jeopardy opinion issued for the rail. The Roosevelt Habitat Conservation Plan in Gila County, Arizona, is the only completed section 10(a)(1)(B) permit that includes the species

(USFWS 2003).

The FWS-Carlsbad Fish and Wildlife Office processes informal and formal consultations concerning the Yuma clapper rail in California. Many of these address issues with irrigation system maintenance and other projects in the Imperial Valley. A formal consultation for a geothermal plant adjacent to the Sonny Bono Salton Sea National Wildlife Refuge was recently completed. The most significant recent formal consultation addressed Reclamation's voluntary fish and wildlife conservation measures and associated conservation agreements with California water agencies in 2002 (USFWS 2002c). This consultation is connected to the 400,000 afy water exchanges that was the subject of consultation between FWS-AESO and Reclamation (USFWS 2001a) and addresses effects to listed species near the Salton Sea from water conservation actions of IID. Reclamation and state partners will fund the conservation measures (USFWS 2002c).

Southwestern willow flycatcher

The southwestern willow flycatcher was listed as an endangered species on February 27, 1995. The FWS re-proposed critical habitat on October 12, 2004 and the proposal includes numerous units, including the LCR, throughout the range of the species. The Southwestern Willow Flycatcher Recovery Plan (USFWS 2002d) was signed in August 2002. The southwestern willow flycatcher is protected under the MBTA.

The southwestern willow flycatcher is a migratory songbird that breeds in riparian areas along rivers and wetlands between sea level and 7,000 feet elevation in portions of Arizona, California, Colorado, Nevada, New Mexico, and southern Utah. The total United States population is estimated to be between 900-1,000 breeding pairs. Most breeding groups support fewer than 5 pairs, and the remaining habitat is very fragmented (USFWS 2002d). Life-history information on the southwestern willow flycatcher is found in the recovery plan (USFWS 2002d) and in regional status reports such as those for the LCR (McKernan and Braden 2001, 2002; Koronkiewicz *et al.* 2004).

Threats to the southwestern willow flycatcher population in the United States include the continuing loss and fragmentation of native riparian habitats, cowbird (*Molothrus ater*) parasitism on nests, predation on nests, potential for environmental contaminants to affect reproductive success (King *et al*. 2002), and loss of migratory and wintering habitats.

Critical habitat for the southwestern willow flycatcher was proposed on October 12, 2004 (69 FR 196/60706-60786). The proposal identifies segments of streams in 21 Management Units contained in five Recovery Units as defined in the Recovery Plan. In addition to the stream courses themselves, the proposed designation also includes some floodplain lands adjacent to the stream or river that are directly influenced by river functions. The areas proposed for designation contain enough of the primary constituent elements to allow for the biological functions that are essential for the conservation of the species.

The areas proposed for critical habitat are listed according to the recovery and management units described in the Recovery Plan:

- Coastal California Recovery Unit: Santa Inez Management Unit (MU)-Santa Ynez River; Santa Ana MU-Bear Creek, Mill Creek, Oak Glen Creek/Yucaipa Creek/Wilson Creek/San Timoteo Wash, Santa Ana River, and Waterman Canyon; San Diego MU-Las Flores Creek/Las Pulgas Creek, San Mateo Creek, Christiantos Creek, San Onofre Creek, Santa Margarita River and DeLuz Creek, San Luis Rey River and Pilgrim Creek, Agua Hedionda Creek and Agua Hedionda Lagoon, San Dieguito River, Lake Hodges, San Ysabel River and Temescal Creek, Temecula Creek, Cuyamaca Reservoir, and San Diego River.
- Basin and Mohave Recovery Unit (California): Owens MU-Owens River; Kern MU-South Fork Kern River including upper Lake Isabella; Mohave MU-Deep Creek, Holcomb Creek, Mohave River; Salton MU-San Filipe Creek.
- Lower Colorado Recovery Unit: Little Colorado MU-Little Colorado River, West/East/and South Forks of the Little Colorado River in Arizona; Virgin MU-Virgin River in Arizona, Nevada and Utah; Middle Colorado MU-Colorado River in Arizona; Pahranagat MU-Pahranagat River and Muddy River in Nevada; Bill Williams MU-Big Sandy River, Bill Williams River, Santa Maria River including upper Alamo Lake in Arizona; Hoover to Parker MU-Colorado River in Arizona and California; Parker to SIB MU-Colorado River in Arizona and California.
- Gila Recovery Unit: Verde MU-Verde River including Horseshoe Lake in Arizona; Roosevelt MU-Salt River and Tonto Creek (including Roosevelt Lake), and Pinto Creek in Arizona; Middle Gila/San Pedro MU-Gila River and San Pedro River in Arizona; Upper Gila MU: Gila River in Arizona and New Mexico.
- Rio Grande Recovery Unit: San Luis Valley MU-Conejos River and Rio Grande in Colorado; Upper Rio Grande MU-Coyote Creek, Rio Grande, and Upper Rio Grande del Rancho in New Mexico; Middle Rio Grande MU-Rio Grande in New Mexico.

The primary constituent elements focus on specific biological and physical features and are:

- Nesting habitat with trees and shrubs that include, but are not limited to, willow species and boxelder;
- Dense riparian vegetation with thickets of trees and shrubs ranging in height from 2 meters (m) to 30 m (6 to 98 feet) with lower-stature thickets of 2-4 m or 6-13 feet tall found at higher elevation riparian forests and tall-stature thickets found at middle- and lower-elevation riparian forests;
- Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 feet) above ground or dense foliage only at the shrub level, or as a low, dense tree canopy;
- Sites for nesting that contain a dense tree and/or shrub canopy (the amount of cover provided by tree and shrub branches measured from the ground) (i.e. a tree or shrub canopy with densities ranging from 50 percent to 100 percent);
- Dense patches of riparian forests that are interspersed with small openings of open water

or marsh or shorter/sparser vegetation, that creates a mosaic that is not uniformly dense. Patch size may be as small as 0.1 hectare (0.25 acre) or as large as 70 hectares (175 acres); and

- A variety of insect prey populations, including but not limited to, wasps and bees (*Hymenoptera*); flies (*Diptera*); beetles (*Coleoptera*); butterflies/moths and caterpillars (*Lepidoptera*); and spittlebugs (*Homoptera*).

At the time of proposal of critical habitat, all stream or river reaches and floodplains included in the proposal had been modified to greater or lesser extent by past human activities. These activities had significantly affected primary constituent elements of the proposed reaches through water-management actions, land developments, and other actions that affect rivers and their floodplains. All areas proposed are considered essential for the conservation of the species, with the recognition that not all areas to be designated meet all the essential features of critical habitat. These areas would require special management or other actions to ensure their value to the species conservation. The proposed rule discusses the selection process for the critical habitat units and the understanding of their current conditions (USFWS 2004a).

Since listing, 53 formal consultations on the flycatcher have been completed in Arizona, 18 in California, 10 in Colorado, four in Nevada, seven in New Mexico, and one in Utah. Of these, six found jeopardy to the species, three in Arizona and three in New Mexico. The jeopardy opinions are listed in Appendix C. More information on past consultations for the southwestern willow flycatcher is in previous biological opinions (USFWS 2001a, 2002a) for the LCR area.

There are four completed HCPs that address the flycatcher:

1. Clark County Multiple Species Habitat Conservation Program (Regional Environmental Consultants 2000), Nevada.
2. San Diego Multiple Species Conservation Program (City of Chula Vista, 2003, City of San Diego 1997, County of San Diego 1997), and Multiple Habitat Conservation Plan (City of Carlsbad 1999, San Diego Association of Governments 2003), California.
3. Riverside County Multiple Species Habitat Conservation Plan (Riverside County Integrated Project 2003), California.
4. Roosevelt Lake Habitat Conservation Plan (USFWS 2003), Arizona.

These HCPs minimize and mitigate to the maximum extent practicable the adverse effects to the flycatcher. They provide protection for the species and replacement of habitats lost from implementation of the covered actions for each plan.

<u>Desert tortoise</u>

The desert tortoise populations north and west of the LCR in Arizona and Utah (excluding the Beaver Dam slope population) were listed as endangered under an emergency rule on August 4, 1989. Subsequently, the entire Mohave population of the desert tortoise west of the LCR in California and Nevada, and north of the LCR in Arizona and Utah, including the Beaver Dam

slope, was listed as a threatened species on April 2, 1990. Critical habitat was designated in February 1994. The Desert Tortoise (Mohave Population) Recovery Plan (USFWS 1994a) was signed on June 28, 1994.

The desert tortoise is an arid-land reptile associated with creosote-bush flats, washes, and hillside bajadas (slopes). A robust herbaceous component to the shrubs and cacti of the creosote bush vegetation type is an important component of suitable habitat. An estimate of desert tortoise population size is not available; however, populations have shown a decline since the listing in 1989. The recovery plan provides life history information (USFWS 1994a) for the species. Material in that publication is incorporated herein by reference.

Threats to the desert tortoise include loss of habitat from urban development, and deterioration of forage resources through livestock grazing, off-road vehicle use, predation, and disease.

Twelve areas in Arizona, California, Nevada, and Utah were designated as critical habitat in 1994. Some critical habitat units extend across state lines and are listed for each state in which they occur. The units are:

- Arizona: Beaver Dam Slope Unit, Gold-Butte-Pakoon Unit.
- California: Fremont-Kramer Unit, Superior-Cronese Unit, Ord-Rodman Unit, Chuckwalla Unit, Pinto Mountain Unit, Chemehuevi Unit, Ivanpah Unit, Piute-Eldorado Unit.
- Nevada: Piute-Eldorado Unit, Mormon Mesa Unit, Gold-Butte-Pakoon Unit, and Beaver Dam Slope Unit.
- Utah: Beaver Dam Slope Unit, Upper Virgin River Unit.

The constituent elements of critical habitat are desert lands that are used or potentially used by the desert tortoise for nesting, sheltering, foraging, dispersal, or gene flow. At the time of designation, all lands in the critical habitat units had been impacted by past land management activities to some degree. Appendix D of the recovery plan (USFWS 1994a) contains an extensive discussion of the types of human actions that have occurred on desert tortoise habitats before and after the designation of critical habitat that have effects to the physical habitat components of the critical habitat. Section 7 consultations since 1994 on the same types of human actions have addressed the effects of those actions on the conservation value of the critical habitat units. The most recent major consultation on the tortoise in California was on the California Desert Conservation Area Plan (USFWS 2002e), which contained a summary of the status of the species and its critical habitat in California. In Nevada, consultations with three BLM offices (Las Vegas, Ely, and Battle Mountain) address most impacts to tortoises and designated critical habitat. Desert tortoise management in Arizona is covered primarily by the Mohave Amendment to the Arizona Strip Resource Management Plan for BLM lands in northern Arizona (USFWS 1998a), which also considered the effects of BLM actions on the conservation value of the critical habitat. Although critical habitat is not a direct consideration in issuance of a section 10(a)(1)(B) permit, the FWS must consider designated and proposed critical habitat in this section 7 consultation. The desert tortoise is the primary species covered by the Clark

County Multiple Species Habitat Conservation Plan in Clark County, Nevada (Regional Environmental Consultants 2000) and critical habitat units in Clark County were evaluated in the analysis for that permit. The Washington County Habitat Conservation Plan in Utah predates critical habitat designation; however, consultations for Federal actions in those areas do consider the effects to critical habitat. Effects to critical habitat areas for the desert tortoise are fully included either by existing section 7 consultations or by the existing HCPs. Conservation actions for the species include protection for individuals and habitat.

The recovery plan defines six recovery units, each of which contains at least one critical habitat unit. Because stable populations of tortoises are needed in each of the six recovery units, all critical habitat units have an important conservation role.

Bonytail

The bonytail was listed as an endangered species on May 23, 1980. Critical habitat for the bonytail was designated on April 20, 1994, and includes portions of the Colorado, Green, and Yampa rivers in Colorado and Utah, and portions of the Colorado River in Arizona. The Bonytail Chub Recovery Plan (USFWS 1990a) was updated and supplemented by the Bonytail (*Gila elegans*) Recovery Goals (USFWS 2002f) in 2002.

The bonytail is a cyprinid fish species endemic to the Colorado River Basin. Extremely small populations of wild bonytail exist in the Colorado, Green, and Yampa rivers in Colorado and Utah, and in the LCR in Arizona and Nevada. The species may be functionally "extinct", since the last capture of a documented wild (not born from hatchery stock) adult in the Upper Basin was in 1988, and in the Lower Basin the last wild adult documented in Lake Havasu was in the early 1990s. In Lake Mohave the consistent records end about the same period (data summarized in USFWS 2002f); however, one presumed wild adult was taken from Lake Mohave in 2003. The wild populations failed due to a lack of sufficient recruitment to maintain the populations. The recovery goals (USFWS 2002f) contain the most recent life-history information on the species. Material in that publication is incorporated herein by reference.

Predation and competition from non-native fish species introduced into the Colorado River Basin pose the greatest threat to the bonytail. Other significant threats to the bonytail include loss of riverine habitats, fragmentation of remaining riverine habitats, changes in flows due to water development projects, and hybridization with other species of *Gila*.

Designated critical habitat consists of the following river reaches and the associated 100-year floodplains:

- Arizona/California/Nevada: the Colorado River from Hoover Dam to Davis Dam including Lake Mohave to its full-pool elevation and the Colorado River from the northern boundary of the Havasu National Wildlife Refuge down to Parker Dam, including Lake Havasu to its full pool elevation.
- Colorado: the Yampa River within Dinosaur National Monument.

- Colorado/Utah: the Green River within Dinosaur National Monument and the Colorado River in Black Rocks/Westwater Canyon.
- Utah: the Green River in Desolation and Gray canyons and the Colorado River in Cataract Canyon.

The constituent elements of critical habitat for the bonytail include but are not limited to:

- Water: this includes a quantity of water of sufficient quality (i.e. temperature, dissolved oxygen, lack of contaminants, nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species.
- Physical habitat: this includes areas of the Colorado River system that are inhabited or potentially inhabitable by fish for use in spawning, nursery, feeding, and rearing, or corridors between these areas. In addition to river channels, these areas also include bottom lands, side channels, secondary channels, oxbows, backwaters, and other areas within the 100-year floodplain, which when inundated provide spawning, nursery, feeding, and rearing habitats, or access to these habitats.
- Biological environment: food supply, predation, and competition are important elements of the biological environment and are considered components of this constituent element. Food supply is a function of nutrient supply, productivity, and availability to each life stage of the species. Predation and competition, although considered normal components of this environment, are out of balance due to introduced nonnative fish species in many areas.

At the time of designation of critical habitat, all river reaches and floodplains occupied by the species had been extensively modified by past human activities. These activities had significantly affected the water, physical habitat, and biological habitat constituent elements of the designated reaches. Those alterations, as well as how each reach related to the constituent elements, were discussed in the biological support document (USFWS 1993c) for each designated reach. All designated areas are considered essential for the conservation of the species, with the recognition that not all areas to be designated met all the essential features of critical habitat. These areas require special management or other actions to ensure their value to the species conservation was not compromised. As formal section 7 consultations on proposed Federal actions have been completed with regard to critical habitat, the environmental baselines were updated to reflect the results of those consultations.

Since 1983, in the Lower Basin, the FWS has processed 19 formal section 7 consultations for the bonytail (Appendix C). There were two jeopardy opinions containing reasonable and prudent alternatives that were designed to provide conservation to eliminate the jeopardy finding. Of the 19 formal consultations, Reclamation activities on the LCR accounted for four, including a jeopardy finding in the 1997 BO (USFWS 1997) that also evaluated effects to the conservation status of the critical habitat reaches in the LCR. Other consultations were on large-scale management plans by the BLM (USFWS 1993b) and NPS (USFWS 2002b), rainbow trout stocking by the FWS (USFWS 1994b), contaminants issues, and section 404 permits. Two of

the projects proposed in these actions were designed to benefit the bonytail though grow-out facilities and management of protected habitats. There are no HCPs that address the bonytail.

Between 1988 and December 31, 2004, the FWS in the Upper Basin has completed consultation on 803 actual projects that collectively have the potential to deplete 1,729,060 afy of water from the Colorado River and its tributaries where there is a potential for adverse effect to endangered fish species, including the bonytail (Kantola 2005). There are other consultations related to river management actions, including channelization, stabilization, flood control, non-native fish, and other actions with the potential to affect the bonytail. The water-depletion consultations all resulted in jeopardy determinations, and the reasonable and prudent alternatives are funding the implementation of the Upper Colorado River Endangered Fish Recovery Program (UCREFRP). Effects of these actions to critical habitat are determined in these consultations to evaluate the effects to the conservation status of the affected reaches.

There is considerable conservation activity ongoing for the bonytail throughout its range. The remnant adult populations are being augmented in both the Upper and Lower basins using hatchery-produced fish. There are no population estimates for the stocked populations in river or reservoir habitats in the Lower Basin; however, as stocking efforts continue, monitoring of the populations will be more feasible. Sixteen bonytail were captured in Cataract Canyon on the Colorado River in the Upper Basin in 2003-2004, with a population estimate of 70 individuals (USFWS 2004b). The original broodstock was developed from bonytail taken from Lake Mohave in the early 1980s (Minckley *et al.* 1989). A genetic analysis of that broodstock showed that not all of the individuals assumed to have contributed to the stock did so (Hedrick *et al.* 2000). The original broodstock is being replaced with a new broodstock derived from the original that maintains the maximum amount of genetic variance that remains. The bonytail captured in Lake Mohave in 2003 was recently shown to have a haplotype previously documented from the lake, but that is not in the existing hatchery stock (Dr. Thomas Dowling, Arizona State University, personal communication 2004, Dr. Chuck Minckley, U.S. Fish and Wildlife Service, personal communication 2003, Gordon Mueller, U.S. Geological Survey, personal communication 2003). It is not certain if this is a hatchery-produced fish stocked in the early 1980s, or a wild fish. Efforts to locate additional wild adults to include in the broodstock, and thus significantly increase the genetic variation available, continue in Lake Mohave.

In addition to augmentation with hatchery-reared sub-adult fish, other recovery actions underway in the basins for the bonytail include acquisition of water rights, determination of required instream flows, floodplain restoration, and monitoring of populations and habitat use. The UCREFRP coordinates recovery actions for bonytail in the Upper Basin (USFWS 1993a). For more specific information on recovery activities there, contact the program at *www.r6.fws.gov/crrip*. Implementation of recovery actions in the Lower Basin is accomplished through the cooperative efforts of Federal, state and university entities.

<u>Humpback chub</u>

The humpback chub was listed as an endangered species on March 11, 1967, under endangered

species legislation enacted in 1966 (Public Law 89-669). Critical habitat for the humpback chub was designated on April 20, 1994, and includes portions of the Colorado, Green, and Yampa rivers in Colorado and Utah, and portions of the Colorado and Little Colorado rivers in Arizona. The Humpback Chub Recovery Plan (USFWS 1990b) was updated and supplemented by the Humpback Chub (*Gila cypha*) Recovery Goals (USFWS 2002g) in 2002.

The humpback chub is a cyprinid fish species endemic to the Colorado River Basin. Six small populations of humpback chub remain. Of these, five are in the Upper Basin in the Colorado, Green, and Yampa rivers, and one is in the Lower Basin in the Grand Canyon reach of the Colorado River including the lower Little Colorado River. Estimates of population sizes were included in the Recovery Goals. In the Upper Basin, populations ranged from as few as 400-600 in Yampa Canyon of the Yampa River, to 2,000-5,000 in the Westwater Canyon area of the Colorado River. Additional work on the Westwater Canyon population estimated 2,200 individuals in 2000 (Hudson and Jackson 2003). With the five populations combined, an estimated 7,300 to 13,800 wild adults are in the Upper Basin (data summarized in USFWS 2002g). These populations are believed to be self-sustaining, although declines in numbers may be occurring, the cause of which is not yet known. Additional focused population estimates are being developed (USFWS 2004b) and current population numbers may be lower than those included in the Recovery Goals document. The recovery goals (USFWS 2002g) contain the most recent life history information on the species. Material in that publication is incorporated herein by reference.

Predation and competition from non-native fish species introduced into the Colorado River Basin pose the greatest threat to the humpback chub. Other significant threats to the humpback chub include loss of riverine habitats, fragmentation of remaining riverine habitats, changes in flows due to water development projects, and hybridization with other species of *Gila*.

Designated critical habitat consists of the following river reaches and their associated 100-year floodplain:

- Arizona: the Colorado River in Marble and Grand Canyons and the lower eight miles of the Little Colorado River.
- Colorado: the Yampa River in Dinosaur National Monument, the Green River in Dinosaur National Monument, and the Colorado River in Black Rocks/Westwater Canyon.
- Utah: the Green River in Dinosaur National Monument, the Green River in Desolation and Gray canyons, the Colorado River in Black Rocks/Westwater Canyon, and the Colorado River in Cataract Canyon.

The constituent elements of critical habitat for the humpback chub include but are not limited to:

- Water: this includes a quantity of water of sufficient quality (i.e. temperature, dissolved oxygen, lack of contaminants, nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life

stage for each species.

- Physical habitat: this includes areas of the Colorado River system that are inhabited or potentially inhabitable by fish for use in spawning, nursery, feeding, and rearing, or corridors between these areas. In addition to river channels, these areas also include bottom lands, side channels, secondary channels, oxbows, backwaters, and other areas within the 100-year floodplain, which when inundated provide spawning, nursery, feeding, and rearing habitats, or access to these habitats.
- Biological environment: food supply, predation, and competition are important elements of the biological environment and are considered components of this constituent element. Food supply is a function of nutrient supply, productivity, and availability to each life stage of the species. Predation and competition, although considered normal components of this environment, are out of balance due to introduced nonnative fish species in many areas.

At the time of designation of critical habitat, all river reaches and floodplains occupied by the species had been extensively modified by past human activities. These activities had significantly affected the water, physical habitat, and biological habitat constituent elements of the designated reaches. Those alterations, as well as how each reach related to the constituent elements were discussed in the biological support document (USFWS 1993c) for each designated reach. All designated areas are considered essential for the conservation of the species, with the recognition that not all areas to be designated met all the essential features of critical habitat. These areas require special management or other actions to ensure their value to the species conservation was not compromised. As formal section 7 consultations on proposed Federal actions have been completed with regard to critical habitat, the environmental baselines were updated to reflect the results of those consultations.

Since 1983, in the LCR, the FWS has processed 22 formal consultations for the humpback chub (Appendix C). There were three jeopardy opinions containing reasonable and prudent alternatives that were designed to provide conservation to eliminate the jeopardy finding. . Of the 22 formals, eight were with the NPS for the issuance of research permits for the species in the Grand Canyon, four were related to National Pollutants Discharge Elimination System (NPDES) or other water-quality programs, one dealt with sport fish stocking, and one with geoscientific research in Lake Mead. The remaining consultations dealt with effects to the species from the operation Glen Canyon Dam. One of these consultations was withdrawn by Reclamation before a biological opinion could be issued. The second found jeopardy and was issued (USFWS 1995) and considered the effects of the action to the conservation value of the critical habitat reach in the Colorado River. The Glen Canyon Dam Adaptive Management Program (GCAMP) is the implementing entity for aspects of the reasonable and a prudent alternative contained in the 1995 biological opinion, and is focused on those regulatory requirements. It does not fund recovery actions, or other types of actions that could benefit the species in the Little Colorado River. The remaining formals relating to Glen Canyon involved aspects of changing flows and fish removal as part of the GCAMP and were not jeopardy opinions.

Between 1988 and December 31, 2004, the FWS in the Upper Basin has completed consultation on 803 actual projects that collectively have the potential to deplete 1,729,060 afy of water from the Colorado River and its tributaries where there is a potential for adverse effect to endangered fish species, including the humpback chub (Kantola 2005). There are other consultations related to river-management actions, including channelization, stabilization, flood control, non-native fish, and other actions with the potential to affect the humpback chub. The water-depletion consultations all resulted in jeopardy determinations, and the reasonable and prudent alternatives are funding the implementation of the UCREFRP. Effects of these actions to critical habitat are determined in these consultations to evaluate the effects to the conservation status of the affected reaches.

There is considerable conservation activity ongoing for the humpback chub throughout its range. There is no stocking of humpback chub augmenting the existing populations, but they are being regularly monitored. Efforts to obtain proper flows and connectivity of habitats for the humpback chub are continuing under the UCREFRP (USFWS 1993a). For more specific information on recovery activities there, contact the program at *www.r6.fws.gov/crrip*. The Grand Canyon-Little Colorado River population has also been considered self-sustaining; however, recent evidence of significant population declines in the Grand Canyon-Little Colorado River population may alter that premise. Humpback chub numbers in this population have been estimated many times between 1980 and the present day (summarized in Coggins *et al.* 2003). While there are problems with the techniques and assumptions used in the various estimates, the adult and sub-adult humpback population has declined from estimates of 7,000 to 8,000 in the early 1980s to an adult population of 1,568 in 2001. A change in recruitment levels may have occurred in the early 1990s, and is a factor in the hypothesis that the adult population will stabilize at a level between 1,000 and 2,500 adults (Coggins *et al.* 2003). The Glen Canyon Dam Adaptive Management Work Group (AMWG) is developing a comprehensive list of management actions needed to address the decline in the Grand Canyon-Little Colorado River population.

Razorback sucker

The razorback sucker was listed as an endangered species on November 22, 1991. Critical habitat for the razorback sucker was designated on April 20, 1994, and includes portions of the Colorado, Duchesne, Green, Gunnison, and White rivers in Colorado and Utah, portions of the San Juan River in New Mexico, portions of the Colorado River in Arizona, California, and Nevada, and portions of the Gila, Salt, and Verde rivers in Arizona. The Razorback Sucker Recovery Plan (USFWS 1998b) was updated and supplemented by the Razorback Sucker (*Xyrauchen texanus*) Recovery Goals (USFWS 2002h) in 2002.

The razorback sucker is a catostomid fish endemic to the Colorado River Basin. Small populations of wild razorback suckers exist in the Upper Basin in the Green River Basin (the Green, Duchesne, White, and Yampa rivers) and the mainstem Colorado River in Colorado and Utah. Wild populations are considered extirpated in the Gunnison River in Colorado and the San Juan River in New Mexico. Aside from a small, undetermined number of wild fish in the

Colorado River, most of the Upper Basin wild population is focused in the Green River Basin, and was recently estimated at 108 individuals in 1999 (Bestgen *et al.* 2002), and hypothesized in that same paper to be less than half that number by 2001. In the Lower Basin, wild razorback sucker populations are known from the LCR in Lake Mead and Lake Mohave. A very few wild individuals may still be found below Lake Mohave to Imperial Dam. The Lake Mead population is estimated at 100-200 individuals (Welker and Holden 2003, 2004). The Lake Mohave wild population was estimated at 2,698 in 2002 (Marsh *et al.* 2003) but has declined to an estimated 475 fish in 2004 (Dr. Paul Marsh, Arizona State University, personal communication 2004). Wild populations in Lake Havasu and the river between Parker Dam and Imperial Dam are extremely small, and past stocking activities with unmarked fish, especially in the Parker Dam-Imperial Dam reach, confuse the identification of fish captured there. Recent declines in numbers of wild fish are the result of the old adults that comprise these populations dying of old age. None of the populations are confirmed to be self-sustaining, with recent recruitment of wild-bred young only documented in Lake Mead (most recently in Welker and Holden 2004). Some recruitment was assumed for a portion of the middle Green River (Modde *et al.* 1996), and captures of small razorback suckers in canals below Parker Dam on the LCR also represent some recruitment occurring in this area (summarized in USFWS 2001a). Additional monitoring in this area will be required to document if recruitment is occurring. The recovery goals (USFWS 2002h) contain the most recent life history information on the species. Material in that publication is incorporated herein by reference.

Predation and competition from non-native fish species introduced into the Colorado River Basin pose the greatest threat to the razorback sucker. Other significant treats to the razorback sucker include loss of riverine and backwater habitats, loss of connectivity of habitats, and changes in flows due to water-development. Effects of man-made pharmaceutical and personal care chemicals, particularly endocrine compounds, may be a threat to maturation and reproduction of adult razorbacks (Baker and Marr 2003).

Designated critical habitat consists of the following river reaches and their associated 100-year floodplain:

- Arizona: the Gila River from New Mexico to Coolidge Dam including San Carlos Reservoir to its full-pool elevation, the Salt River from the Highway 60 bridge to Roosevelt Diversion Dam, the Verde River from the Prescott National Forest boundary to Horseshoe Dam including Horseshoe Lake to its full-pool elevation.
- Arizona/Nevada: the Colorado River from the Paria River to Hoover Dam including Lake Mead to its full-pool elevation, the Colorado River from Hoover Dam to Davis Dam including Lake Mohave to its full-pool elevation.
- Arizona/California: the Colorado River from Parker Dam to Imperial Dam including Imperial Reservoir to its full-pool elevation.
- Colorado: the Yampa River from Cross Mountain to the confluence with the Green River, the Green River from its confluence with the Yampa River to Sand Wash, the Gunnison River from its confluence with the Uncompahgre River to Redlands Diversion Dam, the Gunnison River from the Redlands Diversion Dam to its confluence with the

Colorado River, the Colorado River from the Colorado River Bridge near Interstate 70 to Westwater Canyon.

- New Mexico: the San Juan River from the Hogback Diversion to the full-pool elevation of Lake Powell at the mouth of Neskahai Canyon.
- Utah: the Green River from its confluence with the Yampa River to Sand Wash, the Green River from Sand Wash to its confluence with the Colorado River, the White River from the boundary of the Uintah and Ouray Indian Reservation to its confluence with the Green River, the Duchesne River from river mile 2.5 to its confluence with the Green River, the Colorado River from Westwater Canyon to the full-pool elevation in Lake Powell upstream of North Wash including the Dirty Devil arm of Lake Powell, the San Juan River from Hogback Diversion to the full-pool elevation of Lake Powell at the mouth of Neskahai Canyon.

The constituent elements of critical habitat for the razorback sucker include but are not limited to:

- Water: this includes a quantity of water of sufficient quality (i.e. temperature, dissolved oxygen, lack of contaminants, nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species.
- Physical habitat: this includes areas of the Colorado River system that are inhabited or potentially inhabitable by fish for use in spawning, nursery, feeding, and rearing, or corridors between these areas. In addition to river channels, these areas also include bottom lands, side channels, secondary channels, oxbows, backwaters, and other areas within the 100-year floodplain, which when inundated provide spawning, nursery, feeding, and rearing habitats, or access to these habitats.
- Biological environment: food supply, predation, and competition are important elements of the biological environment and are considered components of this constituent element. Food supply is a function of nutrient supply, productivity, and availability to each life stage of the species. Predation and competition, although considered normal components of this environment, are out of balance due to introduced nonnative fish species in many areas.

In addition to the primary constituent elements, the FWS used additional selection criteria to determine critical habitat for the razorback sucker. These criteria are:

- Presence of known or suspected wild spawning populations, although recruitment may be limited or non-existent.
- Areas where juvenile razorback suckers have been collected or which could provide suitable nursery habitat (backwaters, flooded bottom lands, or coves).
- Areas presently occupied or that were historically occupied that are considered necessary for recovery and that have the potential for reestablishment of razorback suckers.
- Areas and water required to maintain rangewide fish distribution and diversity under a variety of physical, chemical, and biological conditions.

- Areas that need special management or protection to insure razorback survival and recovery. These areas once met the habitats needs of the razorback sucker and may be recoverable with additional protection and management.

At the time of designation of critical habitat, all river reaches and floodplains occupied by the species had been extensively modified by past human activities. These activities had significantly affected the water, physical habitat, and biological habitat constituent elements of the designated reaches. Those alterations, as well as how each reach related to the constituent elements were discussed in the biological support document (USFWS 1993c) for each designated reach. All designated areas are considered essential for the conservation of the species, with the recognition that not all areas to be designated met all the essential features of critical habitat. These areas require special management or other actions to ensure their value to the species conservation was not compromised. As section 7 consultations on proposed Federal actions have been completed with regard to critical habitat, the environmental baselines were updated to reflect the results of those consultations.

Since 1983, in the Lower Basin, the FWS has processed 72 formal consultations involving the razorback sucker (Appendix C). Of these 72 formal consultations, 49 involved livestock grazing, section 404 permits, water-quality standards, fire suppression and prescribed burns, and road construction and other land-management activities in central Arizona. There is one jeopardy opinion containing reasonable and prudent alternatives that were designed to provide conservation to eliminate the jeopardy finding. The formal consultations on the LCR include seven Reclamation projects with a total of three jeopardy findings; two relating to Glen Canyon Dam operations (only one of which was issued) and the 1997 BO (USFWS 1997) on Reclamation operations and maintenance, section 404 permits, sport fish enhancement programs, development of isolated rearing facilities, and general management actions by Federal agencies. There are no HCPs that address the razorback sucker.

Between 1988 and December 31, 2004, the FWS in the Upper Basin has completed consultation on 803 actual projects that collectively have the potential to deplete 1,729,060 afy of water from the Colorado River and its tributaries where there is a potential for adverse effects to endangered fish species, including the razorback sucker (Kantola 2005) There are other consultations related to river-management actions, including channelization, stabilization, flood control, non-native fish, and other actions with the potential to affect the razorback sucker. The water-depletion consultations all resulted in jeopardy determinations, and the reasonable and prudent alternatives include funding the implementation of the UCREFRP.

In the San Juan River of New Mexico, consultations covering the diversion of 800,000 afy of water that has effects to the razorback sucker were completed, with supporting the San Juan River Basin Recovery Implementation Program acting as the reasonable and prudent alternative for the jeopardy biological opinion. Additional information on this program can be obtained at their website (http://southwest.fws.gov/sjrip).

There is considerable conservation activity ongoing for the razorback sucker throughout its

range. Augmentation of wild-bred or hatchery-bred sub-adults occurs in most populations in both the Upper and Lower basins. Between 1995 and 2001, 19,245 razorbacks were stocked into the Gunnison River. Monitoring of these fish stopped in 2001; however, larvae were captured in 2002-2003, indicating reproduction is occurring. Stocking into the Colorado River began in 1999 and continues to the present, with 47,973 fish stocked to date. Monitoring of these fish is conducted concurrently with Colorado pikeminnow population surveys and non-native fish removal programs (Bob Burdick, USFWS, personal communication 2004). Razorback suckers are also found in the Green River during non-native fish removal efforts (Ronald Brunson 2004). In the San Juan River, 7,863 razorbacks were stocked between March 1994 and May 2004. The population is estimated at 591 fish (Dale Ryden, USFWS, personal communication 2004). The current Lake Mead population estimate does include some stocked fish; however, the majority are wild fish as there is only very limited stocking to this population. In Lake Mohave, the population of stocked fish is estimated at 1,017 to 2,494 based on 1999-2002 data (Dr. Paul Marsh, Arizona State University, personal communication 2004). Dr. Marsh also notes that because there is a 3-4 year time lag between stocking the sub-adults in Lake Mohave and when they first appear on the spawning areas, this estimate does not contain individuals from more recent stockings. Estimates for populations derived from the stocking in Lake Havasu and the Parker Dam-Imperial Dam reach on the LCR and in the Salt and Verde rivers of central Arizona are not available.

The UCREFRP coordinates recovery activities in the Upper Basin (USFWS 1993a). In addition to stocking, research on use and management of floodplain habitats, acquisition of water rights and instream flow determinations, and removal of non-native fish predators are ongoing recovery activities. For more specific information on recovery activities there, contact the program at *www.r6.fws.gov/crrip*.

Implementation of recovery actions in the Lower Basin is accomplished through the cooperative efforts of Federal, state, and university entities such as the Native Fish Work Group and a considerable amount of the ongoing conservation is the result of conservation measures and reasonable and prudent alternatives contained in Federal projects and biological opinions. In addition to stocking sub-adult fish into Lake Mohave, Lake Havasu, and the reach below Parker Dam, there is also ongoing research into dispersal of stocked fish into the system, habitat preferences and use, monitoring of spawning at Lake Mead and research into the reasons for successful recruitment to that population, and development of isolated habitats like that at Cibola High Levee Pond to provide secure areas for self-sustaining populations are underway.

Other Covered Species

Status and life history information for the 21 unlisted species included in the LCR MSCP HCP to be covered species is found in Appendix I (LCR MSCP 2004h), which is incorporated herein by reference. A summary of status information for these species within the LCR MSCP planning area is provided in Appendix D of this BCO. This summary does not reflect all information available on the species in the LCR MSCP planning area.

III. ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, state, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of state and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Definition of the Action Area

Section 7 analyses require the definition of an "action area" for use in describing the environmental baseline and the effects of the action (including indirect, interrelated, and interdependent effects). Based on the proposed actions, the FWS determines the "action area" that will be considered in a section 7 consultation. The action area is defined as the area likely to be affected by the direct and indirect effects of the proposed agency action (50 CFR §402.02). Because there may be indirect effects from the Federal actions included in the consultation that occur outside of the geographic area of the proposed action as described by the action agency, the action area of the biological opinion may not be the same as the actual geographic area of the proposed action.

Federal actions that have already undergone section 7 consultations do not factor into the indirect effects analysis. The effects of these actions are part of the environmental baseline for the action area. Section 10 permits that have already been issued by the FWS are part of the environmental baseline.

The LCR MSCP defined the geographical area (the "planning area" in LCR MSCP documents) as the Colorado River in Arizona, California, and Nevada including the full-pool elevations of lakes Mead, Mohave, and Havasu, and the historical floodplain of the LCR. The historical floodplain is defined as all lands that are or have been affected by the meandering or regulated flows of the Colorado River, which historically have been defined by the change in elevation that forms the adjoining uplands. The planning area includes that part of the Colorado River in the United States between the Northern International Boundary (NIB) (located upstream of Morelos Diversion Dam) and the SIB. This area is Reach 7 for the LCR MSCP, also referred to by Reclamation as the Limitrophe Division.

Regulations for implementing section 7 of the Act define indirect effects as those effects that are caused by or result from a proposed action, occur later in time than the direct effects, and are reasonably certain to occur. All of these conditions must be met to qualify as an indirect effect; however, the analysis does not require absolute certainty in order to find that there would be indirect effects. The standard for indirect effects being "reasonably certain to occur" relies on the economic, administrative, and legal requirements remaining, as evidenced by work plans, appropriations, and pending or issued permits. The more administrative discretion remaining to

be exercised before an action that may contribute to indirect effects is proposed, the less there is a reasonable certainty the action would occur.

For this consultation, the FWS has determined that the action area is defined as the planning area for the LCR MSCP, as described in the HCP (LCR MSCP 2004g). Available information does not support a substantive causal connection between growth in service areas and LCR water and power provided to those service areas. While future growth in those areas is likely, the amount, extent, or location of any future growth is subject to site-specific environmental review that would address any effects, and is therefore not reasonably certain to occur as a result of the provision of water and power from the LCR. The role of the LCR water and power on present and future levels of growth and development is best addressed in the existing section 10(a)(1)(B) permits, consultations, and other compliance documents that result from project-specific analyses for future water transfers. Accordingly, the FWS has determined to exclude the water-use areas from the action area described in this BCO.

The CAP delivers up to 1.5 million acre-feet of water to central Arizona water users each year and may divert additional water to put into underground storage for future years. Uses of this water include tribal agricultural use, non-Indian agricultural use, and municipal and industrial use. Some water is banked underground for use during shortage years. Section 7 consultations have been completed on the delivery systems, placing those actions and their effects into the baseline. The continued diversion of water from the LCR is a covered action under the LCR MSCP. The ongoing delivery of CAP water to central Arizona service areas that have multiple sources of water and where growth is regulated by land use plans lacks a causal connection needed to be considered indirect effects.

Arizona has only a limited amount of unused apportionment; most of the LCR water is already in use. Transfers of water from existing uses to other purposes are included in the LCR MSCP regardless if there is a change in point of diversion. The specific origin of the water, and the new place or type of use are not known with certainty at this time; although it is likely that some portion of these transfers would be used by the CAP to firm up or augment existing deliveries. While there is a degree of certainty these projects would be requested (since an amount of change in point of diversion is requested by Arizona in the LCR MSCP), and the place of use for at least some of the water is within the CAP service area, this does not provide new water, only a more reliable supply. These effects do not meet the standards of the Act to be considered as indirect effects of the proposed action given the available information. The environmental effect of such changes would be evaluated at the time the projects are identified, and effects of the change to the new place of use would be considered in those evaluations. The more definitive information derived from those site-specific analyses would allow for evaluation of the effects of water use in the receiving area. The changes included here do not meet the standard for reasonably certain to occur, and thus are not considered to have indirect effects.

In California, a portion of their LCR allocation is used within the planning area (municipal and industrial uses in the river cities of Needles and Blythe, agricultural uses in the Palo Verde Irrigation District and Tribal agricultural areas). These are existing uses that have indirect

effects in the river corridor that are already considered in the environmental baseline for this BCO. Existing water use outside the planning area, particularly for agricultural use in the Coachella and Imperial valleys, and for municipal and industrial uses in coastal California cities and counties, makes up the majority of the water used in California. These ongoing activities fully use the available water, and while there may be evidence to suggest that new urban development is tied to this water, the certainty of its occurrence and the substantive role of this water as a causative factor are too undefined to consider this off-site development as an indirect effect of the proposed action considered in this BCO. Further, a considerable amount of the land base on which this water is used for municipal and industrial purposes is covered by existing or in-process section 10(a)(1)(B) permits. These permits are focused on growth occurring in those areas, and that focus is sufficient to address the effects of imported water use in the areas covered by the permits. The signed permits are part of the environmental baseline. It should also be noted that for developments not covered by an existing permit, compliance actions under the Act for section 9 and under California state law are required as appropriate. Those specific analyses can best evaluate the potential for effects from use of LCR water on species within the water-use areas.

Water transfers within California would alter the amount used for agriculture versus municipal and industrial uses. These are included as covered actions for their effects on the LCR. The specific origin of the water, and the new place of use are not known at this time, although it is likely that less water would be used for agriculture and more in the coastal cities that currently receive water from the LCR. A considerable amount of the land base in the water-use areas is covered under existing or in-process section 10(a)(1)(B) permits, or is subject to compliance actions at the time the projects are proposed for implementation. The signed permits are part of the environmental baseline. Those specific analyses can best evaluate the potential for effects from use of LCR water on species within the water-use areas, especially since the source or destination of transferred water are not currently known. Future transfers would receive separate compliance, including an analysis of the effects to the water-use area, at the time the specific project is identified. The lack of specific information on these future transfers, and the uncertainty of the substantive causation of growth through provision of this additional water, does not allow them to be considered as indirect effects of the actions considered in this BCO.

For Nevada, water and power derived from the LCR are used primarily in Clark County. The Clark County MSHCP (Regional Environmental Consultants 2000) focuses on the loss of habitats due to continued urban growth in the county. Water supply was not considered in this HCP; however, the effects of growth are the focus of the plan and future growth is estimated. Given the amount of water that Nevada receives from the LCR (all of which is used in Clark County) and the amount likely to be received in the future during the time period covered by the Clark County MSHCP and the LCR MSCP, it is not likely that provision of water from the LCR would cause more growth than already forecasted and covered under the Clark County MSHCP.

In the ISC-Secretarial Implementation Agreement biological opinion (USFWS 2001a), the FWS included the water delivery areas in the three states as part of the action area. However, the subsequent analyses for indirect effect determined that indirect effects were not likely to occur in

those areas; or, if such effects did occur, they were subsumed within existing compliance actions.

The action area does not extend below the SIB to the Sea of Cortez. To the extent that consultation for effects to listed species in Mexico may be required in the future on Federal discretionary actions by the Federal action agencies that are included in this consultation, such consultation would occur at the time the Federal agency actually proposed the action for implementation. The issuance of incidental take permits for covered species in the United States will not affect populations of those species in Mexico, because loss of individuals and their habitats in the United States is fully mitigated through the Conservation Plan and has no affect to individuals and their habitats in Mexico.

Environmental Baseline for the LCR MSCP Planning Area

The biological and physical conditions existing within the LCR MSCP planning area are the result of natural and human-caused actions spanning many years. The LCR and its floodplain, as it existed prior to the late 1800's, has been extensively modified through human activities to such an extent that the existing conditions are more reflective of human management actions than natural hydrological or geo-morphological processes.

Pre-development conditions (pre-1880)

The pre-development biological and physical conditions of the LCR were summarized in the 1996 BA (USBR 1996), the 1997 biological opinion (USFWS 1997), Todd (1986), a review of pre-development riparian habitat (USBR 1999), the supplemental BA for the ISC (USBR 2001), and in a recent publication titled "Lost, A Desert River and Its Native Fishes: A Historical Perspective of the Lower Colorado River" from the U.S. Geological Survey (Mueller and Marsh 2002). The information in these documents is incorporated herein by reference. The summary of historical conditions is provided in the following paragraphs for use in comparison with the conditions existing at the time consultation was initiated in 2004.

The Colorado River Basin (CRB) encompasses portions of seven states (Arizona, California, Colorado, New Mexico, Nevada, Utah, and Wyoming). The most important tributary rivers, those contributing the most of the river's flow through what is now the action area, are in the Upper Basin. Snowmelt from this area provided the basis for the normal flow cycle, with smaller amounts coming from snowmelt in northern Arizona (through the Little Colorado River, Paria River, and streams entering the Grand Canyon such as Havasu Creek) and southern Utah (through the Virgin River). Rainfall in Arizona and southern Utah also contributed flows through the streams mentioned above and the Bill Williams River (USGS 2004). The contribution of the Gila River, which drains much of central Arizona, may have been significant, but its confluence with the Colorado River is at the lower end of the action area and most of that flow moved quickly down out of the action area through the Colorado River Delta and into the Sea of Cortez. The rivers of the CRB were, especially during seasonal high flows, fully connected to each other over hundreds of miles, providing for the movement of fish throughout the system.

The seasonal flow pattern for the LCR had snowmelt flows beginning in May and peaking in late June or early July. Flows declined through the later summer and fall, except for pulses resulting from monsoon storms or other rainfall events in the nearer watersheds that could cause rapid but short-term increases in flows. Winter rainfall events, again in the nearer watersheds, would raise flows somewhat through the winter and early spring. Outside of the longer-term seasonal fluctuations and the short-term increases due to localized rainfall events, daily and weekly water levels did not fluctuate to any significant extent. The amount of water available in any given year was dependent on climatic wet or dry years that could lead to floods or drought conditions. The basic seasonal patterns would generally hold, but predictability of actual flows on a seasonal or yearly basis was very low.

The seasonal flow cycle, with the disruptions caused by flood and drought, created a complex, connected, river channel and floodplain through the action area (Mueller and Marsh 2002, Ohmart *et al.* 1975, 1988; USFWS 1997). The enormous volume of sediment carried by the river was a significant factor in the changing morphology as it was deposited in one place and eroded from another in response to changes in flows. High flows spread over the floodplain and reconnected backwaters, sloughs, and marshes isolated from the primary channel that formed at low flows. High flows could also destroy those floodplain features through erosion and sediment deposition, but they would be re-created during the low flow periods. The same cycle of creation and destruction held for the riparian forests of cottonwood, willow, and mesquite. During periods of low flows, the river meandered through the floodplain, using one or more shallow channels and either connecting to, or isolating, backwaters and marshes. The water table under the floodplain remained sufficient to keep isolated backwaters and marshes wet, and provide water for the riparian forests. Movement of the low-flow channels from year to year changed the degree of connectivity to backwaters and marshes, some of which would stagnate or dry out. Riparian forests isolated on floodplain terraces could lose near-surface groundwater, and eventually convert to deeper-rooted or dry land vegetation types. The chief characteristic of the river, its channels, backwaters, marshes, riparian forests, terraces, and other floodplain features was continual change on a both a small and large scale, yet with considerable areas of these important wildlife habitats normally available through the action area.

Water-quality parameters also varied significantly. During high-flow periods, turbidity was very high due to sediment transport. Even at lower flows, considerable turbidity existed in the moving water. Backwaters and other slow-water areas were clearer as the sediment dropped to the substrates. Water temperatures were driven by the combination of air temperatures and water depths. Seasonal differences were significant, with low temperatures likely in the range of 8 to 12° centigrade (C) in winter and 30° C and higher in summer (extrapolated from modern data, Minckley 1979). The amount of solar radiation along the LCR also resulted in daily water temperature changes of several degrees. Deeper, moving waters tended to be cooler than the shallow, quiet water areas such as in backwaters and marshes.

Salinity has always been an important water-quality parameter in the LCR. The Basin contains numerous areas of saline geologic formations lain down during times when area was covered by

marine or brackish water environments (Ohmart *et al.* 1988). Salinity of water flowing into the LCR likely did not change significantly over time, since the sources of the salts were constant. Salinity of the water within the LCR action area was subject to change as a result of evaporation, especially in isolated backwaters and marshes. If there was sufficient inflow to these areas from groundwater to maintain water levels and prevent drying, evaporation over several years could result in extremely high salinities in these backwaters. When these areas went dry, there would be a build-up of salts in the sediments under the area. High flows that eroded these sediments and deposited them elsewhere downstream would also put some of the salts back into the water and flush them out of the action area to the delta and the Sea of Cortez. Portions of the floodplain with significant salt deposits on the surface tended to be further downstream in the action area, and in areas where many shallow marshes and backwaters formed and degraded though reductions in water, high evaporation rates, and filling in by vegetation mats. The amount of salt accumulation that naturally occurred in these areas was a function of wet and dry cycles leading to floods and droughts, and information on salt accumulation rates is lacking. The extent to which salts would build up and be retained in the floodplain soils is not known. Information from the 1800s on the extent of the salt-intolerant cottonwood and willow forests within the historical floodplain implies that high soil salinity was likely a local, not an area-wide issue.

There is no specific information on nutrient loads in the LCR. Nitrogen and phosphorus sources were imported through vegetation material falling into or growing in the marshes or backwaters. Detrital plant materials could concentrate in these areas and provide a higher level of nutrients for invertebrates than in the main channel. Nutrient flow through the system was governed by the creation of these concentration sites and their subsequent dispersal to the river through high-water events that eliminated the backwater or marsh.

The concentration of selenium present in the waters and substrates of the LCR prior to the 1880s is not known. There are no natural selenium sources in the LCR, and all selenium that passes through the system is derived from selenium sources in the Upper Basin carried south with river flows. The amount of selenium in the water may have varied seasonally, as it is noted that during low-flow periods in the Upper Basin, selenium levels are lower than during high flows. This difference is attributed to greater exposure of water to selenium-bearing soils when there is more water (Butler and Lieb 2002). Under pre-development conditions where there were no additional disturbances to soils in the Upper Basin, it is likely that the amount of selenium reaching the LCR was a factor of annual flows and may have varied seasonally. Inflows to the LCR from the Little Colorado River, tributaries in the Grand Canyon, and the Bill Williams and Gila rivers have low natural selenium levels and would have acted to dilute selenium concentrations.

Once in the LCR, selenium can be absorbed directly from the water by biological organisms, or accumulated in benthic sediments. There are several complex pathways involving a variety of forms of organic and inorganic selenium that occur in natural river systems. Where there are high levels of fine sediments (silts and clays), large amounts of organic detritus, and active flow of water over the area, selenium readily accumulates in the sediments (Garcia-Hernandez *et al*.

2001, Welsh and Maughan 1993) where it becomes available to invertebrates and detritus-feeding fish. Areas of sand and gravel or low organic matter, and with limited water flow, do not tend to accumulate selenium. As other animals consume the invertebrates and fish, the selenium bio-accumulates. In the pre-development LCR, marshes and backwaters would have acted as selenium accumulation sites, and exposure of native fish and wildlife species to selenium likely occurred. Whether or not toxic levels of selenium were reached that could affect reproduction or cause direct mortality is not known, but the species persisted in large numbers, so this effect may not have been significant at the population level. The natural river processes that prevented the long-term establishment of marshes and backwaters, and re-distributed sediments (particularly silts and clays) and organic materials downstream during high flows, likely has a negative impact on the ability of the LCR to concentrate and retain high levels of selenium in the sediments over time. Once these areas are disturbed, selenium from the sediment becomes water-soluble and may be absorbed by organisms, re-trapped in sediment downstream, or be carried out of the system. Large amounts of the LCR substrate, particularly the sand and gravel areas, would lack the ability to capture selenium at any meaningful concentration.

In addition to physical characteristics, the LCR action area supported a series of marsh and riparian vegetation communities dominated by cattails, bulrush, cottonwood, willows, and mesquite. Drier areas contained arrowweed (*Tessaria sericea*), quailbush (*Atriplex lentiformis*), and other shrubs, grasses, and forbs. The turbidity of the water precluded significant areas of aquatic vegetation, except in the clearer backwaters. These vegetation communities were arrayed across the floodplain and flanking the river channels. As mentioned previously, river flows controlled the cycle of development and destruction of these habitats. Wildfire may have been a minor factor for the cycling of existing habitats, particularly when conditions allowed for a buildup of fuels in marsh or cottonwood-willow areas. The extent to which wildfires occurred is not known; however, the moist microclimate of the floodplain may have reduced the risk of catastrophic wildfire in the riparian areas. Wildfire in marshes removes dead stems of cattail and bulrush, but does not eliminate the roots. In the event of a wildfire in an area, natural flow cycles provided the conditions needed for re-establishment of vegetation in the burned area.

Wildlife species, particularly birds, were varied and abundant in the floodplain habitats (Grinnell 1914, Rosenberg *et al.* 1991). Resident bird species were seasonally joined by migratory species; some of which passed through the area to and from breeding and wintering grounds, others of which stayed to breed in the area. Species composition was influenced by the relative availability of different habitat types, with riparian and marsh habitats being more common than large open-water habitats. Mammal populations were largely comprised of rodent species, rabbits, and various carnivores such as gray fox (*Urocyon cinerargenteus*) and coyote (*Canis latrans*) (Ohmart *et al*. 1988). A variety of species of snakes, lizards, toads, and frogs were also present, as was one aquatic turtle.

The native fish fauna was much more limited in diversity, comprised of only nine freshwater species and two marine/brackish water species. Information about this native fish fauna is well documented and most recently summarized in Mueller and Marsh (2002). Backwaters and marshes with open water, tributary streams, and the main channels of the river provided a variety

of habitats for these species. Without any permanent barriers to movement, individuals could move to and from the Colorado River Delta and upstream into the upper portions of the Basin outside the planning area. The rigorous physical conditions imposed by the LCR in terms of flows, changing habitats, and water quality resulted in fish species adapted to these harsh conditions. Morphological adaptations allowed species to survive flood and drought, high salinities, high temperatures, and successfully move through the highly turbid environments. The large-size and long life span of the riverine-dwelling species, the Colorado pikeminnow (*Ptychocheilus lucius*), razorback and flannelmouth suckers, and the three chubs (bonytail, humpback, and roundtail [*Gila robusta*]) enabled them to live in the larger rivers and connected backwaters and reduced the need to successfully recruit a new generation of young fish every year. Producing large numbers of eggs each year enabled these species to recover their numbers quickly after a prolonged drought or other natural disaster, when recruitment failed for several years in a row. The smaller, shorter-lived species, the woundfin (*Plagopterus argentissimus*), desert pupfish (*Cyprinodon macularius*), and Gila topminnow (*Poeciliopsis occidentalis*), were also adapted to harsh environments, but their habitats were more stable than the main channel and recruitment could be expected more regularly (Mueller and Marsh 2002).

The LCR and its floodplain provided important resources for local Native American peoples who lived, hunted, fished, and farmed in the area. Their effects on the physical and biological components of the LCR were limited, and did not have significant effects to the structure and operation of the ecosystem.

Existing conditions

Since the 1880s, the LCR has been significantly modified by human activities. Some of those actions occurred only once, such as the construction of Hoover Dam. Others, such as delivery of water to those holding water rights, occur repeatedly. The current status of the physical and biological characteristics of the LCR is the result of these one-time and repeating actions occurring over the span of over 120 years. The full effects to the LCR of these actions that have occurred up to the present day may not yet be represented in the current conditions. Some of the effects caused by human activities may take years to fully express themselves, and there may not have been sufficient time from their initial occurrence for the physical and biological systems to reach equilibrium with these changes. Thus, some of the effects of these past actions will express themselves in the future, and a discussion of these effects is included in the effects of the action section of this BCO. The following discussion includes reference to river management actions, and their effects to the LCR, to assist in evaluating the causes of current conditions, and the effects of continuing those actions into the future.

The LCR is now a system managed to provide water and power to people in Arizona, California, Nevada, and Mexico, control floods, and provide for recreational opportunities. This transformation is the result of construction of the large water-storage dams (Hoover, Davis, and Parker dams), smaller diversion dams (Headgate Rock, Palo Verde, Imperial, and Laguna dams), straightening and modifying the river channel through dredging and bank stabilization, and the wholesale removal of water by individuals and other entities with water rights to LCR water.

The conditions described in the previous section have undergone significant changes as a result of this management. The published literature on the effects to natural river processes from the construction of dams, diversion of water, and channelization contains extensive documentation on the result of implementing these types of actions. Useful references include Hunt 1988 and Brooks 1988. The discussion of the effects of these actions contained in this section results from the review of these, and other more general discussions in the BA for the 1997 BO (USBR 1996, USFWS 1997), the ISC supplemental BA (USBR 2001), and summaries of observed changes to the system (Minckley and Deacon 1991, Mueller and Marsh 2002, Ohmart *et al.* 1988, Todd 1986).

Inflows to the LCR still come from snowmelt in the Upper Basin and more localized rainfall events. However, human development on those watersheds now controls when, and if, any of these flows reach the LCR. The Colorado River Compact of 1922 and subsequent agreements, contracts, laws, and legal decisions control the amount of water that reaches Lake Mead from the main tributaries of the Upper Basin, and how that water is released to users downstream. Only under certain flood-management criteria and other management decisions is more water than called for in these agreements released from Lake Powell to flow to Lake Mead. Most of the historical inflows from the Little Colorado, Virgin, Muddy, Bill Williams, and Gila rivers are significantly reduced due to upstream storage dams to hold water for upstream uses, flood control, and other water diversions that reduce or eliminate normal flows to the LCR. Only the tributaries in the Grand Canyon continue to provide flows to the LCR in a manner similar to the pre-development era. Flood events still occur, when more water enters these systems than can be managed by the infrastructure, and spills reach the LCR. Even these flood flows are managed through flood-control releases from Hoover, Davis, and Parker dams in accordance with management requirements to protect facilities along the river. With the storage space available in the large reservoirs, flood peaks can be significantly attenuated and flows released over a longer time period than would be possible without the reservoirs. Similarly, during drought years, water levels in the reservoirs are significantly affected due to the need to release more water than is coming in to meet downstream demands. Releases from Hoover Dam are not likely to change unless shortage conditions require a reduction in the release of water. To date, there have been no shortages declared on the LCR. Deliveries of water in excess of 7.5 mafy have occurred during years of excess releases for flood control and when a surplus has been declared by Reclamation that frees up additional water for the holders of water contracts.

Prior to the approval of the ISG in 2001 (USBR 2000a, 2000b), there was no standard set of criteria used by Reclamation to determine if a surplus condition existed. A number of factors, including estimates of inflow from the annual snow pack, lake elevations in the main storage reservoirs (which incorporated the need to maintain certain levels of flood storage in Lake Mead), and estimates of water orders were used in combination to determine if a surplus could be declared. The need for a surplus declaration was also influenced by the existence of “unused apportionment,” that water allocated to one state that was in excess of the state’s current water use. As long as the full 7.5 mafy for the Lower Division states was not being used, then another state could use water not used by one state. The distribution of unused apportionment to another state did not necessarily trigger a surplus condition in the sense that over 7.5 mafy was available

for release. An example of the importance of unused apportionment is the history of water use by California of up to 5.2 mafy per year when their allocation totaled only 4.4 mafy. With both Arizona and Nevada increasing their use of their allocations, less was available for California to use over its allocation to meet existing needs. The ISG provided a set of standard criteria for Reclamation to use in the annual determination of a surplus of water being available. The ISG, and the amount of surplus water actually available to the three states, were based on specific lake-level elevations in Lake Mead. At elevations over the 70R level (approximately 1199 to 1201 feet msl), the need to create flood storage space in Lake Mead would provide for a surplus for the Lower Division states. At elevations between 1145 feet msl and the 70R level, a full domestic surplus would be available. The Secretary of the Interior, in the Annual Operating Plan (AOP), would determine the amount of surplus water available for a specific year. For 2004, a partial domestic surplus was declared. Only Nevada requested surplus and received 17,000 af. A partial domestic surplus would be declared for elevations between 1145 and 1125 feet msl. No surplus would be declared at Lake Mead water elevations below 1125 feet msl.

Water levels in Lake Mohave and Lake Havasu operate within a standard monthly pattern and do not change much from year to year. Water levels in Lake Mead are much more volatile and reflect the balance between inflows (water deliveries required from the Upper Basin under the 1922 Compact) and water released to meet downstream demands in the Lower Basin and Mexico. In addition, Lake Mead water levels are managed to provide certain designated amounts of storage at various times of the year for flood control under the *Water Control Manual* (described in LCR MSCP 2004i). Prior to the ISG, meeting the seasonal Lake Mead flood storage requirements was one of the factors used in determining a surplus condition. The Reclamation developed models that used the past 85-year record of inflow events to compare the effects to lake levels from the alternatives. The models showed that implementation of the ISG resulted in the declaration of more surplus years than the pre-2001 approach (the no-action alternative), and an overall reduction in Lake Mead water levels over the no-action alternative. This reduction is the result of the fact that the ISG provide for a surplus declaration at lake elevations lower than the pre-2001 considerations. With a limited (15-year) implementation period, the models showed an increase in lake levels back toward the no-action scenario after several years. In addition to changes in lake level due to changes in surplus criteria, the models provided information on the effects to Lake Mead water elevations from increased diversions in the Upper Basin states over the modeling period (USBR 2000b). These reductions were kept constant through the alternatives.

The storage capacity of the large reservoirs results in the ability to deliver water to downstream users at their demand at any time of the year, not just during the spring runoff. Water is released through Hoover Dam from Lake Mead in response to water orders from users downstream and within that release volume to meet water orders, the daily and hourly releases vary to maximize hydropower production available from the released water. Lake Mohave acts as a regulating reservoir for Lake Mead, and water is similarly released from Davis Dam to first to meet water orders and scheduled over the course of the day to maximize hydropower production. Lake Havasu is the diversion point for over 2 mafy of water (to Metropolitan for California and the CAP for Arizona), and also releases downstream first to meet water orders and scheduled over

the course of the day to maximize hydropower production. Over a 24-hour period, flows below the three large dams vary significantly, resulting in water-level changes in the river reaches of up to several feet (USBR 1996, LCR MSCP 2004i and Appendix J in LCR MSCP 2004h) depending on the dam and the season of release. The degree of water-level fluctuation attenuates downstream from the large dams, but is present for many miles downstream at some level and causes some shallow-water gravel bars and portions of backwaters to be de-watered for at least part of a day. Between Parker Dam and the SIB, smaller diversion dams, some with smaller hydropower stations, divert their water orders and pass the smaller amounts of water remaining downstream. The amount of water released from Lake Mead does vary seasonally, especially in terms of agricultural demands, but the seasonal differences in flows are significantly smaller than in the pre-development system. The managed releases are flatter and much more constant than the high and low flows governed by natural runoff patterns. With only a very limited amount of Arizona allocation not under contract or perfected rights at this time, there is a limited amount of change in demand between years. Flows in the LCR below Lake Mead are now very predictable, and only during flood events that require additional water be released from Lake Mead is there any significant variation from year to year in the amount of water released.

Construction of the large dams formed barriers to the free movement of fish through the CRB, blocking both seasonal migration routes to and from spawning and adult feeding areas, and the exchange of genetic material between local populations. Another significant change to the physical conditions in the LCR caused by the large dams was the interruption of sediment transport through the system. Sediments coming into the LCR from the Grand Canyon now settle in Lake Mead. A significant delta has formed at the Colorado River inflow where the decreased velocity of the water causes the sediments to drop out of suspension. Lake water is very clear and sediment free. Water released from Hoover Dam contains no sediment, but picks up sediment from the river channel and transports it downstream toward Lake Mohave. The river below the dam is “armored,” a term that describes a lack of small-sized silts, sands, and gravels and a predominance of larger rocks that the flows are not sufficient to shift. The lack of sediment in the released water also means that the water is very clear and remains so for a considerable distance downstream until the sediment load causes turbidity to increase. The river reaches below Lake Mohave and Lake Havasu are similarly armored and the water remains clear for varying distances downstream.

As the clear water released from the dams picks up sediment from the river channel near the dam and transports it downstream, the channel near the dam degrades, or loses sediments. This results in the channel becoming deeper. At the point downstream where the flow and velocity of the water can no longer carry the sediments, they drop out of the water column and cause the channel to aggrade. This process of degradation and aggradation is a normal river process; however, because the sediment inflow from the Grand Canyon has been halted by Lake Mead and the other large reservoirs, there is only limited sediment input (from eroding shorelines and wash inflows) to re-fill degraded reaches below the large dams. Over time, the armored reach extends further downstream until equilibrium is reached between the sediment-carrying ability of the water and the amount of new sediment inflow. Water remains clear until a sufficient amount of sediment can be carried that would increase turbidity. It is not certain whether this

equilibrium has been reached in the LCR below Davis or Parker dams.

The channelization of the river had other effects to sediment transport. At the present time, approximately 61% of the river banklines (336 miles for both sides of the river) have been stabilized (LCR MSCP 2004i). By narrowing the river channel to keep managed flows moving quickly and effectively, the velocity of the flows increases. This increased velocity resulted in the increased downstream transports of sediments located on the bottom of the channel and has increased the rate and extent of channel deepening and armoring. The amount of sediment input to the river from the erosion of shorelines (sediments that previously were deposited in the floodplain) is further reduced when these shorelines are stabilized with rock riprap. The rock protects the shoreline from eroding, which reduces the sediment inflow, and results in the continued degradation of the river channel as the water continues to carry channel sediments downstream and there is no replacement. Eventually, the forces involved reach equilibrium; however, we do not know if this has occurred in any reach. The continued need to dredge the Topock Settling Basin (which captures sediments transported downriver from Davis Dam), above Imperial Dam, and at the All American Canal desilting works (both capture sediments generated below Palo Verde Dam), implies that there is still considerable downstream sediment movement occurring. Two other areas of sediment aggradation, one above and one below the town of Blythe, have been increasing and are under consideration for future dredging (these actions are not included in the LCR MSCP because project design was not sufficiently developed at the time the covered actions were defined). These areas formed in wider sections of the LCR where flows were no longer sufficient in amount or velocity to keep the sediment from upstream in suspension. These aggradation areas contain shallow and deeper channels within the width of the river and more closely resemble the historical condition for the river channel.

The almost absolute control over river flows that now exists, combined with the programs providing efficient water delivery and flood protection for human developments in the floodplain, destroyed the interconnected and complex river channel and floodplain habitats. A more complete discussion of this is contained in Mueller and Marsh 2002, Ohmart *et al.* 1988, and USFWS 1997. Development of agricultural areas, towns, and other settlements on the floodplain required that these properties be protected from flooding and erosion. Levees were not a sufficient protection, since they could be eroded away even if armored with rock. Establishment through dredging of a narrow, single, river channel bordered by river banks stabilized with rock rip-rap and backed where needed by levees provided the physical protection for property and enabled water to be efficiently conveyed to downstream users. The reduction in flood threat due to the ability to control releases from the dams encouraged additional development along the river corridor that destroyed additional acres of backwater, marsh, and riparian habitats.

The combination of channelization and disruption of sediment transport in the LCR resulted in channel incisement. The stripping of bottom sediments by clear waters, higher velocities due to the narrowed channel, and a lack of new sediment input caused the degradation of the channel bottom. This brought the level of the water in the channel down and caused water levels under the adjacent floodplains to also drop. Backwaters, marshes, and moist soil areas in the floodplain

dried as water levels declined below them. Mature trees in riparian forests could survive the groundwater declines to a certain point; however, the drying of the floodplain combined with the lack of flood flows served to disrupt the normal re-vegetation cycle. Seedlings of cottonwoods and willows could, in some places and times, find sufficiently damp surface soils to sprout, but without the shallow groundwater, could not thrive and replace the mature trees when they were eliminated by human-caused or natural events. Conditions for re-vegetation on the remaining areas of the floodplain were more suitable for the non-native saltcedar, and this species began to spread widely through the LCR region.

The result of the river stabilization efforts is that LCR no longer meanders across its floodplain. The natural river processes that led to the creation and destruction of riparian forests, backwaters, and marshes have been largely eliminated. What remains of these important habitats is concentrated along the confined river channel. When riparian areas, backwaters, and marshes are located on lands protected from future agricultural or urban development, such as on FWS National Wildlife Refuges (NWRs), these habitats remain at significant risk of loss due to wildfire, flood events that deposit sediment in quiet water areas off the main channel and thus fill in marshes and backwaters, and the natural aging processes that degrade and eventually eliminate backwaters and marshes and create dry land. Because even these protected areas are affected by river channelization and the decline of groundwater levels, native riparian restoration through natural processes is precluded. Active management is required to ensure that these habitats remain functional on these protected lands. For lands in Federal (BLM, Reclamation) or state ownership for parks or wildlife areas, assuming that there is protection from developmental interests, the same degree of active management is required to maintain existing habitats. The Reclamation has mitigation commitments to maintain a number of backwater and marsh areas (see listing in LCR MSCP 2004i) and is cooperating with other Federal and state agencies to maintain important areas. An example of this is the recent dredging of the Arizona and California channels in the Imperial Division to restore water flow to a number of small backwaters in the floodplain. This was a cooperative effort between Federal and state agencies. Other lands in the LCR planning area have limited protection (generally only if there is an endangered species present) and the existing habitats are at risk of active elimination through development or passive elimination due to lack of management actions to ensure their persistence. Without the operation of natural river processes to create new backwaters and marshes, the ones that exist today are what we will have in the future, but only if they are actively managed to maintain their quality. These efforts are expensive, and funding is limited. There are a number of backwaters and marshes that do not have existing maintenance commitments and are degrading out of existence.

Between Morelos Diversion Dam and the SIB, the elimination of natural flow cycle of the LCR has resulted in the loss of backwater, marsh, and riparian habitats supported by that flow. Some flow remains above the SIB; however; this is largely derived from agricultural return flows and is significantly reduced in quantity over the pre-development condition. Flood flows (either from releases from Hoover Dam or down the Gila River) provide the occasional significant freshwater inflow. The Reclamation, in their EIS for the ISC (USBR 2000b), discussed the current status of inflows to this reach, comparing the pre-development condition to that existing

in 2000. Based on the model runs for Lake Mead elevations, Reclamation evaluated the potential changes in probability of Hoover Dam-related flood flows reaching Morelos Diversion Dam and the river between the dam and the SIB due to implementation of the ISC. The analysis showed a small decrease in the probability of flood flows that was not determined to be significant (Appendix L in LCR MSCP 2004h).

Water quality in the LCR has also changed as a result of human activities. Water temperatures in the large reservoirs change seasonally, and the surface temperatures can be high. However, the deep waters of these reservoirs are cold. Water released from these levels through the dams is cold and does not vary seasonally. The tailrace (the river reach immediately below a dam) below Hoover Dam now supports a cold-water trout fishery. Cooler water temperatures persist to the upstream end of Lake Mohave, creating an underflow when it meets the warmer lake water (Paulson *et al.* 1980). Releases from Davis Dam are also cold (12 to 15º C) and the water gradually warms as it flows downstream to 18 to 20º C (Minckley 1979). This warming trend varies with season and flow, with solar heating the primary agent for warming the water, and can be observed at least 25 miles downriver from the dam (Minckley 1979). Because its shallower depth reduces temperature stratification, Lake Havasu does not have significantly colder water at depth. At 21 to 25º C, water released from Parker Dam is colder than is present in the river several miles downstream (25 to 30º C in summer), but the difference is significantly less than that below Davis Dam (Minckley 1979). Temperatures in the lower portions of the river (below Palo Verde Dam) vary seasonally and are still governed by flow, water depth, and amount of solar warming. Backwaters tend to be warmer than the main channel, as was true prior to development of the river.

Salinity of LCR water has increased significantly as water development projects have come on line in both the Upper and Lower basins. Using information from the 1942-1961 hydraulic record, the EPA determined that the salinity levels at Hoover Dam had doubled over baseline levels (EPA 1971) and predicted a trebling of the levels by 2010. Increases in salinity levels further downstream to Imperial Dam were also significant. The primary causes of this increase were increased evaporation from reservoirs and irrigation diversions and return flows. Increasing salinity in soils irrigated with LCR water reduces the value of the land for crops and requires additional water to flush salts down and out of the root zone of the plants. This flushing can carry higher salt loads back to the river and exacerbate the problem for downstream users. The quality of water for other water uses can also be affected, and return flows from municipal and industrial sources may also contribute to the increases. The need to control salinity levels in the water delivered to Mexico resulted in the construction of the Yuma Desalinization Plant (currently not operating), and the diversion of saline drain water from the Wellton-Mohawk Irrigation and Drainage District from entering the LCR and instead being transported from the Main Outlet Drain Extension (MODE), to the Bypass Canal, to the Cienega de Santa Clara. The MODE water, approximately 120,000 af per year, is what created, and supports, the Cienega's extensive marshes. Additional monitoring of salinity levels will form the basis for any future changes in flow patterns in this area.

Phreatophytes such as saltcedar have been assumed to cause increases in soil salinity through

their ability to use saline water and excrete the excess salts onto leaves and stems during normal transpiration. These materials would then fall to the ground and the salts mix into the soil layers. A recent study that looked at soil salinity under saltcedar stands of various ages and did not find any tendency for an increase in soil salinity with length of time the site was occupied by saltcedar (Shafroth 2004). Additional research on this point is needed to further define the effects of saltcedar on soils. In any event, many acres of former floodplain lands that once supported cottonwood and willow trees can no longer do so because of the combination of higher saline water in the river and groundwater, and the higher soil salinities observed over time. The failure of native riparian restoration programs on the LCR, most recently efforts at Imperial NWR to establish a new cottonwood area around a series of ponds, can be traced in significant part to increased salinities.

Changes to nutrient flows in the LCR through fragmentation by the large dams have also been documented (Paulson *et al.* 1980), but their effects on fish and wildlife resources are uncertain. The presence of nutrients in agricultural and domestic-use return flows has changed the availability of these substances; but the effects are not clear. The longer-term retention of backwaters and marshes also enables nutrient loads to increase over time. As these areas age, plant materials continue to accumulate along with sediments and combine to reduce depth and extent of these areas. These organic materials are not distributed to the main river when these areas are maintained (dredged), because the dredge spoil is placed on upland sites away from the river.

In addition to changes in nutrient loads, agricultural and domestic-use return flows add new chemicals to the river. Pesticides such as DDT, herbicides, industrial chemicals, metals, and organochlorine compounds (PCBs) have been found in sediments and in several species of fish and wildlife (Andrews *et al.* 1997, King *et al.* 1993, 2000, 2003). A new concern has developed over the potentials for endocrine disruption of reproduction in fish species due to hormone imbalances caused by a variety of industrial chemicals, organochlorides, pharmaceuticals, and personal care products transmitted to the river via wastewater treatment plant return flows and other point and non-point sources (summarized in Baker and Marr 2003). Permits for effluent releases from wastewater treatment plants are issued under the National Pollution Discharge Elimination System (NPDES). While there are restrictions on the concentration of a number of chemicals found in effluent, there are many more for which there is no restriction. The magnitude of the contamination by these chemicals may increase as more and more return flows from point and non-point sources enter the river, and the amount of flow in the river decreases (reducing the dilution factor).

The level of selenium in the LCR may have increased over the pre-development period due to two primary factors. The first is the increase in selenium inputs from the Upper Basin. Agricultural development in areas with selenium-rich soils exposes the selenium to irrigation water, which is returned to the river via drains or other seepage. Information from the 1930s showed high selenium levels associated with irrigation drain water (Hamilton 1999). Agricultural return flows in these areas are higher in selenium than river flows upstream of the return (Butler and Lieb 2002, Hamilton *et al*. 2001). It is unclear if increases in selenium levels in the Upper

Basin will continue, and what impact that could have on levels entering the LCR. Other sources of selenium, such as from burning coal and other fossil fuels, contribute to local and downstream selenium levels. Because the soils in the agricultural areas flanking the LCR do not contain selenium deposits, irrigation return flows in the LCR are not sources of additional selenium, nor do they concentrate selenium over river levels (Garcia-Hernandez *et al.* 2001, Radtke *et al.* 1988).

The second factor is the elimination of natural river processes that once limited the number of, and length of existence, for backwaters and marshes where the conditions to allow the accumulation of selenium to occur. Limited life spans for these areas precludes the continual increase in organic materials in the sediments, and, as they did age naturally, the amount of flow into the backwater or marsh reduced, thus reducing the supply of selenium from the water to be captured. On the LCR today, backwaters and marshes are not created and destroyed by flow events as they were previously. With the longer life expectancy of existing backwaters and marshes, the selenium in the substrate remains in the area and as more organic and fine particulate material is laid down, as long as flows through the area are maintained, the amount of selenium captured in the substrate increases. Radtke *et al*. (1988) found that oxbow lakes and other backwaters had the highest selenium levels in the LCR. In the large marshes such as Topock Marsh and the backwater marshes formed behind Imperial Dam, selenium storage in the substrate may be quite high. Cycling of this selenium through biological pathways provides it to the food chain where it can accumulate in organisms. Active management through dredging, as is done at Imperial Dam, exposes the stored selenium to oxygen and it is converted to a water-soluble form that is carried downstream for capture elsewhere. Selenium residues can also re-enter the system through drainage of water from the dredge-spoil disposal areas. The re-distribution of selenium in areas with repeated dredging may be significant to areas downstream. The effects of increased levels of selenium entering the LCR from the Upper Basin on the increasing levels seen in LCR habitats is not known; however, the greater amount of selenium in the water, the greater the opportunity for capture of the material into the biota and sediments.

Limited use of flushing (increasing water inflow over a short period) to reduce selenium levels in backwaters has not shown significant benefits (Villegas 1997). This may be in part because the increase in flow brings in more selenium to be captured, and does not remove any of the selenium stored in the substrate. LCR backwaters and marshes that are connected directly to the river have higher levels of selenium than do those that are fed by groundwater (Prieto 1998). This may be the result of selenium uptake from the water by soil absorption or microbial actions as the water moves in the alluvium between the river and the backwater (Velasco and Marr 2003).

Recent research in various locations along the LCR has documented selenium levels well into the range of concern for reproductive failures for aquatic and marsh birds and fish (Andrews *et al.* 1997, King *et al*. 1993, 2000, 2003; Martinez 1994, Radtke *et al*. 1988, Rusk 1991, Welsh and Maughan 1993). Hamilton (1999) hypothesizes that selenium levels in the CRB increased with the initiation of irrigated agriculture in the Upper Basin in the 1880s, and the decline in native fish populations seen in the Upper Basin beginning in the 1910s-1920s can be attributed to

selenium-induced reproductive failures. These declines pre-dated the creation of the large dams and spread of non-native fish in the Upper Basin. Hamilton carries his hypothesis to the LCR for the declines in native fish species in the 1930s, particularly razorbacks and Colorado pikeminnow, to increases in selenium in the LCR carried from the Upper Basin. However, other factors were operating on the fish populations of the LCR at the same period, notably the creation of Laguna Dam that blocked fish passage from the Delta, runs of pikeminnow and razorbacks into irrigation ditches, and drought conditions that killed many fish during the 1930's. The role of imported selenium in the decline of native fish in the LCR remains to be evaluated.

Concerns for neo-tropical migratory birds that forage on the adult stages of aquatic insects whose larval stages may be in areas with high selenium concentrations require further investigation (Estrada and Maughan 1999, King *et al*. 2002). A recent study of insectivorous bird diets from the Grand Canyon did not show a high level of ingestion for aquatic insects except by yellow warblers (45% of their diet was aquatic midges), with an overall ratio of 91% terrestrial insects and 9% aquatic insects consumed (Yard *et al*. 2004). The types of aquatic and terrestrial insects available in foraging areas, and thus the likelihood of exposure to selenium, are likely to vary from area to area and season to season depending on local conditions. Prey preferences of the bird species will also alter their risk factor for exposure.

The native vegetation communities of the LCR have been altered by both the physical changes to the river and the introduction of non-native plant species. The most significant introduction was saltcedar. This rapidly growing, invasive tree from Asia has largely replaced native cottonwoods, willows, and mesquite in the remaining floodplain areas (Ohmart *et al*. 1988). Other non-native plant species that have adversely affected the native riparian vegetation communities include Bermuda grass (*Cynodon dactylon*), and Russian thistle (*Salsola kali*). In the marshes, giant reed (*Arundo donax*) is spreading north along the LCR and, in some areas, could replace common reed, cattails, and bulrush. Giant reed may not provide the same physical habitat structure as the native wetland emergents. In aquatic habitats, the native pondweeds (*Potamogeton* sp.) share space with introduced Eurasian water milfoil (*Myriophyllum spicatum*) and parrotfeather (*M. brasiliense*). The milfoils form dense mats in shallower water than the pondweeds and are more dominant in quiet waters (Minckley 1979). It is not clear if these non-natives have replaced pondweeds in these areas. The most recent invasive plant documented for the LCR is giant salvinia (*Salvinia molesta*), which can form extensive mats, especially in slow-moving areas such as side channels and backwaters, and eliminate fish habitats due to volume of the material and de-oxygenation of the water column.

Changes to the types of habitats available along the LCR also change the wildlife species composition present in the area. Bird species that rely on dense riparian vegetation decline while those more adapted to open fields and agricultural areas become more common (Rosenberg *et al*. 1991). In addition to the changes in species composition, there may be changes to species interactions, such as the increase in cowbird populations affecting the recruitment of various songbird species, including southwestern willow flycatcher, through nest parasitism. Introduction of other non-native bird species such as the starling (*Sturnus vulgaris*) may have had effects to native cavity-nesting birds such as the elf owl, gilded flicker, and Gila woodpecker

through competition for nest sites. With the loss of the old-growth cottonwood and willow, the availability of cavity sites has declined (Rosenberg *et al*. 1991)

The aquatic fauna of the LCR has probably undergone the most significant change. The introduction of the crayfish (*Procamberus clarki*) altered the invertebrate assembly and likely had effects to amphibians and fish due to predation. The bullfrog (*Rana catesbeiana*), due to its highly predatory nature, has been implicated in the decline of some native amphibian species, including the lowland leopard frog (summarized in Schwalbe and Rosen 1988, Casper and Hendricks *in press*). Native relict and lowland leopard frogs have been largely eliminated from the LCR, and bullfrogs may have been a factor in their decline. There has been little work on the bullfrogs on the LCR. The most recent study indicates they primarily consume invertebrates (including crayfish), but fish are eaten on occasion (Clarkson and deVos 1986). That study did not examine the effects of bullfrogs on native tree frogs or toads.

Over 40 species of non-native fish have been intentionally or accidentally introduced into the LCR since 1881 (Mueller and Marsh 2002). These non-natives now dominate the fish fauna of the LCR and have had a major impact on the status and distribution of the native fish species through competition and predation. Of the nine native freshwater fish species, only the bonytail, razorback, and flannelmouth sucker have discernable populations in the planning area (Mueller and Marsh 2002) and that of the flannelmouth represents a reintroduction in the 1970's. The flannelmouth population appears to be naturally self-sustaining (Mueller 2003) while the bonytail and razorback sucker populations are maintained by augmentation of the remaining wild populations. Recruitment for razorback suckers has been documented in Lake Mead (Golden and Holden 2003, Holden *et al*. 1997, 1999; Welker and Holden 2003), the isolated backwater called Cibola High Levee Pond, and may have occurred in the Parker Strip below Parker Dam. Bonytail recruitment has only been documented in Cibola High Levee Pond. Predation and competition by non-native fish species has been identified as the primary cause of recruitment failures for bonytail and razorback (Marsh *et al*. 2003, Minckley and Deacon 1991, Mueller and Marsh 2002) in the LCR.

Changes in human use of the LCR and its floodplain are the root cause of the water-management and land-use changes that have resulted in the significant physical and biological changes to the area that are present today. In addition to the working-uses of the LCR and its floodplain (agriculture, residential and municipal developments), the river is a significant recreation area, drawing boaters, fishers, hunters, and other tourists to established recreation areas on private, state, and Federal lands. Recreation is not without adverse effects to remaining habitats and species in the action area. Development and subsequent maintenance of recreation areas eliminates habitat and may increase input of contaminants. Increased risk of fire from activities of recreationists either within developed sites or in undeveloped areas is well documented. There is a significant increase in wildfires during summer holiday periods, particularly those where fireworks are part of the experience. Habitats in areas adjacent to recreation sites are likely to be visited by people, and some degree of habitat destruction (cutting trees for firewood, disposal of trash) is likely, as well as the potential for disturbances to nesting birds.

Of particular significance is the presence of non-native fish species (such as largemouth bass, striped bass, sunfish, and catfish) for recreational fishing. There is limited stocking of rainbow trout in Lake Mohave by NDOW and FWS under existing consultations that are part of the baseline. The FWS also provides some rainbow trout and channel catfish for Tribal fishing programs. Some rainbow trout are also stocked in the reach below Davis Dam and in the Parker Strip by AGFD. Outside of Lake Mohave, rainbow trout have a limited life expectancy in the LCR due to seasonal high water temperatures, and populations of this species are not established below Lake Mohave. Fishing regulations are an important tool to manage existing stocks of other game fish and provide for their long-term health. Recreational fishers and boaters may also be a link in the introduction of additional non-native plants, invertebrates, and fish to the LCR ecosystem. Boats may inadvertently transport life stages of non-native species from an infected area to the LCR, as has been identified as a concern for the spread of the zebra mussel (*Dreissena polymorpha*). Fishers are also known to dump unwanted baitfish into rivers and lakes. Some introductions of sport fish may also be the result of unauthorized introductions.

Section 7 consultations on the LCR since April 2002

Appendix E contains a summary of the formal section 7 consultations for Federal actions within the LCR planning area that were initiated or completed after the April 2002 issuance of the three-year extension of the 1997 BO for Reclamation's operations and maintenance (USFWS 2002a). No significant amounts of take for any listed species were included in the formal consultations completed during this period. No significant effects to the conservation values of designated critical habitat were documented in this period. Appendix E also lists specific Reclamation operations and maintenance actions covered under the 1997 BO and 2002 BO that have been initiated since April 2002. General maintenance activities undertaken during that time were not reported.

Reclamation did make a finding of "no affect" to listed species from the implementation of the placement and operation of six additional drainage wells in the Yuma Valley that will pump groundwater from under agricultural fields. The covered actions of Reclamation contain the operations and maintenance needs for several existing well fields and associated infrastructure to address groundwater in the Yuma area. Separate compliance for the six new wells was completed in 2001, and a supplemental analysis was done in 2003 on the amount of groundwater decline that could occur away from the project area as a result of the increased pumping called for in the project. The effects to groundwater in Reaches 6 and 7 are discussed in Reclamation 2003. The groundwater declines range from 0 to one foot under the riparian and marsh habitats in those reaches. Because the full decline in groundwater level from the increased pumping will take up to five years to be expressed, and the pumping began in 2003, full expression has not yet occurred. This groundwater decline is considered to be in the baseline, and is not an effect of the LCR MSCP covered actions. Maintenance of the new wells is included as a covered action.

Future conditions

The environmental baseline in the action area is the result of past actions both within and outside

of the action area that have effects to the physical and biological conditions of the LCR. In this section, we briefly discuss the external actions that will influence the baseline and that may have additional effects to the LCR over the next 50 years.

The amount of water coming to Lake Powell from the Upper Basin for eventual delivery in accordance with the 1922 Colorado River Compact will decline over time as additional depletion projects come on line in the Upper Basin. The UCREFRP section 7 consultations include coverage for additional depletions beyond those completed to date (Kantola 2004) but not yet implemented. The Upper Basin states provide a projected additional depletion amount of 1.052 mafy over the period 2000-2050. While these additional depletions will not have an effect on the requirements in the Colorado River Compact of 1922 for the Upper Basin to provide 75 maf of water for any 10-year period to the Lower Basin, the amount of "excess" water not able to be used or stored in the Upper Basin and therefore allowed to flow into Lake Powell and Lake Mead will decrease. The river modeling in the ISC EIS (USBR 2000b) and continued into the LCR MSCP BA (LCR MSCP 2004i) contained these future depletions in the analysis of water levels for Lake Mead. The result is a decrease in the modeled water levels for the lake over and above those modeled for the extension of the ISG an additional 35 years. Because the models are not predictive, the actual effect of these additional depletions cannot be determined. What can be said is that, under non-flood conditions, water levels in Lake Mead would be some amount lower in the future as a result of reduced deliveries to Lake Powell irrespective of any changes to Lake Mead operations that are covered actions for the LCR MSCP. Reclamation believes that the increased depletions in the Upper Basin have a greater effect on the potential decreased probability of flood releases from Lake Mead that may affect water flows between Morelos Diversion Dam and the SIB.

Increases in salinity and selenium in Colorado River water coming from the Upper Basin are also likely to occur. Reduced flows concentrate salts and selenium and, with existing evaporation being maintained, concentrations will increase over time. Because of the increase in salinity, additional measures to meet Minute 242 of the 1944 Water Treaty salinity requirements in water delivered to Mexico may be necessary. This would be the subject of future Federal actions, so the potential effects related to addressing the impacts is not included in the environmental baseline even though the potential some increase in salinity or selenium in the LCR is included.

Recreational activities on the LCR are likely to continue to increase as the local and regional populations grow. The LMNRA Lake Management Plan by the NPS, a baseline Federal action, envisions increased recreational developments on Lake Mead and Lake Mohave to meet growing demand. New marinas, parks, and other public-use facilities are also under development between Davis Dam and the SIB.

Status of the Listed Species in the Action Area

Information on the status of the listed species in the action area is condensed and summarized in this section. Additional details on the status of these species and their habitats in the action area are available in the final LCR MSCP documents (LCR MSCP 2004g, 2004h, 2004i), past

biological assessments and opinions (USBR 1996, 2000a, 2002; USFWS 1997, 2001, 2002a) and other references cited in the text. These documents are incorporated herein by reference. This section does not reference all published or unpublished literature pertaining to the species, distribution, threats, or recovery actions. References given in the section on rangewide status provide information on those topics.

Yuma clapper rail

Reasonable and prudent measures for the Yuma clapper rail contained in the 1997 BO (USFWS 1997) have been implemented by Reclamation. These measures have resulted in no net loss of rail habitat due to river maintenance activities, and the continuation of programs to maintain the suitability of existing marshes as habitat for the rail. The implementation of these reasonable and prudent measures, combined with active management for rail habitats now being undertaken in combination with research into the use of fire as a management tool, has contributed to an improvement in the status of the clapper rail, since 1997.

The Yuma clapper rail is found in the LCR action area wherever suitable cattail marsh habitat is found. Because of the existing stabilization of the LCR, the creation and destruction of marsh habitats characteristic of the pre-development river no longer occurs. More permanent marshes have formed at suitable areas along the LCR. However, as these marshes age and become overgrown or otherwise lose water area, the amount of habitat available declines. This changing habitat quality, largely to do accumulation of dead cattail stalks that reduces access within the stand and accretes material that raises the area above the water level, has a significant effect on local populations over the short term. Because of this variability, only the most recent annual survey data (2000-2004) are used to describe the current status of the species in the LCR action area. Survey effort over this period was reasonably consistent between areas on the LCR. The annual surveys provide an estimate of the minimum number of birds present, and do not provide an actual population estimate.

Based on data from annual survey efforts over the last 5 years, the LCR action area supports between 35% and 48% of the total birds surveyed in those years (Table 4) (USFWS survey data). Of the birds recorded from the LCR planning area, the total found on NWRs ranged from 51% to 75% over this period. These habitats are secure from development or other disturbances; however they are subject to declines in habitat quality due to accumulation of dead plant material. The other two significant habitat areas for the species are the marshes of the Imperial Division outside of the Imperial NWR, and the marshes in the Laguna Division immediately downstream of Imperial Dam. Mittry Lake Wildlife Area is in the Laguna Division and contains a significant amount of the clapper rail habitat. Lands in the Imperial and Laguna divisions are mostly Federal (Reclamation withdrawn lands and BLM owned lands) but, outside of the Mittry Lake WA and a small amount of BLM land are not managed for wildlife. Recreation and river-management needs are the primary sources of disturbance. Future development or provision for other activities on these lands is subject to section 7 consultation.

Table 4: Number of Yuma clapper rails recorded during surveys, 2000-2004, on the LCR and showing relevant percentages in relation to total birds surveyed and to birds surveyed on LCR. Survey data is from USFWS files.

YEAR	2000	2001	2002	2003	2004
Total birds surveyed rangewide (USA only)	477	531	608	830	907
Total birds on LCR % birds on LCR vs total birds	230 (48%)	221 (42%)	212 (35%)	345 (42%)	347 (38%)
Total birds on National Wildlife Refuges on LCR % birds on Refuges vs total birds % birds on Refuges vs LCR total	117 (24%) (51%)	140 (26%) (63%)	136 (22%) (64%)	202 (24%) (59%)	259 (29%) (75%)
Total birds in Imperial Division outside of Imperial NWR % birds in ID vs LCR total	23 (10%)	17 (8%)	13 (6%)	21 (6%)	22 (6%)
Total birds in Laguna Division % birds in LD vs LCR total	90 (41%)	53 (24%)	60 (27%)	119 (37%)	63 (18%)

The smaller areas of habitat in the LCR action area are on Federal, Tribal, State, and private lands and are generally not actively managed for wildlife purposes. Most of these areas would require some form of Federal involvement, usually a section 404 permit under the Clean Water Act, before any removal of the habitat could occur.

All extant cattail habitats in the LCR action area are subject to declines in habitat quality through overgrowth of the marsh and the subsequent accumulation of dead plant material. Prior to the LCR being controlled, normal flow patterns cyclically created and destroyed marsh habitats and reduced the likelihood a marsh would be static long enough to become choked with dead plant material. These processes no longer function, and many marshes in the LCR action area have declined in quality as dead material accumulated. Wildfires, either lightning- or human-caused, are a significant risk to clapper rail habitats, because they can burn during breeding seasons and are uncontrolled in their extent. A study evaluating the use of prescribed fire to burn marshes and remove accumulated material to restore habitat quality is currently underway on the LCR and Salton Sea areas. The managed fire does not kill the cattail roots, but does eliminate the dead vegetation on the surface. Initial results indicate that, when habitats where clapper rail use has declined due to overgrowth are burned, clapper rails return to the areas within a year once new growth of cattails appears and clapper rail numbers in the restored habitat increase. Active burn programs under this study are in place on Havasu and Imperial NWRs. Unlike wildfires that may occur at any time, these programs plan for burns outside of the clapper rail breeding and molting season to reduce adverse effects.

Other threats to the Yuma clapper rail in the LCR action area include selenium contamination of

the forage base, noise and other disturbance from recreational activity, and elimination of habitat for development. The significance of existing selenium levels to Yuma clapper rail reproduction is not known; however, the levels of selenium in clapper rail habitats are high enough to be of concern (Roberts 1996, Andrews *et al.* 1997, King *et al.* 2000, 2003; Garcia-Hernandez *et al.* 2001). There is no current evidence that reproductive failures have occurred; however, no specific research looking for eggs and young birds to evaluate the potential for effects has occurred.

Implementation of the 1983 recovery plan in the LCR action area includes the multi-agency cooperative survey and efforts to define proper management for clapper rail habitat and eventually provide continuity for such management in written management plans. Development of management plans for the FWS refuges on the LCR is in preliminary stages.

Federal and non-Federal activities have had significant adverse effects to the Yuma clapper rail. Construction of the large dams eliminated many miles of floodplain habitats due to the formation of lakes. Changes in flows, elimination of overbank flooding, and channelization of the river disconnected the river from the floodplain and eliminated the cycle of creation for marshes on the floodplain and along the secondary channels. Prior to this, the amount of marsh present on the LCR at any one time varied greatly, and the cycle of creation, aging, and destruction was based on river flows. The creation of the small diversion dams, especially Laguna and Imperial dams, provided stable water levels behind them where marshes could become permanently established. Other activities by Reclamation created large marshes at Topock Marsh as mitigation for channelization in the Mohave Valley reach. Whether or not there is more marsh available now than in the past is uncertain. The certain thing is that the marshes that are present now are more permanent. However, even these marshes will eventually be destroyed by high flows that deposit sediments but are unable to scour other areas to create new marshes and backwaters. Further, marshes age and become dryer land with the accumulation of sediments and dead plant materials that raise the ground surface above the water. Many marshes in the LCR exhibit this aging process. Because the natural cycle of creation and destruction is not operating, without active human interference through fire, dredging, or other management, these areas will cease to be marshes that can support Yuma clapper rails. The most significant areas of habitat for rails on the LCR are in Federal ownership and are protected from development pressures. Active management is necessary to provide for the long-term continuance of these marshes due to natural aging.

A change to salinity and selenium concentrations in LCR waters also has the potential for adverse effects to rails and their habitats. Small backwaters and marshes with high evaporation rates often have very high salinities that can affect the ability of cattails and bulrush to grow. Cattails generally will not grow at over 5,000-ppm salinity (Sanchez *et* al. 2000). Salinity levels can also affect the forage base in these areas. Selenium is known to interfere with successful reproduction in rail species, and while no such effects have been documented on the LCR, the levels of selenium now present in some areas are high enough to be of concern for reproduction. The change from more transient marshes and backwater to the more permanent ones characteristic of the LCR today may also have affected the local concentrations of selenium and

the degree of exposure possible to the rail population. If there has been an increase in selenium in the LCR, and that trend continues because of the current pattern of river management, adverse effects to reproductive success may begin to appear. Differences in selenium concentrations between connected and isolated backwaters (Velasco and Marr 2003) and the relative value of those different habitats for rails is an issue for investigation, especially for dredging actions in existing habitats.

The changed physical conditions also support invasive plant and animal species that may affect rails. The introduction of crayfish to the LCR provided the rails with a significant new food resource, although it is one that accumulates selenium in its tissues. Crayfish also have significant adverse effects on fish and other invertebrate populations, so any value of the crayfish to the rails may have been offset by the reduction in those natural forage bases. The spread of non-native plants, such as giant reed and, most recently, giant salvinia, affects habitat quality and the ability of the rails to use the habitat available. Rails do not appear to select areas of giant reed, and replacement of native cattail and bulrush by these species would reduce the amount of available habitat. Salvinia is an invasive water plant (a member of the fern family) that prefers quiet waters and may grow into mats a foot or more thick that choke shallow waters and prevent access to the substrate by bottom-feeding birds such as rails. Very contaminated areas may also be anoxic much of the time, and not support invertebrate populations.

Southwestern willow flycatcher

Reasonable and prudent alternatives and reasonable and prudent measures contained in the 1997 BO (USFWS 1997) have been implemented by Reclamation. The net effect of these alternatives and measures is an increase in the knowledge base on habitat and habitat suitability; yearly survey information including nesting data and cowbird parasitism; long-term preservation of 1400 acres of habitat within the range of the flycatcher; and a determination on historical habitat availability and restoration potentials for lands along the LCR. This conservation has improved the status of the flycatcher within the LCR, since 1997.

The southwestern willow flycatcher is a breeding species within the LCR MSCP action area. Other individuals use the LCR corridor, including the reach of the LCR in Mexico, to migrate to other breeding grounds and back to Central America for the winter. Intensive annual surveys of suitable southwestern willow flycatcher habitat in, and adjacent to, the LCR MSCP action area began in 1996 and continue to the present. The most recent published data are from 2003 (Koronkiewicz *et al.* 2004).

Migratory willow flycatchers have been found throughout the LCR MSCP action area where suitable native and non-native riparian vegetation exists. Ongoing surveys at 95 sites in 2003 detected flycatchers at least once in 54 of those sites. Records extend from south of Yuma, Arizona, up to Separation Canyon and into southern Nevada on the Muddy and Virgin rivers. Migrating birds were recorded at various sites until the end of June.

Surveys for willow flycatchers in 2003 recorded over 200 individual birds on the LCR and

adjacent tributaries (Koronkiewicz *et* al. 2004). Because of the presence of other willow flycatcher subspecies migrating through the area, it is not clear how many of these records are for the southwestern subspecies. Individuals detected between June 15 and July 20 likely are southwestern willow flycatchers (USFWS 2002d). There are five geographic areas containing sites at which breeding southwestern willow flycatchers were documented in 2003. Two of these sites, Pahranagat NWR and the Virgin River near Mesquite, both in Nevada, are outside of the LCR MSCP action area. In the Mormon Mesa area, breeding sites were on the lower Virgin River above Lake Mead. The Topock Marsh area is on the Havasu NWR and is entirely within the LCR MSCP action area. The lowermost portion of the Bill Williams River NWR area supports breeding birds and is adjacent to Lake Havasu. In 2003, a total of 57 nesting attempts were documented, of which 50 nests had eggs at one point (Koronkiewicz *et al.* 2004). Of that 50, 27 nests fledged young flycatchers and 23 nests failed. Most nest failures resulted from predation on eggs or young, with only 14% of failures resulting from brown-headed cowbird parasitism. The number of nests within or immediately adjacent to the LCR MSCP action area in 2003 was 17, or 34% of the total. Nine of those nests were successful, and all nine were in Topock Marsh and Bill Williams River NWR sites. Preliminary information from 2004 surveys indicates that flycatchers are using the same areas as in the past and nesting attempts have increased over 2003 (T. Koronkiewicz, SWCA Inc., personal communication 2004).

Flycatcher habitat at some sites in the LCR MSCP action area, such as Topock Marsh and Bill Williams River NWR, is relatively stable and protected from development. However, wildfire is a significant threat to these areas. Vegetation at Topock Marsh is largely highly flammable saltcedar and occurs in a contiguous area, increasing the risk of a wildfire that could destroy the entire area. The vegetation at the Bill Williams River NWR site is composed of more native riparian species, but the area is difficult to access for effective on-the-ground fire suppression. If a fire begins in the cattail marshes at the mouth of the Bill Williams River, it could easily move upriver to the riparian habitats.

Ongoing conservation efforts in the LCR MSCP planning area are largely the result of requirements placed on Reclamation through section 7 consultations on their operations and maintenance (USFWS 1997, 2002a), water transfers and development of Interim Surplus Criteria (USFWS 2001), with additional activities undertaken under section 7(a)(1) and in cooperation with other LCR parties such as the CRIT. These actions within the planning area focus on development of cottonwood-willow habitats, annual surveys for birds, studies on habitat suitability criteria, and cowbird trapping.

Federal and non-Federal activities have had significant adverse effects to the southwestern willow flycatcher. Combined with the changes in flows due to the construction and operation of dams and diversions, river stabilization actions eliminated the connection to the floodplain riparian habitats. Much of the floodplain was lost to agricultural and other types of development and it is no longer available for the riparian forests needed by the flycatcher. Over time, most of the riparian areas left have dried due to the reduced flows and declining water table such that regeneration into native riparian vegetation that depended on an open floodplain with seasonal overbank flooding is more and more difficult to achieve. Riparian vegetation that does establish

when surface water is available to the floodplain often is lost quickly due to groundwater levels that are too deep for young plants to reach. The spread of saltcedar exacerbates the problems of regeneration for the native species by its ability to quickly colonize areas even with limited access to groundwater, and the increasing soil salinity that results from the concentration of salts in the plant and its detritus. Neither cottonwood nor willow is notably tolerant of saline soils and there are areas where, even under proper hydrological conditions, regeneration fails. This loss without replacement of native riparian habitats has significantly affected the amount of suitable habitat available for the flycatcher. Fortunately, in some areas, the groundwater levels under mature saltcedar provide the moisture parameters needed by the flycatcher and they can nest in these particular areas of saltcedar. Unfortunately, saltcedar is highly flammable and fire can wipe out large areas, including areas of suitable habitat. It is not known how long it would take to restore a burned-over area to suitability. Recent observations from Roosevelt Lake indicate that stands of young riparian vegetation will be occupied by flycatchers if the soils underneath are moist (Greg Beatty, USFWS, personal communication 2004).

The physical changes to the LCR also affect the ability of the flycatcher to find foraging sites with abundant supplies of flying insects. Moist soils, marshes, and other shallow open-water areas contribute to the flying insect populations needed by the flycatcher. Deep, fast-moving river channels do not produce significant amounts of aquatic insects. Reductions or elimination of a suitable forage base reduce overall habitat suitability. Selenium concentrations that accumulate in nymph or larval stages of aquatic insects and persist into the adult stage may affect flycatcher reproductive success (Estrada and Maughan 1999, King *et al*. 2002). Changes to the habitat also result in changes to the local fauna, as seen in the increased number of cowbirds and other birds associated with human developments and activities (Rosenberg *et al*. 1991) and their effects on native species such as the flycatcher.

The proposed critical habitat for the southwestern willow flycatcher in the LCR MSCP action area is part of the proposed designation for the Pahranagat, Virgin, Middle, Bill Williams, Hoover to Parker, and Parker to SIB management units of the Lower Colorado Recovery Unit (Arizona, California, and Nevada). The lower end of the Virgin River and Muddy River units extend to near that river's delta with Lake Mead. The Middle Colorado unit extends down the Colorado River into the reach within the full-pool elevation of Lake Mead to end near Pierce Ferry. The Hoover to Parker unit is from about 15 miles below Davis Dam to near the Highway 62 bridge near Parker and includes Lake Havasu, and Parker to SIB is from approximately the confluence of Vinagre Wash in California with the LCR downriver to 3.5 miles north of the Gila River confluence with the LCR. The Bill Williams River unit also extends to that river's confluence with Lake Havasu.

The physical and biological conditions of the LCR as described in the environmental baseline have affected the constituent elements of proposed critical habitat in a number of ways. Changes in flows, creation of dams and diversions, channelization and the resultant disconnection of the river from the floodplain, and development of the floodplain for urban and agricultural purposes have significantly altered the conditions needed for creation and maintenance of native riparian forests that provide flycatcher migration and nesting habitats. Expansion of non-native plant

species, especially saltcedar, that inhibits establishment of native cottonwood and willow trees in areas that otherwise remain suitable for the native tree species is a related adverse effect. Because these conditions already exist on the proposed critical habitat areas, any eventual designation of these areas as critical habitat must take into account the current conditions. That is not to say that the areas on the LCR proposed as critical habitat are not able to contribute to the conservation of the willow flycatcher, but that some of the primary constituent elements are not found throughout the reach and management actions to enhance these elements is needed. This condition was recognized in the proposed rule (USFWS 2004a).

Desert tortoise

The status of the desert tortoise in the LCR MSCP action area is not known, but given the extent of habitat within the action area, this does not represent a significant portion of the population. Desert tortoise may have once used the upper margins of the floodplain habitats as foraging areas, and the loss of those opportunities through drying of the floodplain and conversion to agriculture or other developments may have been significant for the local populations.

The LCR action area, defined by the river channel and historical floodplain, does not contain significant amounts of desert tortoise habitat. There is some habitat in the open flats and washes adjacent to the river and the denser native or non-native riparian habitats. The land cover type information in the HCP indicates 23,447 acres of desert scrub within the planning area, and this could support desert tortoises. Some use of other land cover types, such as undetermined riparian, sub-types of mesquite, and some sub-types of saltcedar may support tortoises. The quality of this habitat to support desert tortoises has not been determined. The information is not separated out by state, so the amount of this habitat located in the portions of the states where the tortoise is listed is not known. The number of tortoises occupying these potential habitats has not been estimated.

Areas of potential habitat for the desert tortoise are on Federal, Tribal, State, and private lands. Protection of these lands from development or other disturbances varies significantly both among and within the land ownership categories. Habitats on lands owned and managed by the Reclamation, BLM, NPS, and FWS are largely protected from development, but other disturbances from roads and recreational use may occur. All programs on these lands require section 7 consultation before proceeding if there is a potential to adversely affect the tortoise. For Tribal lands and all non-Federal lands, section 9 prohibitions are in place for the listed populations of desert tortoises. The desert tortoise in the Nevada portion of the LCR action area is a covered species in the Clark County Multiple Species Habitat Conservation Program (Regional Environmental Consultants 2000). In addition, a set of survey, handling, and relocation protocols has been developed and is a standard provision in biological opinions covering the species.

Critical habitat for the desert tortoise in the LCR MSCP planning area is in the Piute-Eldorado Unit in Clark County, Nevada, and Gold Butte-Pakoon Unit in Mohave County, Arizona and Clark County, Nevada. The portions of the critical habitat units within the LCR MSCP planning

area are within the boundaries of the Lake Mead National Recreation Area. The constituent elements that provide for desert tortoise habitat are found in desert scrub vegetation, which is generally not found within the full-pool elevations of Lake Mead, but would be in the uplands surrounding the lake. Effects to critical habitat from the LCR MSCP are not likely to occur.

Bonytail

The status of the bonytail in the LCR MSCP action area has improved since 2002. Extirpation of this species in the wild is being forestalled by the ongoing stocking programs that augment the failing wild-born populations. The ultimate success of the stocking programs in establishing new populations is critical to the conservation of the species. Considering the number of recaptures, we know that some percentage of the stocked bonytail is surviving. However, with the degree of survivorship of the stocked fish unknown, the success of the programs in providing sufficient numbers of fish to form the basis of a self-sustaining population cannot be measured at this time.

Bonytail are found in Lake Mohave, Lake Havasu, and the riverine reach between the two reservoirs within the LCR action area. The number of wild-born bonytail remaining in the LCR is unknown, but is likely to be extremely small. Most of the current populations are the result of stocking of hatchery-reared fish beginning in the 1980s and continuing through to the present. These stocking programs are the primary ongoing recovery activity for this species on the LCR and have developed from requirements of section 7 consultations on Federal actions and voluntary conservation activities by Federal and state partners.

Prior to 1994, approximately 155,000 small (less than 10 cm) bonytail were stocked into Lake Mohave by the FWS to augment the existing population. Stocking of larger fish (over 250 mm) began in 1994 to achieve the FWS commitment to stock 125,000 sub-adult bonytail into the lake as part of the Willow Beach rainbow trout and channel catfish stocking program (USFWS 1994b). Reclamation is a cooperating partner with the FWS in this program. To date, over 37,000 fish over 250 mm have been stocked (Dr. Chuck Minckley, USFWS, personal communication 2004a; Dr. Chester Figiel, USFWS, personal communication 2004). The program was to have been completed by 1999; however, difficulties in raising bonytail to a suitable size to stock into the wild set the program back. Several bonytail stocked under this program, and others stocked as juveniles in the 1980s, have been recaptured in the lake, documenting the survival of some fish. Annual survey efforts in the late spring in an attempt to locate wild or stocked bonytail in the lake have resulted in the capture of 113 bonytail between 1980 and 2003 (Dr. Chuck Minckley, USFWS, personal communication 2004a). There are not sufficient data to estimate the size of the Lake Mohave population.

The LCR MSCP and Reclamation have provided special funding to capture wild adults to incorporate into the breeding stock, which has enabled the FWS to spend four to five weeks a year on capture operations. This funding continues through 2006. Unfortunately, success of these operations has been limited. In 2002, one fish was captured and was documented as a stocked individual. The most recent capture was in May 2003 of a bonytail that had been last captured in 1997 and implanted with a telemetry tag as part of a research project on habitat use in

the lake (Dr. Chuck Minckley, U.S. Fish and Wildlife Service, personal communication 2003; Gordon Mueller, U.S. Geological Survey, personal communication 2003). The exact origin of the fish is unknown, but it has a genetic haplotype not currently represented in the hatchery stock (Dr. Thomas Dowling, Arizona State University, personal communication 2004).

By November 2004, a total of 30,349 sub-adult bonytail (Minckley 2004, USFWS 2004c, Kirk Koch, BLM, personal communication 2004) were stocked into Lake Havasu by the BLM to meet their commitment to stock 30,000 sub-adults under the Lake Havasu Fisheries Improvement Program (USFWS 1993b). Another 1,000 fish will be stocked in December 2004. This program was to have been completed in 2003; however, problems with raising fish in the hatcheries set the program back (BLM 2003). To date, at least 16 bonytail have been recaptured during organized survey programs (10 fish), other captures (three fish), and by anglers (three fish) (Dr. Chuck Minckley, USFWS, personal communication 2004b). One bonytail was captured at Park Moabi on the LCR south of Needles in 2004 that had been stocked into Lake Havasu (Gordon Mueller, U.S. Geological Survey, personal communication 2004). All of these were stocked fish that had been at large in the lake from approximately two years to 2-6 months. There have been insufficient recaptures to estimate the size of the Lake Havasu population.

Bonytail will also be stocked with razorback suckers into isolated impoundments required under the 1997 biological opinion (USFWS 1997). None of these impoundments have yet been stocked with bonytail; however, the bonytail population at High Levee Pond on the Cibola NWR has successfully recruited several year classes and is the focus of studies on the physical parameters of the pond and the life history of the fish present (Mueller *et al*. 2003). This information will be useful in establishing other populations in isolated backwaters along the LCR.

Telemetry information on bonytail in Lake Mohave indicates that during the day, the adults are in deeper, open water in the reservoir. At night, the fish come into the shallow water areas along the shoreline. Wild-born fish followed in the study were somewhat more likely to use the offshore, deeper water areas than the hatchery bred fish that had been reared to sub-adult status in coves (Marsh and Mueller 1999). Bonytail are not found in the riverine reach below Hoover Dam and above the reservoir pool. Additional studies on habitat use and movement of stocked bonytail in Lake Havasu would be beneficial.

Bonytail in Lake Mohave and Lake Havasu are at a limited risk of entrainment. Bonytail have been found in open reservoir areas in deeper water and are known to use the lower end of Lake Mohave. They may be in proximity to the Davis Dam intakes. Similar habitats in Lake Havasu are near the MWD and CAP intakes as well as the powerplant intakes at the dam. As populations increase, there may be entrainment incidents.

Water-level fluctuations below Davis and Parker dams do not currently pose a risk to the bonytail. However, bonytail from Lake Havasu are moving upriver toward Davis Dam, and restoration of the species below Parker Dam will put individuals at risk.

Federal and non-Federal activities have had significant adverse effects to the bonytail. Construction of dams and diversions fragmented riverine habitats, eliminated considerable reaches of riverine and floodplain habitats while creating large lakes, altered sediment transport and seasonal flow variations including elimination of most flood events and causing significant daily water fluctuations, and changed nutrient and chemical cycles. River-stabilization actions eliminated the connection to the floodplain and reduced the complexity of the channel habitats and the associated backwaters and marshes through channel incisement, prevention of overbank flooding, control of erosion that no longer adds sediment back into this sediment-starved system, and management that precludes formation of new backwaters and channel features. There is very limited information on the effects of selenium to bonytail (Buhl and Hamilton 1996); however, the normal prey base of the bonytail is fish and invertebrates and it does utilize backwaters. In addition to the direct effects of such habitat alterations on the ability of the bonytail to maintain self-sustaining populations, these alterations create a more stable habitat suitable for the successful establishment of non-native species, including fish, frogs, and invertebrates, that are the primary cause of population declines for the bonytail.

Critical habitat includes the Colorado River from Hoover Dam to Davis Dam, including Lake Mohave to its full-pool elevation and from the northern boundary of Havasu NWR to Parker Dam including Lake Havasu to its full-pool elevation in Arizona, California, and Nevada. The constituent elements of critical habitat have been significantly affected by the activities discussed in the environmental baseline. Of particular note are the fragmentation of the river, which precludes fish movements between populations, and the extensive presence of non-native fish species that are largely responsible for the lack of recruitment. The critical habitat designation was made after most of the actions discussed in the environmental baseline had resulted in significant changes to the historical physical and biological conditions that are reflected in the constituent elements. The value of the LCR, even in its existing state, to the survival and recovery of the bonytail was considered in the designation process (USFWS 1993c), and the area is considered essential for the conservation of the species.

The current condition of critical habitat, in terms of the constituent elements, in the LCR MSCP action area is not significantly different from the conditions at the time of designation in 1994 and reviewed in 1997 and 2002 after incorporation of RPAs, RPMs, and conservation measures. As noted in the environmental baseline discussions, there is a continuing degradation of overall river conditions due to the effects of actions in the baseline and the continuing actions. These effects are primarily seen in the riverine reaches, not in the large reservoirs. There have been no changes to conditions in Lake Mohave that affect the constituent elements. The conservation value of this reach remains unchanged. Similarly, there have been no changes to conditions in Lake Havasu that affect the constituent elements. The conservation value of the reservoir portion of this reach remains unchanged. The riverine portion of the reach, from Havasu NWR to the full-pool elevation of Lake Havasu, has seen some changes in the amount of armoring due to sediment movement (this is an effect of past actions that has not yet reached equilibrium). This change has not been significant and has not affected the conservation value of the reach.

Reasonable and prudent measures and reasonable and prudent alternatives in the 1997 BO

(USFWS 1997) have been implemented by Reclamation. The net effect of this implementation was an assessment of risks from entrainment or stranding, support for bonytail chub reintroduction, development of off-channel habitats for bonytail and razorback suckers, a review of ongoing maintenance and restoration projects to maximize benefits to listed fish, and an examination of the interactions between native and non-native fish species. In addition to these programs, Reclamation has been an active cooperator in stocking of bonytail into Lake Mohave and Lake Havasu under FWS and BLM programs. The net effect likely has been beneficial to the bonytail.

Humpback chub

The status of the humpback chub in the LCR MSCP action area is not clear. Riverine habitat once available to the species was lost with the construction of Hoover Dam. Operations of Glen Canyon Dam upstream have affected the flows and water quality that reach the lower end of the Grand Canyon in the action area and contribute additional adverse effects. The transience of the potential habitat in the action area, and the uncertainty about physical conditions of substrate, flows, temperature, and other important components make it difficult to assess the value that exists right now. There is no information on selenium levels in the lower Grand Canyon sediments. In addition, Lake Mead acts as a source population for non-native fish that can move up into the canyon and adversely affect recruitment of humpback chubs. The few humpback chubs that may be present are not known to be spawning, and the movement of these individuals through the area to the upstream habitats is not known. The population upriver is declining, and considerable management efforts are under discussion to address those issues (Van Haverbeke and Simmonds 2004). The role of the river in the lower portion of the Grand Canyon in the future stability of the upstream population is unknown.

The core of the humpback chub population, including the designated critical habitat, is located upstream of the planning area in the Colorado and Little Colorado rivers. Humpback chub were recorded in the lower Grand Canyon within the LCR action area in the 1950's (summarized in Valdez *et al.* 1992). The location documented is Spencer Canyon (Grand Canyon River Mile (RM) 246, approximately 6 miles downriver of Separation Canyon [river miles used here are those from Stevens 1983]). Most recent surveys have not gone below Diamond Creek (Grand Canyon RM 226), which is 14 miles upriver of Separation Canyon. There is a record for Grand Canyon RM 241, approximately at Separation Canyon in 1991, and one for Spencer Canyon in 1993 (Valdez *et al.* 1993). There is no breeding population within the action area, but based on the past captures, it is likely that there are a few individual sub-adult or adult humpback chub in the Colorado River within the action area. The size and distribution of this population is not known.

The amount of habitat for the humpback chub in the LCR action area is controlled by the elevation of Lake Mead. At full pool elevation, there is no riverine habitat for the humpback chub in the LCR action area. At progressively lower Lake Mead elevations, the riverine habitat increases starting from the upstream end as the lake recedes. The physical conditions in this riverine habitat will vary tremendously depending on lake elevation, amount of inflow from the

Colorado River and upstream tributaries, past deposits of sediments that influence how flows move through the area, the substrate conditions, and other habitat components. The elevation of Lake Mead at the time of initiation of formal consultation was approximately 1130 feet above mean sea level (msl). At this elevation, we estimate that a minimum of 62 miles of riverine habitat exists (Separation Canyon to Paiute Point), based on topographic data. The quality of this habitat in 2004 is not known; however because of the declining water levels in Lake Mead, there is riverine habitat available for the species in the action area.

Within the LCR action area, the AMWG does not implement conservation actions related to the implementation of the 1995 biological opinion on the operation of Glen Canyon Dam (USFWS 1995). Some survey trips in the early 1990s did include the LCR action area, but these were limited efforts.

There is no designated critical habitat for the humpback chub in the LCR MSCP action area. The designated critical habitat ends at Granite Park (River Mile 209) and this is approximately 30 miles upstream of the LCR MSCP planning area boundary at Separation Canyon (RM 240). . The constituent elements of critical habitat have been significantly affected by activities relating to the operation of Glen Canyon Dam, which is managed in conjunction with Lake Mead by the Reclamation. Those management actions are the subject of existing section 7 consultations with Reclamation and are not part of the environmental baseline for the LCR MSCP action area.

Razorback sucker

Reasonable and prudent measures and reasonable and prudent alternatives in the 1997 BO (USFWS 1997) have been implemented by Reclamation. The net effect of this implementation was an assessment of risks from entrainment or stranding, augmentation of existing razorback sucker populations, development of off-channel habitats for bonytail and razorback suckers, a review of ongoing maintenance and restoration projects to maximize benefits to listed fish, and an examination of the interactions between native and non-native fish species. In addition to these programs, Reclamation has been an active cooperator in stocking of razorback suckers into Lake Mohave and Lake Havasu under FWS and BLM programs. The net effect likely has been beneficial to the razorback sucker.

Razorback suckers are found throughout the LCR MSCP action area in both reservoir and riverine areas. Wild-born fish are confirmed present in Lake Mead and Lake Mohave, and small numbers of wild-born individuals may persist in Lake Havasu and the river below Parker Dam. The majority of the extant population below Lake Mead is the result of stocking of sub-adult individuals into the reservoirs and rivers under a variety of conservation efforts. These stocked fish all derive from wild-born adults in Lake Mohave.

Lake Mead

Approximately 100-200 razorback suckers in two population centers (Las Vegas Wash and Echo Canyon) live in Lake Mead (Welker and Holden 2003). These fish are the descendants of the

original population formed after Lake Mead was created, and are largely the result of successful recruitment of wild-born individuals to the population from 1974 to 1998, with the most recent recruitment likely derived from the fish born in the 1970s. Very limited stocking of hatchery-reared fish has occurred in Lake Mead, and the wild-born and hatchery-reared adults are found together on the spawning areas. The Lake Mead population is the only razorback sucker populations with confirmed recruitment (possible recruitment has occurred in the Green River and in the LCR below Parker Dam) and for that reason, this population is critically important to the long-term survival and recovery of the species. Both of the known spawning areas are in the lower portion of the reservoir in Las Vegas Bay and Echo Canyon. Razorback larvae have been found in the upper reservoir nearer to Pierce Ferry, but no spawning aggregations have been located. Work in 2004 continues to examine these locations, and there is a proposal to initiate surveys near the Virgin and Muddy river inflows to Lake Mead.

Information gathered by the Reclamation- and SNWA-funded studies (Golden and Holden 2002, 2003; Welker and Holden 2003) indicates that successful recruitment of razorbacks may be related to the amount of underwater cover from submerged terrestrial vegetation and high turbidity. The known spawning locations are near areas with significantly higher turbidities than other similar sites on the lake, and the presence of thick stands of newly drowned vegetation that provides dense cover may be equally effective. The capture of individuals from the 1997-1998 cohorts during survey work in 2002-2003 provided documentation of recruitment in those years where there was an increase in water-level elevations on the lake. Additional work on this subject is continuing.

Because of the prolonged drought in the western United States, the water level elevation of Lake Mead has been declining over the last four years. In 2004, levels continued to decline. Preliminary data from the 2004 field season indicate that razorback suckers in the Echo Canyon population continue to move down out of the canyon as water levels recede (Welker and Holden 2004). Suitable spawning habitat appears to be present at these lower lake levels, but the amount of vegetative cover at these depths is likely not sufficient to provide for recruitment. The presumed spawning site at Blackbird Point in Las Vegas Bay has been inundated by silts deposited by the wash and likely does not provide spawning habitat at this time (Welker and Holden 2004). The lower lake level has contributed to the elimination of the site; however, raising the lake level will likely not restore the site due to the thick blanket of silt now covering the site. Surveys over the summer and fall of 2004 and into 2005 are attempting to assess if this spawning population has relocated.

The 2001 biological opinion for Interim Surplus Criteria (USFWS 2001a) contained a provision whereby Reclamation would supplement the natural recruitment in Lake Mead by stocking sub-adults grown from wild-born, Lake Mead larval razorbacks if the lake level went below 1160 feet msl. This condition existed for the 2004-spawning season (lake levels were 1140 feet msl and dropping in January-March). Reclamation and the FWS will be assessing the implementation of this supplemental stocking. Outside of those potential efforts, significant stocking of larval to sub-adult fish to this population is not envisioned for the near future. Large-scale stockings of larval or young-of-the-year fish may be attempted in those years when the

right conditions for recruitment exist.

Telemetry work done on razorback suckers in Lake Mead indicates that adults generally return to the same spawning areas each year. They concentrate in the shallow waters near their spawning areas during the spawning period and move out into deeper water away from shore and further away from the spawning sites at other times (Holden *et al.* 1997, 1999).

Razorback suckers in Lake Mead are at a limited risk of entrainment. Known populations are not in the vicinity of the Saddle Island intake, or the intakes at Hoover Dam. Water-level fluctuations in the lake do not pose a risk of stranding or desiccation.

Lake Mohave

The Lake Mohave stocking effort is led by the Native Fish Work Group, a multi-agency cooperative effort that seeks to replace the aging razorback population in the lake with one comprised of young adult fish that are the offspring of the original population. The goal of the project is a population of 50,000 fish that maintains the genetic variance found in the parental razorback population formed when Lake Mohave was created. This project uses wild-born larvae individually collected from several sites over the spawning season and raised to sub-adult size, first in hatchery tanks then in more natural grow-out ponds prior to stocking in the reservoir. Fish stocked through the program were up to 250 mm in length up until 2002, when fish at or over 300 mm were stocked. This change arose due to information on the higher survivorship of larger sized fish. As of the end of 2004,101,218 sub-adult fish have been stocked since the project began in 1991 (Ty Wolters, USBR, personal communication 2005). These figures include razorbacks stocked from lakeside ponds, Willow Beach NFH, and Dexter NFH&TC. Work on this program has continued in 2005, with an additional 4,037 sub-adult razorbacks stocked from Willow Beach in January 2005 (Dr. Chester Figiel, USFWS, personal communication 2005). Once mature, these young adults are re-captured on the spawning grounds with the remaining old adults and currently make up the majority of the estimated population of 1,492-3,969 fish in the reservoir (Marsh *et al.* 2003, Dr. Paul Marsh, Arizona State University, personal communication 2004). Complete loss of the founder population due to old age is expected within the next few years, with only about 475 of the founder population remaining (Dr. Paul Marsh, Arizona State University, personal communication 2004). Testing on the genetic variation in the stocked fish versus the founder population is ongoing to ensure that the program is retaining genetic variability (Dowling *et al.* 1996, Dowling *et al.* 2004). This program will continue to stock sub-adult fish to meet the 50,000-population goal.

Razorback suckers spawn successfully in Lake Mohave; however, there has been no documented recruitment for at least 25-30 years (McCarthy and Minckley 1987, Minckley *et al*. 1991). The importance of turbidity to young razorback suckers in predator avoidance that was shown in the laboratory (Johnson and Hines 1999) and inferred from work in Lake Mead (Golden and Holden 2003) is directly applicable to Lake Mohave. Spawning sites on Lake Mohave are on gravel and cobble shorelines in clear water. Adult fish are easily observed from the shore. Larval fish that hatch from the eggs have limited areas with sufficient cover to protect them from non-native fish

predators. The lack of cover through turbidity, limited growth of aquatic plants, and lack of recently submerged terrestrial vegetation (as is periodically available in Lake Mead) may be an important factor in razorback sucker reproductive failure in Lake Mohave.

Telemetry work done on razorback suckers in Lake Mohave indicates that adults return to the same historical spawning sites each year, but an individual fish may use more than one spawning site. Outside of the spawning period, adults used a variety of habitats within the lake, including coves and other shallow shoreline habitats (Mueller *et al.* 2000). Some razorback suckers are captured in the canyon reach of the LCR above the reservoir pool.

Razorback suckers in Lake Mohave are at a limited risk of entrainment. Individuals may use areas near Davis Dam and be in proximity to the intakes, and have been documented as surviving a passage through the dam. Water-level fluctuations in the lake do not pose a risk of stranding or desiccation under the current operating rules.

Below Davis Dam, razorback suckers are at risk of stranding and desiccation due to the water-level fluctuations. Known occupied habitats at Laughlin Lagoon and Park Moabi are subject to fluctuating water levels. Survey work in these areas has not documented any spawning or nursery habitat affected; however, as populations increase, additional areas may be used that are within the fluctuation zone.

Lake Havasu

The Lake Havasu stocking effort led by BLM under the Lake Havasu Fisheries Improvement Project (LHFIP) (USFWS 1993b) was completed in 2001 with 30,000 fish stocked. These fish were derived from wild-born adults from Lake Mohave that were spawned in the hatchery and raised in hatcheries or more natural grow-out facilities to stocking size. Individuals from those stockings have been located in the upper portion of Lake Havasu near Chalk Cliffs, Castle Rock, Topock Gorge, just above the gorge at Park Moabi, and in the river below Davis Dam in the vicinity of Laughlin, Nevada (Minckley 2003, Mueller 2003). Spawning aggregations have been seen in these areas, and larvae have been collected (Mueller 2000, 2001). Daily water level fluctuations may have some effects to spawning and nursery habitats in this reach. Some razorbacks in the river below Davis Dam were originally stocked in Lake Mohave and are assumed to have successfully passed through the power plant in Davis Dam (Mueller 2000). The size of the population established by the stocking is not known.

Lake Havasu is a clear lake with very limited change in elevation over the course of a year. This operation precludes the development of terrestrial vegetation in the drawdown areas of the reservoir pool that could contribute to razorback sucker recruitment success by providing cover for larval and juvenile razorbacks. Submerged aquatic vegetation develops over the summer in shallow water, but may be too late developing to achieve benefits for native fish recruitment. The placement of artificial fish habitat structures as part of the LHFIP may provide cover for native fish as well as for the non-native sport fish. The extent of this use is unknown.

Razorback suckers in Lake Havasu are at risk of entrainment, especially from the CAP intake because it is in shallower water. Individuals may use areas near Parker Dam and be in proximity to the intakes there. Water-level fluctuations in the lake do not pose a risk of stranding or desiccation.

Between Parker Dam and Imperial Dam

Between 1986 and 1998, various Federal and State agencies stocked 2.45 million razorback suckers into this reach of the LCR. The vast majority of these fish were fry stocked in the 1980s, with the remaining few thousand being sub adults released for caddis fly control, or as part of research efforts. A number of adult fish now found in this reach likely derive from these stockings, and there may be limited recruitment occurring. This has not been clearly documented, but fish seemingly younger than could be explained from these other stockings have been found.

Beginning in 1999, the Reclamation implemented a 70,000 sub-adult fish-stocking program using fish derived from hatchery spawning of wild-born Lake Mohave adults and raised in hatcheries or other grow-out facilities. This program was required under the 1997 (USFWS 1997) and 2001 (USFWS 2001a) biological opinions. To date, 50,381 fish have been stocked (Frank Agyagos, AGFD, personal communication 2005). Post-stocking monitoring of these fish was begun in 2003. Fish have been found as far as 70 miles downriver of the stocking site (Schooley 2004).

The small razorback sucker population in Senator Wash Reservoir is also being studied to assess the habitat conditions in the lake, the size and structure of the razorback population, and the potential to expand the use of this reservoir for recovery purposes. This population is estimated at 352 adult fish (Leslie 2004).

Reclamation funded AGFD for a telemetry study of razorback suckers in the Imperial Division to assess habitat preferences of adult and sub-adult fish. These studies confirm the preference for backwaters and side channels over main-channel habitats (Bradford and Gurtin 2000) by razorback suckers. Razorbacks also use areas newly created or restored by dredging programs (Slaughter *et al*. 2002) and are not greatly disturbed by dredging events that create these habitats.

Water-level fluctuations from Parker Dam releases can affect spawning and nursery habitats in this reach. Effects are more likely above the Cibola Gage, due to the attenuation of the fluctuations. Turbidity increases downstream from Parker Dam. This increase results from organic materials moving out of the backwaters and marshes, and sediment input from washes and un-stabilized shorelines. Backwaters tend to have lower sediment-related turbidity due to lower flows that cause the material to fall to the bottom but have higher concentrations of plankton and organic materials that affect water clarity. As stated previously, backwaters and marshes are sites for the accumulation of selenium, and extensive use of these habitats by razorback suckers may increase the amount of selenium in their tissues. The size of the razorback population in this reach of the river is small, and no recruitment has been documented

outside of Cibola High Levee Pond. No effects of selenium toxicity on young fish have been observed in that site. Increased levels of selenium may represent a risk to successful recruitment.

Establishment of recruiting razorback populations in isolated impoundments has, outside of High Levee Pond, not yet been successful. The large 225-acre facility at Beal Lake on the Havasu NWR was dredged to create deep and shallow water habitats, poisoned to remove non-native fish, and stocked with juvenile razorbacks in 2002. Later surveys did not find any razorbacks, but did find non-native fish species, indicating that the renovations had not been successful. The cause of mortality for the razorbacks is not known. Plans to assess water quality and habitat conditions, re-poison the lake, and re-stock with razorbacks are under development. The 40-acre project at the Duck Ponds on Imperial NWR was also unsuccessful. The first poisoning project failed to completely remove non-native fish. Once razorbacks were stocked, they disappeared, likely due to dissolved oxygen problems. Subsequently, the ponds were re-poisoned and stocked with 10,000 juvenile razorbacks. Monitoring of the razorbacks in the ponds is continuing, with approximately 6,000 surviving one month post-stocking and showing considerable growth. Additional ponds for this program are under evaluation by Reclamation. The presence and variation of selenium levels in backwater habitats may be an important factor in determining the design of isolated impoundments and their eventual success or failure.

Critical Habitat

Critical habitat within the planning area includes Lake Mead to its full-pool elevation, Hoover Dam to Davis Dam including Lake Mohave to its full-pool elevation, and the LCR and its 100-year floodplain between Parker Dam and Imperial Dam in Arizona, California, and Nevada. The constituent elements of critical habitat have been significantly affected by the activities discussed in the environmental baseline. Of particular note are the fragmentation of the river that precludes fish movements between populations, and the extensive presence of non-native fish species that are largely responsible for the lack of recruitment. The critical habitat designation was made after most of the actions discussed in the environmental baseline had resulted in significant changes to the historical physical and biological conditions that are reflected in the constituent elements. The value of the LCR, even in its existing state, to the survival and recovery of the razorback sucker was considered in the designation process (USFWS 1993c) and the area is considered essential for the conservation of the species.

The current condition of critical habitat, in terms of the constituent elements, in the LCR MSCP action area is not significantly different from the conditions at the time of designation in 1994 and reviewed in 1997, 2001, and 2002 after incorporation of RPAs, RPMs, and conservation measures. As noted in the environmental baseline discussions, there is a continuing degradation of overall river conditions due to the effects of actions in the baseline and the continuing actions. These effects are primarily seen in the riverine reaches, not in the large reservoirs.

Effects to water-level fluctuations in Lake Mead that could adversely affect physical habitat needed for spawning and nursery areas were identified in the ISC consultation (USBR 2000a, 2000b, USFWS 2001a). The conservation measures included in the proposed action did not alter

the water-level fluctuations; however, the effects to the razorback sucker from those fluctuations were sufficiently addressed. There have been no changes to conditions in Lake Mohave that affect the constituent elements. The conservation value of this reach remains unchanged.

The river reach that periodically forms in the lower Grand Canyon as a result of water-level fluctuations of Lake Mead would be affected by the ISG due to increased probabilities of lower Lake Mead elevations. The effect to constituent elements is not significant, since razorbacks can use both reservoir and riverine environments, and the conservation measures address effects to the razorbacks of alterations to water levels. The riverine reach between Parker Dam and Imperial Dam was affected by the change in point of diversion of up to 400,000 afy of water (USFWS 2001a). The constituent elements of water and physical habitat were affected through the decrease in flows through this reach that resulted in lower water levels in the river. The conservation measures in the proposed action (USBR 2000a) were determined to be sufficient to offset any adverse effects to the conservation value of the reach.

Summary

Federal and non-Federal activities have had significant adverse effects on the razorback sucker. Construction of dams and diversions fragmented riverine habitats, eliminated considerable reaches of riverine and floodplain habitats while creating large lakes, altered sediment transport and seasonal flow variations including elimination of most flood events and causing significant daily water fluctuations, and changed nutrient and chemical cycles. River stabilization actions eliminated the connection to the floodplain and reduced the complexity of the channel habitats and the associated backwaters and marshes through channel incisement, prevention of overbank flooding, control of erosion that would otherwise add sediment back into this sediment-starved system, and management that precludes formation of new backwaters and channel features. This transformation may result in increased levels of selenium contamination, with the potential for adverse effects to razorback suckers as discussed in recent Upper Basin Reports (Buhl and Hamilton 1996, Hamilton *et al*. 2001). In addition to the direct effects of such habitat alterations on the ability of the razorback sucker to maintain self-sustaining populations, these alterations create a more stable habitat suitable for the successful establishment of non-native species, including fish, frogs, and invertebrates, that are the primary cause of population declines for the razorback sucker. A new threat to the backwaters and slower moving channel habitats preferred by the razorback sucker is the spread of giant salvinia in the LCR. This invasive plant is known to choke backwaters and prevent their use by fish. A multi-agency effort to control or eliminate giant salvinia from the LCR has provided funding and other resources for physical removal and herbicide treatments to kill or remove local infestations. Unlike in other parts of the United States (particularly in the South), the spread of giant salvinia in the LCR has been limited, and the degree of infestation is significantly less where it is found. The limiting factors causing this restraint are unknown, but may be related to water quality. Efforts are continuing to identify problem areas, define control solutions, provide public information, and keep the plant from spreading north of Palo Verde Dam

The status of the razorback sucker in the LCR MSCP action area has improved since 2002. The

ongoing stocking programs and other management actions has increased the numbers and the understanding of the species in the LCR. The LCR contains the largest remaining population of razorback sucker in its range in Lake Mohave, and this population retains a considerable amount of what was likely the historical genetic variance of the species. The Lake Mead population is critical to the understanding of physical factors that enable successful recruitment even in the presence of large numbers of non-native fish species.

Status of the Other Covered Species in the Action Area

Information on the status of the unlisted covered species within the action area has been condensed and summarized in Appendix D of the BCO. Additional details on the locations and population sizes for these species are available in the LCR MSCP documents (Appendix I of LCR MSCP 2004h) and other references cited in the text. In most cases, the degree of status information and magnitude of threats for the unlisted species is not as well defined as it is for the listed species.

IV. EFFECTS OF THE ACTION

This BCO analyzes the effects of two categories of proposed actions. The first is the issuance by FWS of an incidental take permit that addresses the impact of the take resulting from a suite of non-Federal actions as described in the HCP (LCR MSCP 2004g). The second is the suite of Federal actions by Reclamation, Western, BIA, BLM, FWS, and NPS as described in the BA (LCR MSCP 2004i), and includes the effects of implementing the Conservation Plan as described in both the HCP and BA.

As described in the HCP and BA, there is no clear separation between some Federal and non-Federal actions, especially those related to river operations, that allows for assignment of effects to one or another specific action. In addition, Reclamation has included the effects of both their discretionary and non-discretionary actions in the effects analysis. This inclusion provides for a complete assessment of the effects to covered species and their habitats of all actions on the LCR. As previously discussed in this BCO, the combined effects analysis necessitates the development of one BCO for the Federal actions that are the subject of this consultation. The FWS also recognizes that there is no statutory requirement under the Act for Federal agencies to consult on their non-discretionary actions, and that Reclamation has included those actions in the effects analysis in order to provide the most complete picture of effects possible. The effects of non-Federal actions on the covered species and the ability of the HCP Conservation Plan to address the incidental take resulting from those effects are central to the analysis for the issuance of the section 10(a)(1)(B) permit.

The FWS analyzed and evaluated the material in the BA and HCP relevant to the effects of the covered actions on the covered species independently of our involvement in preparing these documents. That we have incorporated by reference significant portions of the BA and HCP into this BCO is to provide a direct reference to materials used in our evaluation of the effects of the

actions contained in this consultation.

This section examines the effects of both categories of proposed actions and the environmental baseline for the action area to describe the conditions expected to exist in the future as a result of the proposed actions. The discussion of the effects of these actions as related to incidental take contained in this BCO on pages 31-43 is a companion to this discussion and should be considered a part of the complete analysis under this section. This discussion contains material from the BA (LCR MSCP 2004i) and/or HCP (LCR MSCP 2004g) on covered actions or effects, but does not cite all relevant items in those documents. Those documents are incorporated herein by reference.

The effects analysis first considers the types of effects to species and their habitats that result from various components of the environmental baseline and the proposed actions. This is done because the effects of most actions are the same for many of the covered species, and to repeat the general effects discussion for each species is redundant. Specific sections on the effects to critical habitat are provided for each species with designated or proposed critical habitat.

Direct and Indirect Effects of Completed Actions Related to the Proposed Actions

This category of actions reflects the permanent changes to the action area resulting from construction of the large dams (Hoover, Davis, and Parker), diversion dams (Headgate Rock, Palo Verde, Imperial and Laguna), and channelization and construction of related river-management structures. The effects of construction of these facilities are fully included in the environmental baseline, as described in the “Existing Conditions” section of this BCO. The effects of these structures on the LCR physical and biological resources are also described in that section, providing a measure of the degree of change between the historical and current condition. These effects are not new, and they are continuing because the consequences do not happen all at once, but over long periods of time and thus have not yet been fully realized. The magnitude of the additional effects within the 50-year time frame of the LCR MSCP cannot be predicted with certainty. The existing degraded physical and biological conditions form the environmental baseline for this consultation. The conservation contained in the Conservation Plan over and above what is needed to fully mitigate the effects of the incidental take from the covered actions improves the status of the species over that of the environmental baseline. The net effect of implementing the Conservation Plan thus reduces the degradation resulting from the completed actions.

The continued presence of these facilities through the next 50 years will continue to affect the physical characteristics of the river. Significant changes back toward a more natural river system are precluded. The result is maintenance of the existing parameters governing habitat and biological conditions in the action area. In addition, it is anticipated that some habitat or biological conditions will continue to degrade. For example, the disconnection of the floodplain from the river and the incisement of the river channel preclude conditions that favor native riparian habitat restoration after events such as fire. The conditions on the ground now favor non-native saltcedar, and this species is documented as more likely to replace native trees.

Losses of extant marshes and backwaters due to natural aging will continue and, unless specifically managed, these areas would be lost without replacement. Additionally, because the LCR has not come to equilibrium in respect to sediment transport interruptions caused by the presence of the large dams, there will be additional impacts to the river channel, shoreline stability, and groundwater under the floodplain. By the end of the 50-year life of the LCR MSCP, additional loss of native habitats from the continued operation of these facilities will have occurred. The magnitude of these future losses is not likely to have a major effect on future conditions on the LCR, and, with the implementation of the Conservation Plan, there will be a net improvement in conditions over the current state.

Direct and Indirect Effects of Proposed Actions that are Continuing Actions

The list of covered actions for the Federal agencies and the non-Federal parties includes those actions that occurred in the past and are anticipated to continue to occur over the next 50 years. These are listed in Chapter 2 of the BA (LCR MSCP 2004i) and Chapter 2 of the HCP (LCR MSCP 2004g). These activities are referred to as the "ongoing actions." The flow-related actions are the ordering, releasing, and diversion of Federal and state water allocations under the existing rights and contracts, and hydropower orders and delivery of power under the existing contracts. These releases include the 7.426 mafy of the 9.0 mafy of water allocated to Arizona, California, Nevada, and Mexico that would continue to be ordered, released, and diverted as it is under current management. It does not include the 1.574 mafy of water affected by the changes in point of diversion and the other flow-related covered actions; the effects of that covered action is accounted for in the effects of future actions. The plan for flood control releases from Hoover Dam are also presumed to continue unchanged for the term of the LCR MSCP. The non-flow-related actions include operations and maintenance of dams, powerplants, and transmission facilities; maintenance of CRFWLS components (existing bank stabilization, levees, training structures, jetties, and other related structures); and maintenance of operational, diversion, and irrigation structures within the action area. This analysis looks at operations and maintenance of facilities and programs, not their initial construction or implementation.

As with the effects in the previous section, the effects of these actions are not new but are a continuation of the same activities performed in the past. These actions and their effects on the LCR are described in the environmental baseline section of this BCO. The same types of effects of these ongoing actions are anticipated to occur over the 50-year time frame of the LCR MSCP. For example, existing ordering and diversion of water has effects to flow patterns, sediment transport (through velocity changes as flows change), and seasonal water-level fluctuations. These flow patterns have created the existing conditions on the LCR as described in the environmental baseline. Those orders that will continue into the future unchanged will continue to have those effects to the LCR.

The risk of entrainment, stranding, and desiccation from the ongoing diversions and powerplant pass-through remains the same for the ongoing actions.

Maintenance of existing CRFWLS stabilized banklines, levees, and related structures will

periodically remove small amounts of covered species habitat that may have established itself on the sites. The amount of such habitat is estimated in Table 3 of this BCO. Removal of habitat would result in the potential loss of or disturbance to covered species present in the habitat at the time the work is undertaken.

Maintenance on existing canals, drains and other irrigation structures would also periodically remove small amounts of habitat that may have established itself on the sites. The extent of this action is also included in Table 3 of this BCO. Removal of habitat would result in the potential loss of or disturbance to covered species present in the habitat at the time the work is undertaken.

Maintenance dredging of settling basins and mitigation backwaters would eliminate shallow-water areas that have developed either through sediment management or growth of vegetation. Dredging is a short-term physical disturbance in these areas, with an increase in human presence, noise, and potential for contaminant spills. Creation of dredge launch and retrieval areas may also affect shoreline habitats where such facilities do not exist. Aquatic habitats, mostly in the form of shallow water areas and vegetation cover, and marsh habitat from emergent vegetation such as cattails, are lost. Placement of dredge spoil on upland or low-value saltcedar dominated habitats may not cause adverse effects to listed species; however, if pipelines or other conveyance methods are needed that require clearing of a path for the pipeline are part of the project, there could be habitat lost. Disposal of dredge material from areas with a high selenium level in bottom sediments may result in an increase in the amount of free selenium in the water. Exposed to air, sediments may release selenium into the drain water off the disposal site back into the river. If dredged material is side-cast into the river (to be removed at settling basins downstream), the selenium may come into solution in the water and be absorbed elsewhere downstream. The amount of dredging likely to occur over the next 50-years is not likely to have a significant effect on the selenium levels in the LCR. However, this portion of the selenium cycle should be better understood to ensure that it does not contribute to reproductive failures in fish or birds.

Because the LCR system may not be in equilibrium, additional losses of native habitats from the implementation of these ongoing actions into the future are anticipated. Additional adverse effects arise from the disturbance of covered species during maintenance activities. The magnitude of these future losses, in comparison to the existing baseline conditions, is not likely to have a major effect on future conditions on the LCR, and, with the implementation of the Conservation Plan, there will be a net improvement in conditions over the current state.

The effects of ongoing AGFD and NDOW activities that involve management of recreation via patrols and maintenance of navigation markers has little potential for effects to listed species except from noise disturbances or wake generated during patrol actions. Boat wakes can cause disturbances to marsh bird nests and may dislodge young fish from cover in shallow nursery areas. These are not likely to have significant effects to listed species because of the limited area and time of the effect.

Maintenance of boating access and other recreational facilities have limited new effects but

maintain existing opportunities for impacts to occur to listed species and their habitats as described in the environmental baseline. Fishery and wildlife management actions such as general fish and wildlife surveys (those not targeting endangered or threatened species) may encounter individuals of listed species; however this is a small probability and does not have a significant effect. Individuals of listed species captured during such surveys would be released.

AGFD proposes limited stocking of rainbow trout below Davis Dam and on the Parker Strip. This is estimated to occur as often as 3 times in a ten-year period. Rainbow trout in these reaches do not survive the normal summer water temperatures, and no populations are established. Rainbow trout are known predators on razorback suckers (see USFWS 1994b) and may still be present in these areas during the spawning period for the razorback. The number of existing egg and larval predators in these areas is augmented by the stocked rainbow trout; however, the magnitude of the additional impact is not likely to be large.

Adverse effects to listed species from the continued implementation of the ongoing actions will continue to occur and result in some incidental take from habitat loss, harassment, and harm. The amount of that take has not been determined; however, it is not expected that there would be a significant additional effect from this take. The conservation provided in the Conservation Plan is more than sufficient to address all forms of incidental take identified in the proposed action and provide additional conservation benefits for most species as described in the HCP.

Direct and Indirect Effects of Future Actions in the Action Area

The effects of the Federal agency actions are described in Chapter 5 of the BA (LCR MSCP 2004i), and the effects of the future non-Federal actions are described in Chapter 4 of the HCP (LCR MSCP 2004g), and are summarized in the Amounts and Type of Incidental Take section of this BCO. The information on effects, and how the effects were determined, contained in the BA and HCP is herein incorporated by reference. This section first looks at the general overview of the effects of the future Federal actions, and then specifically looks at the effects to the listed species and designated and proposed critical habitat for those species. The companion analysis for the non-listed species is in Appendix C of this BCO.

Effects of future Federal and non-Federal actions are related to both flow and non-flow related actions described in the BA. The acreage affected by these actions is summarized in Table 2 of this BCO. Reclamation has specific actions that contribute to the flow-related effects because these are connected to changes in points of diversion that may result from Reclamation implementation of their water management responsibilities. Western also has a flow-related component because the generation of hydropower by Reclamation, which is managed consistent with water release requirements, is reflected in daily river fluctuations. The non-Federal actions are primarily flow-related; however, there are some non-flow related projects included. Non-flow related actions also apply to Reclamation, BIA, and NPS. Non-flow related actions are primarily footprint type activities, where actions on the ground may affect habitat or individuals of the covered species. The text for each agency or applicant's effects is summarized from the BA and HCP, and is not intended to be a complete recitation. The full texts of the BA and HCP

are incorporated into this BCO by reference.

Reclamation's Actions

Reclamation flow-related actions include the changes to water releases from changes in point of diversion for up to 1.574 mafy of LCR water, administrative actions that affect storage and delivery of water, the extension of surplus guidelines, definition of shortage criteria, and changes to water deliveries to Mexico at the SIB and relative to projects in the Yuma area.

Changes to water releases that result from changes in points of diversion, shortage criteria, ISG extension, and administrative actions by Reclamation, and resultant changes to daily operations have effects to flow levels in the river that are reflected in the amount of habitat lost contained in Table 2 of this BCO. Reductions in river flows result in reduced river levels and declines in groundwater that eliminate aquatic, marsh, and riparian habitats. Loss of individuals of the southwestern willow flycatcher and other covered riparian bird species is not likely the result of the decreased flows, but the availability and suitability of habitat would decline as habitats are lost due to reductions in groundwater levels due to reduced flows. Changes in water quality of aquatic habitats, especially backwaters that are shallower as a result of lower flows, may adversely affect the suitability of these areas for native fish. Reduction in water depth in marsh habitats may also accelerate the aging of these systems toward dry land, further reducing the amount of suitable marsh for the Yuma clapper rail and the other covered marsh birds. The type of effects, and the resultant changes to the LCR ecosystem, is the same as described in the environmental baseline for actions that have already occurred. The new changes increase the amount of those effects as recorded as loss of habitat in Table 2.

Extension of the ISG may have effects to water levels in Lake Mead, as described in Appendices J and M (LCR MSCP 2004h) and summarized in the BA (LCR MSCP 2004i), including the updated modeling in the evaluation (USBR 2004 in Appendix J). In reviewing the results of Lake Mead elevation modeling, it is important to note that these are not predictive models. The models rely on a starting elevation for Lake Mead (the January 1 elevation for the first year the model will be run), and the inflows used for the runs are those recorded from the recent historical record (post-1906). The actual lake levels experienced during any future year will depend on the inflows for each future year, as they happen. The usefulness of the models is to evaluate the differences in water levels for specific changes to management when other factors are held constant. The one factor that makes different sets of model runs not entirely comparable for analysis is the start elevation of Lake Mead. In the model runs used in the ISC evaluation (USBR 2000a, 2000b, USFWS 2001a), the elevation of Lake Mead used as the initial point was higher than the point used for model runs for the LCR MSCP, thus the information in the 2000 BA and EIS (USBR 2000a, 2000b) cannot be directly compared to the modeling done for the LCR MSCP and contained in Appendices J and M. Similarly, the "new modeling" in Reclamation 2004 (developed in response to public comment on the LCR MSCP documents) cannot be directly compared to the "previous modeling" in Appendices J and M. The model must use the actual elevation; so even with the same projects running for the same period, if a different start year is selected, the model runs using different starting elevations will not be

comparable. The appropriate comparison is made between the with-project and baseline model runs that use the same starting elevation for Lake Mead, because those data will show the difference based on the same initial conditions to the different assumptions contained in the with-project and baseline actions. The model runs can point out the differences in long-term reservoir levels between treatments, and the effects of lower or higher start points on the magnitude of those differences.

The ISG extension and determination of shortage protection levels would affect the probabilities of Lake Mead water levels as described in the BA and Reclamation 2004 and relevant appendices that discuss the modeling done for lake levels. We have considered the "previous modeling" and "new modeling" as described in the references cited above in our analysis, since the "new modeling" represents the most current information, and the "previous modeling" contains other important information. Graphics of the result of both modeling exercises are presented in Appendix F of this BCO.

The "previous modeling" shows the 90th and 10th percentiles that are likely not different for the "new modeling" (these elevations are not presented in Reclamation 2004). The 90th percentile increases under both the baseline and proposed management (referred to as the action alternative in Appendix J, M, and USBR 2004) from the starting elevation and becomes fixed at full pool elevation within a few years. This is a result of the model due to the physical constraints and flood control operations that are assumed in the model. The 90th percentile is not, therefore, useful for this analysis. The 10th percentile shows a significant decline in both the baseline and proposed management due to the effect of low inflow years. The significant change in the 10th percentile is due to the change in the 2nd level shortage elevation between the baseline and proposed management. In the baseline, elevation 1000 msl was designated for protection, and therefore the model will reduce projected outflows if needed to maintain that elevation. In the proposed management, that level of protection was reduced to 950 msl, so the model allowed the Lake level to decline beyond 1000 msl. The probability of reaching 950 msl may occur earlier and more often in the "new modeling" than in the "previous modeling," the difference for this evaluation is not significant.

The 75th percentile does not show any significant difference between the baseline condition proposed management until 30-years out and that difference is small. As with the 90th percentile, the repeating high flow years help to buffer this portion of the graph; however, it is worth noting that the lower starting elevation for the "new modeling" slows the rate at which the model reaches the stable levels by 10 years as shown in the "previous modeling." This indicates the effect of the lower starting elevation is felt for several years, as water levels are slow to climb.

The 50th percentile shows a decrease from the proposed management over the baseline condition over 40 years for both the "previous modeling" and the "new modeling." The "new modeling" lines are significantly lower than the "previous modeling, " but both stabilize at approximately the 1100 msl level after 2040. The important component here in the "new modeling" is that the 50th percentile line for the proposed management remains lower than that for the baseline

condition throughout this period. The lower starting elevation eliminates any advantage provided by the transfers in reducing the demand for surplus since the line at all times is below the 1125 msl trigger to allow a partial surplus. The "previous modeling" had a longer period of probable surplus due to the effects of a higher starting elevation that was also protected by the transfers lessening the need for surplus water. The difference in the baseline condition and proposed management lines between the "previous modeling" and "new modeling" results from the starting elevations, and not any difference between the model assumptions. The general pattern of the baseline condition and proposed management are the same between the two modeling results. This similarity allows recognition, that under the modeling assumptions, continuing the ISG in concert with the new shortage protection levels does result in a decrease in water levels in Lake Mead over the baseline condition.

The information from the 25th percentile shows a significant difference between the "previous modeling" and the "new modeling" for both the baseline condition and proposed management. Like the 50th percentiles, the "new modeling" line is again lower in elevation overall than the "previous modeling, " the continued effect of the lower starting elevation. In the "previous modeling" the baseline condition and proposed management track very closely. This is not true of the "new modeling" where the proposed management line does not track the baseline condition for most of the period. This difference may be the result of the 950 msl shortage protection level as opposed to the 1000 msl used in the baseline condition. However, that does not explain the difference between the "previous modeling" when the same two shortage protection levels were used. What this shows is that there is a greater likelihood of reaching very low water levels since there is less elevational "cushion" to offset the effect of low inflow years, due to the lower starting elevations.

What this analysis shows is that extension of the ISG and assumption of new shortage criteria for Lake Mead results in a decrease in probabilities for water levels around and below the 50th percentile rank. A discussed earlier, these models are not predictive, because the actual Lake Mead elevations will rely on actual future inflows in addition to the proposed management. Of the two determining factors, actual elevations will decide which of the proposed management actions can be accommodated in any particular year. Lake Mead will continue to experience water level fluctuations over the 50-year period. In general, for high inflow years (those where the inflow is significantly greater than the required outflow to meet downstream uses and system losses), implementation of the proposed management would not significantly change water elevations over the baseline condition. Moderate inflow years (those where inflows equal required outflow plus system losses) may experience some increase in the degree of fluctuation due to demand for surplus water and experience a decrease in water levels. Low inflow years (those with less inflow than needed to meet outflow and system loss) would have the most noticeable change due to the need to use previously stored water to meet downstream demands which would cause the water levels to decline. With the continuation of the ISG, surplus water would continue to be available above elevation 1125, which would, if that water is taken, draw down the lake over that for the baseline condition. The proposed management reduction in the shortage criteria (both at first level and second level) provides less protection for the higher elevations and allows for more water to be removed and elevations to decline further before

restrictions are put in place. The magnitude of the changes cannot be determined because they are based on future inflow. In a prolonged dry period, Lake Mead would be at lower elevations for longer periods of time under the proposed management than under the baseline condition.

With the modeling information as background, extension of the ISG does result in a reduction in Lake Mead water levels compared to the baseline condition where the ISG do not extend past 2016. This result indicates that more and lower water elevations, with an increase in probability of risk to existing razorback sucker spawning habitat in Lake Mead as well as lakeshore, marsh, and riparian habitats for the sticky buckwheat, threecorner milkvetch, Yuma clapper rail, and southwestern willow flycatcher, could occur if the ISG are extended. The actual degree of that risk to habitat is not possible to estimate, since the actual risk is based on the inflows to Lake Mead that would occur over the 50-year term of the LCR MSCP, and the availability of suitable soils and physical conditions at various lake elevations to support the habitat to support these species. As currently known, most of the habitat opportunities are around the upper elevations of the lake and the extent downward the lake elevation can go before the conditions needed to support these habitats no longer exist is not known. The model results do not show any significant change to the elevation of the 75th percentile (the elevations therein are where most of these known habitats are found) between the baseline condition and the proposed management, so it can be assumed that the development and destruction of habitats in these areas will continue to occur.

With the decreases in probability of specific lake elevations at the 50th and 25th percentiles over the baseline condition, there is an increased likelihood that lower lake elevations would be present, possibly for longer periods. Because the baseline condition provides for a higher second-level protection elevation than does the proposed action (1000 msl versus 950 msl), there is a significant decrease in the lowest lake levels that could be reached as shown in the models. This implies that habitat areas formed in the middle area will be more likely to be affected by water level fluctuations since both the degree and probability increase. The amount of potential spawning and nursery habitat for the razorback sucker in this elevational range is unknown. The amount of potential riverine habitat for the humpback chub increases since the lower lake elevations provide for a longer riverine reach for a longer period. For the lakeshore plants, Yuma clapper rail, and southwestern willow flycatcher, the amount of habitat that could be supported by this elevational range is unknown; however, whatever habitat does form would be subject to increased risk of drowning out or desiccation due to degree and probability of fluctuations. It is also important to note, for the razorback sucker in Lake Mead, evidence suggests that low water levels that persist for several years and then a rapid rise to cover the exposed areas where terrestrial plant material has developed may be an important component in the successful recruitment seen in the lake (Golden and Holden 2002, 2003; Welker and Holden 2003). Increases in fluctuation levels in Lake Mead may also provide some benefit to the razorback sucker, if these changes come in an appropriate cycle. That potential benefit does not accrue to the lakeshore plants or the two bird species, since their habitats must develop over time. The end result for all the species affected by Lake Mead elevations is that their habitats or potential habitats within the lake pool are likely gained and lost over time at a higher probability and over a greater area.

Future non-flow covered actions by Reclamation involve new CRFWLS facilities and other river management structures and devices as described briefly in this BCO and more fully in the BA. These activities include vegetation clearing that may eliminate habitats of covered species (Table 2 shows these losses as part of the non-flow related column), dredging and other restoration work at Laguna Reservoir to restore storage capacity, placement of up to 13.9 miles of new bank stabilization, construction of up to 42 new jetties, and a new stockpile and access road. Work at Laguna Reservoir would dredge out portions of the settling basin that have filled in and now support vegetation to restore the ability of the basin to accept sediment flows from Imperial Dam sluicing operations. The operation would have noise impacts to the surrounding area, and dredge material would be placed in existing disposal areas. Effects of dredging are described in the environmental baseline and in the effects of ongoing actions above.

New bank stabilization and jetty construction continues the process of isolating the river from the floodplain, encourages incisement through narrowing the channel and increasing flow velocities, eliminates shallow shoreline habitats in favor of steep rocky banks, and if not properly placed and designed, can cause changes to upstream or downstream erosion or depositional patterns that may lead to additional stabilization being required. Traditional stabilized banks have little habitat value due to the steepness of the bank, length-wise barrier effect, and lack of associated vegetation. Alternative designs or strategies may reduce the adverse effect, or provide for the creation of wildlife habitats at or adjacent to the project site. The extent to which such alternatives would be put in place is unknown.

Avoidance and minimization measures contained in the Conservation Plan would reduce the effects of these future actions through timing of actions outside the breeding season, avoiding covered species habitats, and evaluation of alternatives to commonly used stabilization techniques.

BIA Actions

All BIA future actions are non-flow related. Construction of new agricultural areas on the Fort Mojave, CRIT, Fort Yuma, and Cocopah reservations would permanently remove existing habitats and replace them with farm fields. Development of these agricultural areas also requires the construction of irrigation infrastructure (pump stations, canals, and drains) that removes additional acres of habitat. The amount of habitat lost is shown in Tables 2 and 3 in this BCO. Implementation of avoidance and minimization measures contained in the Conservation Plan would reduce the effects to listed species through restrictions on clearing within the breeding season. New irrigation systems would be maintained to preclude the development of marsh or riparian habitats within them, thus preventing adverse effects from maintenance activities. Because some of this vegetation removal is done using herbicides, there is a risk of exposure to listed species in the vicinity. Use of registered herbicides according to label directions and by professional applicators reduces this risk.

Within the existing tribal irrigation systems, a portion of the canals is unlined. BIA will line

these canals with concrete to reduce seepage and control growth of plants in the canals. Reductions in seepage can have adverse effects to plant growth outside of the farm fields when such areas are downslope of the canals. The extent of this potential effect to species habitats is unknown; however, most canals are concentrated in farm field areas containing little non-farm vegetation.

Other BIA actions, including support for water conservation programs, riparian habitat rehabilitation and related programs, and recreational development have limited effects to habitat or individuals of listed species. Because the specific projects are not clearly defined, additional review at the time of development would identify any other adverse effects. The covered actions include approximately 550 acres of future fuels treatments to reduce the risk of wildfire. For the most part, these types of areas do not provide suitable habitat for the listed species, or if there is habitat, it is generally low-value. Avoidance and minimization measures contained in the Conservation Plan, particularly those that restrict clearing or other vegetation removal to outside of the breeding season for birds, would reduce the potential for adverse effects from this activity.

FWS and BLM Actions

As described in the covered actions section of this BCO, the effects of ordering, diversion, and return flow of FWS and BLM entitlements are subsumed within the ongoing flow-related effects discussed herein. No future changes to the use of these waters that would alter these operations are anticipated.

NPS Actions

The NPS has only non-flow related future actions. The NPS proposes to remove low-value non-native riparian habitat (mostly dry saltcedar) and in its place plant native riparian trees to restore 600 acres of riparian habitat around Lake Mead and Lake Mohave. These actions are to benefit wildlife and enhance aesthetics. This action would temporarily eliminate use of these low-value habitats by covered species, and potentially disturb covered species utilizing habitats in adjacent areas subject to noise, dust, or other construction–related effects. Work would be conducted from October to March, and is unlikely to exceed 30 acres (20 on Lake Mead and 10 on Lake Mohave) in any one year. Implementation of the appropriate species' avoidance and minimization measures contained in the Conservation Plan would be part of any removal of non-native vegetation during implementation of the restoration. Adverse effects of the vegetation removal would be temporary, with the restoration of some of the native riparian habitats providing benefits for the species in the long-term.

Creation of 20 surface acres of isolated backwaters for native fish rearing would involve construction work on the backwater and isolating berms or dikes. Previous cooperation by NPS on the native fish rearing programs was covered by a biological opinion (USFWS 1994c). Terrestrial covered species, particularly birds, could be disturbed by the noise and activity on the sites. Native fish species in lakes Mead and Mohave could be affected if they use existing backwaters that would be subject to modifications to convert them to this use. Excavation and

placement of materials could cause mortality of individuals if they are present. Implementation of the appropriate species' avoidance and minimization measures contained in the Conservation Plan would be part of implementation. Later management actions, such as renovation using fish toxicants, would be done in cooperation with the FWS. Some native fish remaining in the ponds could be killed or injured by renovations; however, there is a standard protocol the FWS uses to reduce this risk through pre-treatment removal of native fish and monitoring during the action to remove any native fish observed during the treatment. Specifics of these projects would be addressed at the time the project is proposed.

Creation of new fishing access and the accompanying placement of fish-habitat structures could impact bonytail and razorback suckers through a concentration of non-native fish species at the structures; although they could also provide cover for the native fish species. There is a slightly increased risk of an angler taking a listed fish; however this is a minor risk. The existing NPS consultation on lake management activities in the LMNRA contains a conservation measure that provides for posting of information on the presence of native fish at boat launch areas, but this may not apply to the fishing docks. Anglers have captured at least three bonytail in Lake Havasu (Dr. Chuck Minckley, USFWS, personal communications 2004a, 2004b), so there is a potential for the take of these fish in Lake Mohave that has not been fully evaluated in the past. The potential for this take is recognized in this BCO, and it is not likely to be significant.

The maintenance of existing boat ramps within the existing footprint would not likely remove additional habitat for listed species. Rehabilitation or expansion of the existing ramps may remove some terrestrial habitat, but it is not likely to be of value to listed species. Any work below the water surface would eliminate natural substrates, and placement of concrete slabs or other work activities could injure or displace native fish from the area. Specific mitigation may be needed in conjunction with issuance of a section 404 permit under the Clean Water Act for these projects.

Actions Associated with Hydropower Generation (Reclamation and Western)

Future hydropower generation is flow-related in that power-scheduling needs may affect the timing of flows released from the major dams, which creates the daily water-level fluctuations. For the purposes of this analysis, the BA assumes that the operational aspects of the existing hydropower generation protocols would continue to be used for the next 50-years. This means that the current river release patterns, including daily fluctuations resulting from hydropower generation, will continue to occur over the term of the consultation.

The river stage models used to evaluate the loss of habitats due to declines in groundwater were also used to assess the differences in river stage during hydropower generation. Because there will be less water released from Hoover, Davis, and Parker dams with the full implementation of the 1.574 mafy change in point of diversion, the amount of water available to generate hydropower from each dam will also decrease. The amount of this decrease, both in terms of flow and river stage elevation is not significantly large, and is shown in Appendix J. The pattern of releases will not change because the operational protocols do not change. There will be a

slightly longer period of low water releases over a day, and the high water releases will not be as high or may last a shorter time. The following discussion addresses the effects to species from this fluctuation.

As discussed in the environmental baseline, these fluctuations result in changes to water depth that expose shallow water areas, reduce backwater and marsh depths, and may result in stranding of fish or desiccation of fish eggs or larvae. The pattern of these fluctuations is described in Appendix J (LCR MSCP 2004h) and in the 1996 BA (USBR 1996). Normal water releases over a day also vary by season due to the different levels of downstream water use. The winter-spring fluctuation patterns overlap with the presence of eggs and larvae. The reach below Hoover Dam will not experience changes in river stage comparable to that below the other two dams, and the risk of stranding or desiccation remains the same for this reach. Few razorback suckers are found in this cold-water reach, and no bonytail have been found, so this risk is very small. The fluctuations are most noticeable, and have the highest risk of stranding or desiccation, in the reaches of the LCR immediately below Davis and Parker Dams. The fluctuations attenuate downstream and eventually are obscured. The likelihood of stranding juvenile to adult-sized fish is very small due to the physical character of the rivers in the areas of most significant fluctuation. Water-level reductions in the deep channel are generally not a risk, and most existing backwaters have sufficient deeper areas for fish to easily move into and not be trapped. The primary risk is to spawning and nursery areas.

The reach between Davis Dam and Lake Havasu has no small dams or cross-river diversion structures to cause ponding of water that would accelerate the attenuation of fluctuations. Some level of fluctuation is seen through Topock Gorge to where the effects of the lake dampen out the fluctuations. Important habitat for the razorback sucker is within the area of fluctuation, and includes Laughlin Lagoon and the backwater at Park Moabi. It is anticipated that bonytail will move into these same areas as more of that species are stocked in Lake Havasu. Parts of Laughlin Lagoon become significantly shallower, particularly during the winter and spring periods, but the amount of substrate area exposed is unknown. Fluctuations at Park Moabi are significantly attenuated and likely very little substrate is exposed. Spawning on shallow gravel bars at or near the backwater entrances may have a risk if the bars are less than five feet deep. Because these areas are more likely to be out of the water during the early morning when flows are lowest, they would be unavailable for at least part of the day and that reduces the potential for a razorback or bonytail to select that area for spawning. Nursery areas in the backwaters may be at greater risk due to the shallow waters present; however, young razorbacks (and likely young bonytail) are active at night and would be out and moving during the lowest flow periods and less likely to be trapped during the period of declining water levels.

The reach below Parker Dam has two diversion dams that pond water behind them and contributes to attenuating the fluctuations; however, fluctuations up to approximately two feet are observed at the Taylor Ferry gage. This gage is below both Headgate Rock and Palo Verde Diversion dams. We do not have information on the location of spawning or nursery areas for razorback suckers in this reach; however, the same types of risk factors, such as depth of gravel bars, would be present in this reach as in the Davis Dam to Lake Havasu reach. When bonytail

are stocked below Parker Dam, if they used the same habitats as the razorback sucker, then they would be at the same degree of risk.

The likelihood of existing and future water-level fluctuations stranding individual bonytails or razorbacks is small. The incised nature of much of the river channel does not allow for the shallow side channels that pose the highest risk. Gravel and sand banks and bars in the channel are surrounded by deep water and fish in the vicinity can easily access these safe areas. Use of shallow gravel banks for spawning does have a risk of desiccation of eggs, and there is some degree of risk to backwater nursery habitats. However, there are considerable areas of gravel banks and backwaters that remain submerged even under the lowest water levels, and provide suitable spawning and nursery habitats. There is a risk of individual fish using shallow areas that could become exposed due to water level fluctuations that translates into the potential for incidental take. Based on the analysis above, this amount of take is likely to be small and is fully offset by the amount of conservation provided in the Conservation Plan.

State-Covered Actions

The future flow-related and non-flow related covered actions for Arizona, California, and Nevada are essentially identical and their effects can be discussed together.

The flow-related covered activities for the states focus on the change in point of diversion for up to 1.574 mafy of LCR water. As described previously, Arizona is requesting coverage for up to 200,000 afy; California for up to 800,000 afy: and Nevada for up to 233,000 afy. The effects of those changes in points of diversion are reflected in the covered species habitat losses contained in Table 2. In addition to those direct effects, the reduction in river flows has additive effects to the current status of the environmental baseline. For example, the reduced river flows affect the ability of the river to re-connect with the floodplain; lower water levels in backwaters and marshes may encourage faster degradation of those areas due to aging and excessive plant growth; changes in flow velocity affect sediment transport and channel incisement rates; and there is reduced dilution for NPDES-approved inflows, or other contaminant inflows.

The states do not have any defined future non-flow related covered actions. No new diversion, conveyance, power generation, or appurtenant facilities such as roads are included in their covered actions. Operations and maintenance of existing facilities is an ongoing covered action and is discussed earlier in this BCO, and largely consist of minor vegetation clearing and some disturbance to individuals of the species in adjacent areas due to noise and dust.

AGFD and NDOW include vegetation-management programs, primarily riparian and marsh restoration, as their new non-flow related covered actions. Their other future activities are actually ongoing activities that will continue into the future and are addressed earlier in this BCO. AGFD may place up to 100 acres of fish habitat structures over the term of the permit and develop an additional 100 acres of riparian or marsh habitat. NDOW includes 200 acres of fish habitat structures and 100 acres of riparian habitat improvement. These actions would have effects similar to those discussed under the future actions for NPS.

Direct and Indirect Effects of Implementing the Conservation Plan

Reclamation will be the implementing entity for the Conservation Plan once they accept this section 7 consultation and the FWS issues a section 10(a)(1)(B) permit to the non-Federal permit applicants. The conservation measures relating to avoidance and minimization, monitoring and research, protection for created habitats, and those species-specific measures not related to habitat construction will not have an adverse effect on the listed species or the other covered species because they are designed as measures to avoid adverse effects from implementation of the covered activities or the Conservation Plan. However, even with implementation of avoidance and minimization measures, there may be a small residual adverse effect. An example of a residual adverse effect is seen in the avoidance and minimization measures to not allow for construction or maintenance of conservation habitats during the breeding season of covered species. This measure is not absolute; these activities may take place in these occupied habitats if avoidance is not practicable. It is expected that exceptions to this measure would be very limited, so the amount of the effect is likely to be small.

Implementation of the Conservation Plan will involve the creation of 5,940 acres of cottonwood-willow habitat, 1,320 acres of honey mesquite habitat, 512 acres of marsh habitat, and 360 acres of backwaters and their maintenance as suitable habitat for the 50-year term of the consultation and permit. Effects of constructing these habitats on lands already cleared for agriculture or other purposes would be limited to disturbance to adjacent areas that contain suitable habitat for the listed species. As described previously, there would be a loss of some amount of low-value, generally unsuitable habitat for listed species when the habitat is created on undeveloped lands with existing vegetation communities. If clearing does not avoid the breeding season for bird species, there would be a limited amount of residual adverse impact.

Maintenance of these habitats involves actions to ensure they meet the habitat needs for the species. Tree trimming, specific clearing and replanting, use of prescribed fire on overgrown marsh habitats, and dredging of backwaters may be required multiple times over the next 50 years. These actions will have effects as described in the section on types of incidental take.

Direct and Indirect Effects of Issuing a Section 10(a)(1)(B) Permit

The FWS must consider the effects to the survival and recovery of listed species of issuing a section 10(a)(1)(B) permit. This analysis focuses on the amount of incidental take that would result from the covered actions, and the amount and types of mitigation, minimization, and avoidance measures contained in the Conservation Plan. As discussed earlier in this BCO, the Conservation Plan contains conservation benefits that exceed the requirement to fully mitigate for the adverse effects of incidental take. The strength of the Conservation Plan is an important factor in determining the status of the species when all effects and actions are factored into the analysis. The effects of the covered actions are discussed in the previous sections of the effects analysis, and only the effects themselves are specified here. The full discussion of the effects and conservation for these species is in Chapter 5 of the HCP (LCR MSCP 2004g) and is

incorporated herein by reference.

Yuma clapper rail

Implementation of the future covered actions may result in the loss of 243 acres of Yuma clapper rail habitat (see Table 2 in this BCO). Continued implementation of ongoing covered actions may continue to have adverse effects to existing habitats as described in the environmental baseline and effects of the action sections of this BCO.

The Conservation Plan provides for the creation of 512 acres of suitable marsh habitat for the Yuma clapper rail. This habitat will be maintained as needed to ensure suitability, and replaced if destroyed by fire, drought, or flood. Creation of this habitat, if done in existing but degraded marshes, will, in the short term, eliminate that degraded habitat and displace any resident individuals. Because of the degraded conditions, it is not likely that such areas would support resident individuals; however, the possibility that there may be some use has been considered in the analysis. The restored habitat will offset this temporary loss. Similarly, maintenance activities in the created habitats may temporarily displace resident individuals. During creation of other habitat types and maintenance actions for the Conservation Plan, there may be some disturbance to Yuma clapper rails from operation of equipment and removal of limited areas of low-value, degraded habitats. Habitat-maintenance projects funded through the LCR MSCP maintenance fund will restore existing habitats to suitable conditions for the species. The potential effects of these activities on the degraded habitats will be evaluated in a site-specific evaluation at the time the action is proposed for implementation. Avoidance and minimization measures contained in the Conservation Plan will be recommended for inclusion in these projects. This assists in offsetting the losses of habitat from the continuing actions.

General conservation measures AMM 1, AMM 2, AMM 3, AMM 5, AMM 6, MRM 1, MRM 2, MRM 5, CMM 1 and CMM 2 apply to the species. (See page 26 of this BCO for a brief description of these conservation measures, and Chapter 5 of the HCP for a complete description.) Implementation of the AMMs will reduce the amount of potential take from harm or harassment and the potential for loss of habitat from the covered actions and implementation of the Conservation Plan. Implementation of the MRMs will provide information on species distribution and habitat needs to focus restoration activities and the potential effects of selenium in the system. Implementation of CMMs will protect and restore habitats affected by wildfire. Specific conservation measures address the creation of new habitat and the maintenance of existing habitat.

Southwestern willow flycatcher

Implementation of the future covered actions may result in the loss of 1,853 acres of southwestern willow flycatcher habitat (see Table 2 in this BCO). Continued implementation of ongoing covered actions may continue to have adverse effects to existing habitats as described in the environmental baseline and effects of the action sections of this BCO.

The Conservation Plan provides for the creation of 4,050 acres of suitable riparian habitat for the flycatcher. This habitat will be maintained as needed to ensure suitability and replaced if destroyed by fire, drought or flood. Creation of this habitat, if done in low-value land cover types (primarily used during migration), will, in the short term, eliminate that habitat and displace any migrants to adjacent areas. Because of the degraded conditions, it is not likely that such areas would support resident individuals; however, the possibility that there may be some use has been considered in the analysis. The restored habitat will offset this temporary loss. Similarly, maintenance activities in the created habitats may temporarily displace migrants or breeding individuals if done during the period birds are present, although implementation of the AMMs would significantly eliminate this risk because work would not be done while the birds were present. During creation of other habitat types and maintenance actions for the Conservation Plan, there may be some disturbance to flycatchers from operation of equipment and removal of limited areas of low-value habitats. Habitat-maintenance projects funded through the LCR MSCP maintenance fund will restore existing habitats to suitable conditions for the species. The potential effects of these activities on the degraded habitats will be evaluated in a site-specific evaluation at the time the action is proposed for implementation. Avoidance and minimization measures contained in the Conservation Plan will be recommended for inclusion in these projects. This assists in offsetting the losses of habitat from the continuing actions.

General conservation measures AMM 1, AMM 2, AMM 3, AMM 5, AMM 6, MRM 1, MRM 2, MRM 4, CMM 1 and CMM 2 apply to the species. (See page 26 of this BCO for a brief description of these conservation measures, and Chapter 5 of the HCP for a complete description.) Implementation of the AMMs will reduce the amount of potential take from harm or harassment and the potential for loss of habitat from the covered actions and implementation of the Conservation Plan. Implementation of the MRMs will provide information on species distribution and habitat needs to focus restoration activities and provide insight into brown-headed cowbird interactions with the flycatcher. Implementation of CMMs will protect and restore habitats affected by wildfire. Specific conservation measures address the creation of new habitat and the maintenance of existing habitat.

<u>Desert tortoise</u>

Implementation of the future covered actions may result in the loss of 192 acres of desert tortoise habitat (see Table 2 in this BCO). In addition, there is a risk of mortality of individual tortoises from operation of machinery and other equipment in the construction of new agricultural areas and restored habitat under the Conservation Plan.

The Conservation Plan provides for the acquisition and protection of 230 acres of existing but unprotected tortoise habitat. This amount of habitat fully mitigates for the loss of habitat due to the covered activities, but does not provide any additional conservation benefit for the species. Because the effects of the covered actions on the tortoise are extremely limited, the LCR MSCP did not elect to provide additional conservation benefits, and none are required. The specific conservation measure for the species requires that all ground-disturbing activities that occur in potential desert tortoise habitat would follow the established guidelines to protect tortoises from

harm during those activities. General conservation measure AMM5 applies to the tortoise, and will reduce the potential for effects to the species during maintenance of hydroelectric facilities in tortoise habitats. (See page 26 of this BCO for a brief description of these conservation measures, and Chapter 5 of the HCP for a complete description.)

Bonytail

Implementation of the future covered actions may result in the loss of 399 acres of bonytail habitat (see Table 2 in this BCO). Some loss of degraded backwater habitats that no longer can provide suitable habitat for the species may occur if such areas are rehabilitated as part of the habitat creation portion of the Conservation Plan. Such actions may have a small risk of incidental take if a bonytail is using that habitat at the time the project is implemented; however, this risk is very limited since fish would not be expected to use these areas. The risk of stranding, desiccation, and entrainment will continue and potentially increase. Continued implementation of ongoing covered actions may continue to have adverse effects to existing habitats as described in the environmental baseline and effects of the action sections of this BCO.

The Conservation Plan provides for the creation of 360 acres of backwater habitats suitable for the bonytail. This does represent a net loss of 39 acres of backwaters since 399 acres would be lost due to the covered activities. This net loss is acceptable because Reclamation is currently developing at least 300 acres of isolated backwaters for bonytail and razorback sucker that will be maintained over the term of the LCR MSCP, and, based on current biological information on the species, habitat is not a limiting factor on the LCR as it is for a number of the marsh and riparian species. The LCR MSCP program to fund an extensive augmentation program into the LCR is the primary conservation action for this species, and these efforts are significantly greater than the amount of mitigation required. Funding to produce sub-adult fish for augmentation of existing populations and reintroduction into currently unoccupied areas of the LCR and enable specific species monitoring and research is likely to be of significantly greater benefit to the bonytail than the provision of an additional 39 acres of backwaters.

General conservation measures AMM 1, AMM 4, AMM 5, AMM 6, and MRM 5 apply to the bonytail. (See page 26 of this BCO for a brief description of these conservation measures, and Chapter 5 of the HCP for a complete description.) Specific conservation measures address creation of new habitat, augmentation of populations, conducting monitoring and research, developing additional rearing capacity, and coordination of conservation efforts with other conservation programs.

Humpback chub

Implementation of the covered actions may result in the periodic loss and replacement of up to 62 miles of transitory Colorado River habitat above Lake Mead. This area is not currently known to support the humpback chub, and would be available to varying degree dependent on Lake Mead elevation. The likely future of lower Lake Mead elevations actually provides for more of this 62-mile reach to be present in the future than may have been present in the past.

There is no risk of stranding, desiccation, or entrainment to the species because it is not located in areas of daily fluctuating flows in the LCR MSCP planning area, nor is any habitat affected by implementation of the Conservation Plan. No monitoring or research is proposed for the species; however, such actions may be undertaken by the AMWG or their designated contractor using the $10,000 per year the LCR MSCP will provide to that group to fund identified but unfunded conservation measures identified for the species. This funding is the specific conservation measure for this species, and fully mitigates for the potential effects to species habitat that result from the covered actions. It may also be considered a slight benefit, since the funding would be used to improve the status of the Grand Canyon population through programs lacking a current funding source.

Razorback sucker

Implementation of the future covered actions may result in the loss of 399 acres of razorback sucker habitat (see Table 2 in this BCO). This does represent a net loss of 39 acres of backwaters since 399 acres would be lost due to the covered activities. This net loss is acceptable because Reclamation is currently developing at least 300 acres of isolated backwaters for bonytail and razorback sucker that will be maintained over the term of the LCR MSCP, and, based on current biological information on the species, habitat is not a limiting factor on the LCR as it is for a number of the marsh and riparian species. The LCR MSCP program to fund an extensive augmentation program into the LCR is the primary conservation action for this species, and these efforts are significantly greater than the amount of mitigation required. Some loss of degraded backwater habitats may occur if such areas are rehabilitated as part of the habitat-creation portion of the Conservation Plan. Such actions may have a small risk of incidental take if razorbacks are using that habitat at the time the project is implemented. The risk of stranding, desiccation, and entrainment will continue and potentially increase. Continued implementation of ongoing covered actions may continue to have adverse effects to existing habitats as described in the environmental baseline and effects of the action sections of this BCO.

The Conservation Plan provides for the creation of 360 acres of backwater habitats suitable for the razorback. Funding to produce sub-adult fish for augmentation of existing populations and reintroduction into currently unoccupied areas of the LCR and enable specific species monitoring and research likely to be of significantly greater benefit to the razorback sucker than the provision of an additional 39 acres of backwaters.

General conservation measures AMM 1, AMM 4, AMM 5, AMM 6, and MRM 5 apply to the razorback. (See page 26 of this BCO for a brief description of these conservation measures, and Chapter 5 of the HCP for a complete description.) Specific conservation measures address creation of new habitat, augmentation of populations, conducting monitoring and research, developing additional rearing capacity, continuing support of ongoing conservation efforts in Lake Mead and Lake Mohave, implementation of conservation required under the ISC consultation, and coordination of conservation efforts with other conservation programs.

Direct and Indirect Effects to Critical Habitat

Southwestern willow flycatcher

The current conditions of the primary constituent elements and the conservation value of the critical habitat areas are those that exist at the time of consultation, which is also the time the areas were proposed for designation. Although no critical habitat existed along the LCR prior to this proposal, past section 7 consultations have evaluated the effects of Federal actions to the amount and condition of flycatcher habitats in the action area. The following discussion contains information on these past consultations and how effects to habitat were considered to provide a platform for the analysis to the proposed critical habitat.

The proposed critical habitat reaches in the lower Virgin River, lower Muddy River, and the lower part of the Colorado River in the Grand Canyon that extends into the full-pool elevation of Lake Mead may be affected by the fluctuation of water levels in Lake Mead that alternatively floods or dewaters the habitat at the deltas of these rivers, and creates lake or riverine areas at the Colorado River inflow. The effects of the covered actions on Lake Mead for the current consultation are largely the result of: (1) changes in Lake Mead elevations due to the extension of the ISG, (2) determination of shortage protection levels, and (3) if any of the NPS riparian restoration actions take place in these critical habitat areas, a loss of some low-value habitat and subsequent replacement with higher-value habitat. The NPS actions will have very limited adverse effects to primary constituent elements, and would not reduce the conservation value of these areas since there would be a net gain in habitat meeting the constituent elements. For the flycatcher critical habitat around Lake Mead, this information indicates that at times of very low water elevation, there would be a greater exposure of critical habitat to drying (in the case where the water disappears from the area) or, that lands with the potential to support riparian vegetation are exposed and such vegetation becomes established. The question is, at what Lake Mead elevation does critical habitat end? Using the description of the proposed critical habitat units provided in the proposed rule, the FWS plotted the extent of the units on topographic maps of Lake Mead. This provided a reference point for the location of the proposed critical habitat relative to the full-pool elevation of Lake Mead. The extent of proposed critical habitat at the Muddy and Virgin river inflows is above 1200 msl and above 1140 msl at the Colorado River inflow.

The 1997 biological opinion (USFWS 1997) recognized the transience of habitats within the full-pool of Lake Mead and contained an RPA that required Reclamation to replace the flycatcher habitat at the Colorado River delta through acquisition of 1,400 acres of suitable habitat on non-Federal land elsewhere. The effects to all Lake Mead-associated habitats from the changes in Lake Mead water levels were addressed in the ISC consultation (USFWS 2001a). The biological opinion evaluated the conservation provided in the 1997 biological opinion for these transitory habitats and the conservation was designed to offset the periodic losses due to lake-level fluctuations, and the change in probability of lower lake levels due to the ISC. The result of the evaluation was that the increase in probability of lower lake levels could provide more years of habitat availability at these transitory habitats or more years when the areas are dry. For this consultation, the results of the Lake Mead modeling (see Appendix F of this BCO) indicate there

is a reduction in the 50th percentile line over that seen for the baseline condition (shown in the same graph). However, since the 50th percentile is already below the 1140 msl elevation, there is little change anticipated to the probabilities that this area would or would not be inundated or otherwise unable to support habitat for riparian birds, including the flycatcher. This difference is not significant enough to require additional conservation for changes in Lake Mead elevations evaluated in this consultation over that in the 1997 biological opinion.

At the Muddy and Virgin rivers, the elevation at which the proposed critical habitat extends is above the 90th percentile level for the Lake Mead elevational modeling (see Appendix F of this BCO) and no significant change in probability of water being present to support this habitat is seen from implementation of the future covered actions. This indicates that there would not likely be additional effects to primary constituent elements or the conservation value of these proposed critical habitat units from the extension of the ISG and the shortage protection criteria because there is no significant change in the potential for these areas to be exposed or flooded. The area of Lake Mead affected by the actions is below the proposed critical habitat boundaries at the Muddy and Virgin rivers.

The Bill Williams proposed critical habitat unit extends to that river's confluence with Lake Havasu. The covered actions will have no effect on lake levels in Lake Havasu that could result in changes to the primary constituent elements and thus to the conservation value of this critical habitat area.

The proposed critical habitat reaches from below Davis Dam to Parker Dam and from Vinagre Wash to above the Gila River confluence would be affected by the ongoing and future covered actions. As described in the environmental baseline, past actions on the LCR have resulted in significant losses of riparian habitat from construction of the large reservoirs that drowned out alluvial valleys, development on the floodplains, and the disconnection of the river from much of the floodplain due to changes in flows and river management operations. The effects to the primary constituent elements that comprise the description of essential riparian habitats are in these earlier discussions in this BCO.

The primary effect of the covered actions to proposed critical habitat is the loss of the available acreage as shown in Table 2, and the further disconnection of the river from the floodplain. The effect to the lateral extent has significance to the amount of area that could, in the future, develop the primary constituent elements and be considered as meeting the conservation needs of the species. Most of this loss is the result of changes in point of diversion for up to 1.574 mafy of LCR water, with some losses from footprint projects. The result of the implementation of the covered actions is the elimination of the primary constituent elements from 1,853 acres identified flycatcher habitat that may be included in the proposed critical habitat. A loss of this amount of habitat from the proposed critical habitat areas, in the absence of compensatory mitigation, would adversely affect the conservation value of these areas for the flycatcher.

The LCR MSCP Conservation Plan contains habitat mitigation to offset the loss of habitat to the flycatcher. The Conservation Plan contains provisions to create 4,050 acres of suitable habitat

for the flycatcher to mitigate for the loss of 1,853 acres of existing habitat. The habitat-creation program also provides direction that the created habitats will be of higher habitat quality than the acreage lost. Much of the existing habitat that would be lost does not support nesting flycatchers and is used only during migration. The only known nesting site in these critical habitat areas is at Topock Marsh, and the LCR MSCP contains a provision that the water levels at Topock Marsh that support this habitat would not be affected by the changes in points of diversion. The 4,050 acres of created habitat would be designed to possess the primary constituent elements that support nesting pairs of flycatchers, and the habitat would be maintained to ensure it remains suitable for flycatchers. The habitat would also be distributed throughout the LCR MSCP planning area, and thus provide a migratory corridor for birds that utilize areas beyond the LCR. Because of the definitions used to determine the lateral extent of the proposed critical habitat, it is not clear how much of the 4,050 acres of created habitat would be included in any final critical habitat designation made for the flycatcher. However, all 4,050 acres would be constructed within the LCR MSCP planning area, or at least in areas adjacent to the planning area, such as on the Bill Williams, Gila, or Virgin rivers, that are contiguous to the affected critical habitat area.

The 25 million dollar maintenance fund included in the Conservation Plan will provide funds for landowners to use to maintain the quality of flycatcher habitat on their properties. Depending on the individual project and its future maintenance by the landowner, habitat could remain suitable for flycatchers for many years. Flycatcher habitat is by nature transitory, that is, the vegetation community tends, as it matures, to become less valuable to the species. Continued maintenance is needed to prolong the useful life of an area for the species. This transitory nature of flycatcher habitat is recognized in the proposal to designate critical habitat. This fund is intended to assist in offsetting the effects of the ongoing actions that result in continuing losses of habitat for the flycatcher. The amount of such habitat that could be maintained is not predictable; however, the funds can be used by Federal, state, Tribal, or private entities to ensure existing flycatcher habitats remain suitable. The funds can only be spent within the LCR MSCP planning area, so the critical habitat areas that would benefit are those that are adversely affected.

The net result on the LCR below Davis Dam from implementation of the covered actions and the Conservation Plan is positive. More habitats containing the primary constituent elements would be created and maintained than would be lost, and it is intended that the created habitat be of a higher quality, and thus a higher value, to the flycatcher. The conservation of the flycatcher requires that all recovery units meet their goals for flycatcher territories, and the areas proposed as critical habitat were selected based on those goals. The conservation value of the Davis Dam to the SIB proposed critical habitat areas would be increased beyond the current condition if the Federal proposed actions are implemented.

Desert tortoise

There are limited effects to designated critical habitat for the desert tortoise from the implementation of the covered actions. Most of the loss of habitat is not on critical habitat but is related to the development of new agricultural areas on Tribal land outside of the critical habitat boundaries. It is likely that the 230 acres of habitat that would be protected under the LCR

MSCP would be in high-value areas, including within critical habitat, important for tortoise conservation. This would be a net benefit, as it would enable management of those lands for tortoises. Conservation activities for the relict leopard frog, sticky buckwheat, and threecorner milkvetch around Lake Mead would not affect the constituent elements of critical habitat because these actions would not take place in areas containing the constituent elements, or, by their nature, would not adversely affect the constituent elements. An example would be clearing non-native plants from areas containing sticky buckwheat or threecorner milkvetch that allows for these and other native plants to thrive. Native plant species provide food for the tortoise and these actions provide benefits to the forage base.

Bonytail

Critical habitat was designated in 1994. By that time, what would be defined as the primary constituent elements were already significantly modified from the pristine, pre-development conditions on the rivers of the CRB. Nevertheless, the conservation value of these river reaches was clearly acknowledged by the FWS through the fact they were designated as critical habitat containing primary constituent elements and were essential for the conservation of the species. Section 7 consultations occurring after the designation focused on the changes to the conditions existing at the time of designation of the primary constituent elements and their relationship to the conservation value of the critical habitat that resulted from implementation of proposed Federal actions under consultation.

The 1997 biological opinion determined that Reclamation's actions would result in adverse modification of designated critical habitat, and the biological opinion included RPAs and RPMs designed to address the effects that led to the finding. None of these RPAs or RPMs provided for changes to existing conditions for the primary constituent elements (water, physical habitat, biological habitat), but provided for other benefits to the species to improve its status in the LCR. With the completion of the consultation, the effects of the past management actions, and those continuing under the consultation, on the primary constituent elements and thus the conservation value for the species, became part of the environmental baseline.

The 2002 reinitiation of the 1997 biological opinion on operations and maintenance did not find adverse modification of critical habitat from the proposed action to continue the section 7 coverage for Reclamation's actions for an additional three years. This finding was based on the implementation of the RPAs and RPMs that improved the status of the species over the preceding five years, and the lack of significant change to the primary constituent elements and the resultant lack of change to the conservation value of the critical habitat over the conditions extant in the environmental baseline.

The primary constituent elements for the bonytail critical habitat in Lake Mohave would not be significantly affected by the implementation of the covered actions analyzed in this BCO because there would be no change to the water supply, physical, or biological conditions in the reservoir over the current condition. Implementation of the Conservation Plan measures for the bonytail will increase the number of fish in Lake Mohave, and subsequent monitoring and

research may assist in identifying potential measures to address existing issues with the physical and biological constituent elements. Such measures could lead to management actions that improve the conditions of the physical and biological constituent elements. This potential is uncertain, and is not relied on to assess the effects of the Federal actions on critical habitat. At worst, the existing conservation value would be retained in Lake Mohave and a finding of destruction or adverse modification is not supported by the analysis. The same analysis and result hold for the conservation value of the Lake Havasu portion of the critical habitat.

The primary constituent elements in the portion of the critical habitat reach from Havasu NWR to the full-pool elevation of Lake Havasu would be affected by the covered actions. The reduction in flows from Davis Dam caused by the changes in point of diversion represent 860,000 afy of the 1.574 mafy over the 50-year term. The water constituent element would be affected by the reduction in flows and as a result may have changes to water quality parameters such as temperature (less water available to buffer solar heating and cooling effects), and the dilution factor for contaminant inflows. The physical constituent element would be affected through the loss of main channel and backwater habitat in this area due to lower river elevations. The models indicate approximately 85 acres of aquatic habitat in the Davis Dam to Lake Havasu reach would be lost (this is the loss to flannelmouth sucker habitat which is only found in this reach). Since the designated critical habitat reach is approximately 20 miles of the Davis Dam to Lake Havasu reach (Davis Dam is at river mile 278, the northern boundary of critical habitat is at river mile 242, and the approximate extent of Lake Havasu's maximum elevation at 450.5 feet is at Blankenship Bend at river mile 222) only 35% of the loss (30 acres) would occur in the critical habitat.

Some channel-maintenance activities may take place within this reach, particularly maintenance dredging at the Topock Settling Basin. This action would take place in the main channel and remove accumulated sediments. The result would be deeper and slightly higher velocity reach, but the difference over the existing condition would be minor and not a significant change to existing conditions of the primary constituent elements due to the magnitude of the change. Maintenance dredging for Topock Marsh may have short-term effects to habitats there, but would likely enhance habitats over the longer term by providing more water flow through the marsh that improves water quality for fish. Dredging does have a risk of increasing selenium levels in the water if sediments with high levels of sequestered selenium are in the project area. Water flows would carry this selenium downstream to be sequestered elsewhere or flushed from the system. There is a conservation measure (MRM 5) and a commitment from Reclamation in the BA that provides for the evaluation of effects to selenium levels through dredging and backwater/marsh creation. The magnitude of this effect to water quality is not known, but given the limited amount of dredging provided in the covered actions for this area, the increase is not likely significant to the constituent elements or the conservation value of the habitat.

The Conservation Plan provides for the placement of 85 acres of created backwater habitat below Davis Dam to mitigate for the loss of 85 acres of aquatic habitat. Much of this habitat is designed to benefit the flannelmouth sucker, a covered species not found in the lower portion of the reach that contains the bonytail critical habitat. The specific location of this replacement

habitat is not known, so the amount that would be replaced within the critical habitat boundaries is unknown. However, mitigation for effects to critical habitat conservation value can be sited in areas adjacent to the critical habitat that are also used by the species. It is anticipated that bonytail from Lake Havasu will use the reach below Davis Dam and the new habitat that would be created there. Because these backwaters would not be isolated from the river (flannelmouth suckers only benefit from backwaters connected to the river), these backwaters would have the same concerns related to the biological constituent element (non-native fish species) as the aquatic habitat lost within the critical habitat area but would meet the needs of adult and sub-adult bonytail as effectively as the existing habitat in this reach. The 85 acres of connected backwaters to be constructed below Davis Dam and above Lake Havasu are considered to address the effects to the water and physical constituent elements in the 20-mile riverine reach of critical habitat above Lake Havasu. The conservation value of this critical habitat area is not significantly changed as a result of the covered actions and implementation of the Conservation Plan.

Razorback sucker

Critical habitat was designated in 1994. By that time, what would be defined as the primary constituent elements were already significantly modified from the pristine, pre-development conditions on the rivers of the CRB. Nevertheless, the conservation value of these river reaches was clearly acknowledged by the FWS through the fact they were designated as critical habitat containing the primary constituent elements and were essential for the conservation of the species. Section 7 consultations occurring after the designation focused on the changes to the conditions existing at the time of designation of the primary constituent elements and their relationship to the conservation value of the critical habitat that resulted from implementation of proposed Federal actions under consultation

The 1997 biological opinion determined that Reclamation's actions would result in adverse modification of designated critical habitat, and the biological opinion included RPAs and RPMs designed to address the effects that led to the finding. None of these RPAs or RPMs provided for changes to existing conditions for the primary constituent elements (water, physical habitat, biological habitat), but provided for other benefits to the species to improve its status in the LCR. With the completion of the consultation, the effects of the past management actions, and those continuing under the consultation, became part of the environmental baseline.

The 2001 (USFWS 2001a) biological opinion on the ISC identified significant issues to the physical habitat constituent element from fluctuations of lake levels. These effects have been discussed at length in this BCO, and more completely in the 2001 biological opinion, which is incorporated here by reference. With the conservation measures in the Reclamation's ISC proposed action that provided a means to offset the potential adverse effects to razorback sucker spawning and nursery habitats, we were able to determine that the changes to probabilities of lower water level elevations did not constitute adverse modification of critical habitat (USFWS 2001a). The conservation value of the Lake Mead critical habitat that forms the baseline for this evaluation is that existing after the effects of the ISC are incorporated.

The 2002 reinitiation of the 1997 biological opinion on operations and maintenance did not find adverse modification of critical habitat from the proposed action to continue the section 7 coverage for Reclamation's actions for an additional three years. This finding was based on the implementation of the RPAs and RPMs that improved the status of the species over the preceding five years, and the lack of significant change to the primary constituent elements and the resultant lack of change to the conservation value of the critical habitat over the conditions extant in the environmental baseline.

The primary constituent elements for the razorback sucker critical habitat in Lake Mead (including the lower portion of the Colorado River in the Grand Canyon within the full-pool elevation of Lake Mead) would be affected by the extension of the ISG guidelines and the definition of shortage protection elevations. The existing conservation value of the Lake Mead critical habitat is extremely significant, as it represents the only location in the range of the razorback sucker with documented recruitment of wild-born individuals to the adult population. The ISG extension and determination of shortage protection levels would affect the probabilities of Lake Mead water levels as described in the BA and relevant appendices that discuss the modeling done for lake levels. This analysis was discussed in the section addressing effects of the Reclamation actions. The increased elevational range discussed in that analysis for potentially exposed spawning and nursery habitats (physical habitat constituent element) is the important component. The extent of suitable spawning and nursery habitat at various lake elevations is not known; however, the Echo Bay population has shown a downslope movement of their spawning area as water levels in the lake have declined. Research on the Lake Mead razorback sucker population indicates that a particular cycle of water level fluctuation may be advantageous in providing the conditions needed for successful recruitment (Golden and Holden 2002, 2003; Welker and Holden 2003) by providing flooded terrestrial vegetation as cover for the young fish. This cover provides additional protection from non-native fish species that prey on the young fish. The probability for that fluctuation cycle to occur is not known, but will continue to exist over the next 50 years.

The existing condition of the primary constituent elements and the conservation value of Lake Mead for the razorback sucker would, based on the model results for Lake Mead elevations, remain essentially unchanged for most probable future situations. The existing conditions have already been the subject of formal section 7 consultation and no destruction or adverse modification was determined to occur. The only change that may occur is in the lowest elevations, and there is no effect of those lower elevations on currently known spawning areas since those spawning areas would already be exposed at much higher lake elevations that are already included in the baseline condition and do not show any significant change in probability with the proposed actions. The difference in the amount of potential spawning or nursery habitat at elevation 1000 msl (the baseline) and 950 msl (the proposed action) are not likely to be significant. The proposed action does not negate the opportunity for the rising water level cycle that may be beneficial for successful recruitment.

The Conservation Plan contains the extension of the specific ISG conservation measures that

provide protection for razorback suckers in Lake Mead. These are listed in the HCP as:

- RASU 7: provide funding and support for the continuation of the Reclamation/SNWA ongoing Lake Mead razorback sucker studies for 5-10 years beyond the time provided by the ISC consultation.
- RASU 8: continue conservation measures identified in the ISC biological opinion: (1) maintain existing operations on Lake Mohave that benefit native fish and explore additional ways to benefit the species there; (2) to the maximum extent practicable, provide for rising spring water surface elevations of 5-10 feet or to the extent hydrologic conditions allow; and (3) monitor water levels of Lake Mead and evaluate the impacts to razorback spawning at water levels below 1,160 msl and, if determined appropriate, collect larvae for rearing when water reaches levels where significant spawning habitats are not available.

With the type and magnitude of change in Lake Mead water levels, and the implementation of conservation measures in the Conservation Plan, there would not be significant adverse changes to the existing condition of the primary constituent elements and the conservation value of Lake Mead for the razorback sucker. Completed section 7 biological opinions concerning Lake Mead elevations did not determine there was a reduction in conservation value with the application of conservation measures for the razorback sucker. The extension of those conservation measures, combined with the lack of significant increase in exposure of spawning areas over the next 50-years as shown through the model results, does not result in a loss of conservation value for the species

The primary constituent elements for the razorback sucker critical habitat in Lake Mohave would not be significantly affected by the implementation of the covered actions analyzed in this BCO because there would be no change to the water supply, physical, or biological conditions in the reservoir over the current condition. Implementation of the Conservation Plan measures for the razorback would increase the number of fish in Lake Mohave, and subsequent monitoring and research may assist in identifying potential measures to address existing issues with the physical and biological constituent elements. Such measures could lead to management actions that improve the conditions of the physical and biological constituent elements. This potential is uncertain, and is not relied on to assess the effects of the Federal actions on critical habitat. At worst, the existing conservation value would be retained in Lake Mohave and a finding of destruction or adverse modification is not supported by the analysis; more likely the conservation value would be enhanced.

The critical habitat reach from Parker Dam to Imperial Dam would experience the greatest effects to primary constituent elements of any critical habitat reach. These effects are related to the changes in points of diversion that result in a loss of 314 acres of aquatic habitat (399 total acres minus the 85 acres in the Davis Dam-Parker Dam reach) of the 12,778 acres present in this reach (data from Table 3-11 of the HCP). This loss would affect the water constituent element through a decrease in flow levels, and the physical habitat constituent element from the loss of backwater and main channel habitats left dry above the new water levels. Other physical

constituent element components affected are water quality (particularly an increase in summer temperatures in backwaters, and dilution effects of contaminants), and changes to volume of daily releases that may expose more shallow gravel/cobble bars in the channel and shallow water nursery habitats in the backwaters.

Temporary losses to habitats in settling basins, channels, and backwater habitats due to dredging activities will also occur in this reach. Habitat losses are temporary, with the newly dredged areas providing suitable habitat that supports the primary constituent elements and maintains conservation values. Dredging does have a risk of increasing selenium levels in the water if sediments with high levels of sequestered selenium are in the project area. Water flows would carry this selenium downstream to be sequestered elsewhere or flushed from the system. There is a conservation measure (MRM 5) and a commitment from Reclamation in the BA that provides for the evaluation of effects to selenium levels through dredging and backwater/marsh creation. The magnitude of this effect to water quality is not known, but given the limited amount of dredging provided in the covered actions for this area, the increase is not likely significant to the constituent elements or the conservation value of the habitat.

The Conservation Plan provides for placement of 275 acres of new backwater habitats in this critical habitat reach to offset the loss of the 314 acres of aquatic habitat. These new habitats would be of higher conservation value for the razorback, in that they would primarily be isolated from the river channel and be designed to provide all the constituent elements needed by the species. Further, because of their isolation, non-native fish would not be present in these created habitats, which would allow the razorback suckers to successfully recruit into these habitats. As discussed earlier in this BCO, habitat is not a limiting factor for the razorback, and the net loss of 39 acres backwaters in this section of critical habitat is not a significant factor in the conservation value when considered in the context of the augmentation of fish into the reach, the monitoring and research component, and the higher value of the created backwaters to the species.

Interrelated and Interdependent Activities

Interrelated activities are parts of the proposed action that depend on the action for their justification, and interdependent activities have no independent utility apart from the proposed action. The non-Federal actions for which section 9 incidental take coverage was requested through the section 10(a)(1)(B) process could be considered interrelated activities to the issuance of the incidental take permit by the FWS. The covered actions of both Federal and non-Federal LCR MSCP participants include virtually all actions that could be considered interrelated or interdependent to river operations, and their effects to endangered species are fully discussed in the BA and HCP and analyzed in this BCO. No other interrelated or interdependent activities were identified.

Indirect Effects Outside of the Action Area

We have determined there are no indirect effects of the covered actions included in the MSCP

outside of the action area. (See the discussion in the environmental baseline for the determination of the action area.) Indirect effects are effects related to a proposed action that are: (1) later in time, (2) caused by or result from the proposed action, and, (3) are reasonably certain to occur. Indirect effects may occur outside of the action area directly affected by an action. See Final ESA Section 7 Consultation Handbook, p.4-27 (March 1998).

The issue of whether the continued delivery of water from the Colorado River would affect listed species in areas outside of the LCR MSCP Planning Area by causing urban growth and development has been evaluated by the FWS and participating MSCP entities. The results of our analysis and discussions are reflected in Chapter 5 of the BA for the LCR MSCP and in this section. However, while the FWS appreciates the BA's analogy to the National Environmental Policy Act (NEPA) indirect effects analysis, the FWS' indirect effects analysis in the context of the Act does not necessarily rely on NEPA case law by analogy.

While we recognize that urban growth and development is projected to occur in areas served by water from the LCR such as San Diego, Los Angeles, Tucson, Phoenix, and Las Vegas, for the reasons outlined below, we are unable to determine, with any reasonable degree of certainty, that the covered actions cause urban growth and/or development. We are also unable to determine, with any reasonable degree of certainty, that take of listed species or adverse modification of their habitat is reasonably certain to occur.

Causation

With regard to causation, we have carefully considered whether or not urban growth and/or development outside of the LCR MSCP planning area will be caused by the covered actions in the LCR MSCP. The FWS typically applies a "but for" test with regard to causation. Pursuant to the "but for" test, if another activity or effect is likely to occur regardless of the proposed action, it is not caused by the proposed action. In the context of the LCR MSCP, this means if urban growth and/or development is likely to occur regardless of the LCR MSCP covered actions, urban growth and/or development is not caused by the covered actions. Another way of stating this is to say that if urban growth and/or development probably would not occur unless the covered actions occur, this urban growth and/or development is caused by the covered actions.

The covered actions do not result in more water being delivered to Arizona, California, or Nevada or communities in those States where urban growth is projected to occur, for example, Tucson, San Diego, and Las Vegas. Rather, the current amount of water delivered to these states will be continued under the LCR MSCP. Future changes in the use of LCR water, like in southern California, are unknown at this time. The analysis contained in the BA indicates that growth would not be caused by continued delivery of LCR water due to a number of reasons, including the availability of other sources of water supply. In Arizona, there are sources of water outside of LCR water. Other sources of water in high growth areas in Arizona include groundwater available statewide and surface water from the Gila, Salt, and Verde rivers for central Arizona including Phoenix. Therefore, it is not possible to determine with any degree of

certainty whether or not LCR water is causing urban growth and development in Arizona. In Nevada, recent efforts have identified additional water sources in counties adjacent to Clark County and Las Vegas that may provide alternative sources of water outside of that provided by the LCR. The population in Clark County is clearly growing and urban development is expanding. While most of the water supply for Clark County comes from the LCR, they do have a groundwater supply that was used exclusively until 1971**.** (Phil Lehr, Colorado River Commission of Nevada, personal communication 2004).

It is difficult for the FWS to conclude that the covered actions cause urban growth and/or development. Urban growth and development is dependent upon any number of factors including national and regional economic conditions, climate, quality of life, and local employment opportunities. For a discussion of the complexity of causes of urban growth, see the discussion of indirect effects in the BA. For example, if the economy in a community is depressed and employment opportunities are few, the continuing delivery of existing levels of water to that community is not necessarily going to cause that community to grow. An example of this can be seen by looking at the demographic data for San Diego from the 1970s to the present that is cited in the BA. Given the numerous factors that contribute to urban growth and development, there is no direct causal link between the continued provision of LCR water and urban growth in the states receiving LCR water.

Reasonable Certainty to Occur

Even if the continued delivery of LCR water were the cause of urban growth and/or development, it would not constitute an indirect effect under the Act because the effect of unauthorized take of endangered species or urban growth in listed species' habitat would not be reasonably certain to occur. The concept of reasonable certainty is embodied in the definition of indirect effects in order to eliminate speculative actions and their effects from consideration. "Reasonably certain to occur" does not, however, mean that there is a guarantee that an action or an effect will occur. The FWS considers the effects of actions that are likely to occur, bearing in mind the economic, administrative, or legal hurdles that remain to be cleared. Determining what is reasonably certain to occur regarding urban growth and development in Arizona, California, and Nevada over the course of the next 50 years requires significant speculation. Given the rise in ESA compliance pursuant to section 7, and especially section 10 in these states, we are required to speculate less with regard to the reasonable certainty of take of listed species and adverse effects to their critical habitats outside the action area.

In order for actions like urban growth and/or development to be treated as indirect effects they must also be reasonably certain to occur, as evidenced by appropriations, work plans, permits issued, or budgeting; they follow a pattern of activity undertaken by the agency in the action area; or they are a logical extension of the proposed action. In addition, they must be located in areas that would impact listed species. Urban growth and development is reasonably certain to occur in areas served by LCR water. Although some level of new urban growth can be expected to occur in the large geographic LCR water service areas, it is not reasonably certain that the growth would occur in listed species habitat areas. As explained below, unauthorized take of

protected species and adverse impacts to their habitat outside the LCR Planning Area are not reasonably certain to occur.

The FWS can only speculate when and where urban growth and/or development will occur in the areas served by LCR water over the next 50 years. In contrast, we have substantial information with regard to the current level of conservation and compliance with the Act in the service areas as follows.

- In California, existing HCPs cover large regions within Orange, San Diego, and Riverside Counties (Orange County Central-Coastal MSCP, San Diego MSCP, Western Riverside MSHCP). Additional multi-species HCPs are pending approval for other parts of Riverside, Orange, San Diego, and Imperial Counties (Orange County Southern HCP, San Diego North County MSCP, and the Coachella Valley MSCP).

- In Nevada, LCR water is delivered within Clark County. The Las Vegas service area is covered by the Clark County MSHCP. The 30-year Clark County MSHCP covers 79 Covered Species, 103 Evaluation Species, and 51 Watch List Species in the area served by LCR water. (Information available at website, www.co.clark.nv.us).

- In Arizona, water deliveries outside the MSCP Planning Area occur through the CAP, which has obtained ESA compliance through Section 7. (There have been more than 40 section 7 consultations involving the CAP.) The CAP delivers up to 1.5 million acre-feet of water to central Arizona water users each year. Uses of this water include tribal agricultural use, non-Indian agricultural use, and municipal and industrial use. Section 7 consultations have been completed on the delivery systems, placing those actions and their effects into the baseline.

- Phoenix is a major urban growth area that receives LCR water. There are listed species in and around the Phoenix area; however, growth is generally not in areas occupied by these species. Other actions are covered by section 7 consultations. There are a number of listed species in and around Tucson. Besides numerous section 7 consultations in this area, the pending Sonoran Desert Conservation Plan MSHCP is currently being drafted. It will cover 55 species in Pima County. The FWS expects completion of the plan by the spring of 2006. Furthermore, the City of Tucson and Town of Marana are preparing their own HCPs along similar timelines in areas where urban growth and development and numerous listed species coincide.

Given these regional HCPs, numerous project-specific HCPs, and the protections provided through section 7, the FWS is confident that anticipated urban growth will be directed away from areas important to the conservation of listed species, and that unauthorized impacts to protected species and habitat outside the LCR Planning Area are not reasonably certain to occur.

Cumulative Effects

Cumulative effects include the effects of future state, Tribal, local, or private actions that are

reasonably certain to occur in the action area considered in this BCO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The BA (LCR MSCP 2004i) contains an analysis of the types of future non-Federal actions that may have cumulative effects to covered species and their habitats in the action area. This information is incorporated by reference. These actions are generally related to increasing the human population of the action area, with subsequent increases in economic development, recreation and visitation (including risks of accidental or intentional non-native species introduction and human-caused wildfire), and introduction of environmental contaminants. Some specific projects are identified in the BA and in the EIS/EIR (USDOI and Metropolitan 2004c). Because of the long-term nature of this consultation, most of the specific actions that may have cumulative effects have not been identified; however, the general types of effects that may occur can be defined.

Effects to covered species from these non-Federal actions include but are not limited to:

- Loss or degradation of covered species habitat through conversion of undeveloped lands for residential, commercial, or other types of development together with their supporting infrastructure.
- Increased use of undeveloped lands for recreation that may disturb or result in mortality of individuals of the covered species.
- Increased predation or competition from domestic animals, native or non-native birds more suited to the altered habitats (including starlings and cowbirds) created by new development.
- Introduction of additional non-native plants, invertebrates, or fish to the LCR that compete with, prey on, or alter the habitat components for covered species.
- Increased potential for contamination of the LCR with municipal effluent, storm-water discharge, chemical spills, petroleum residues from boating, and non-point source discharges. Increased salinity levels are likely to occur based on documented trends, and increases in selenium may occur if water inflows from the Upper Basin continue to have increasing levels of this contaminant.
- Increased risk of wildfires started by recreational activities, personal land-management actions, or arson.

The magnitude of these effects over the 50-year term of the LCR MSCP is unknown. Any analysis of these effects at this time is complicated by the lack of specific information on actual projects that raises questions on the reasonable certainty of occurrence, uncertainty regarding the potential for increases in numbers of non-native species, and in the likelihood of contamination incidents. It is also important to consider that if there are increases in effects to covered species from these types of actions, there would be a response to address those increases. For example, when giant salvinia was discovered in the LCR, efforts were immediately undertaken to control the infestation. Future introductions of non-native species would likely elicit the same response. Similarly, significant changes in salinity, selenium, or other contaminants would elicit a control

or management response. Some of those responses are likely to be Federally driven, as would be the case with salinity (a significant concern for Reclamation in deliveries of water to Mexico) and municipal effluent (by the Environmental Protection Agency under water quality standards). The effects of land development or management actions would not likely remove significant amounts of high value habitats, since most of those areas are not on private lands. There are high value habitats on Tribal lands, and there is an opportunity to work with the Tribes to minimize effects at the time the project is proposed. Given this analysis, we do not believe that there would be significant effects to covered species or critical habitat from cumulative effects.

Conclusion

After reviewing the current status of the Yuma clapper rail, southwestern willow flycatcher, desert tortoise, bonytail, humpback chub, and razorback sucker, the environmental baseline for the action area including additional effects from actions in the baseline that would occur over the period covered by this consultation, the effects of issuing an incidental take permit, effects of the other Federal actions including implementation of the Conservation Plan, and cumulative effects, it is our biological opinion that the proposed actions are not likely to jeopardize the continued existence of these six species. Designated critical habitat for the bonytail, razorback sucker, and desert tortoise is not likely to be destroyed or adversely modified. Proposed critical habitat for the southwestern willow flycatcher is not likely to be destroyed or adversely modified. In making these determinations, we considered the following:

<u>Yuma clapper rail</u>

- Loss of habitat from the covered activities (243 acres) will be offset by the creation of 512 acres of habitat, a net gain of 269 acres. This additional acreage will be distributed through the planning area and will allow for the expansion of the existing populations, provide additional stops for migrating or dispersing individuals, and contribute to the importance of the LCR for this species' conservation. Habitats created under the LCR MSCP will be maintained for at least 50 years, and replaced as needed after fires, drought, or flood damage to ensure their presence. To a significant extent, this long-term persistence of habitat is not currently provided for the habitats that would be lost, so this is an additional benefit.
- Use of the maintenance fund to provide resources to maintain existing marsh habitats for the species will provide assurance that the current population and distribution of habitat will be maintained over the life of the permit. This provides a desirable addition to the security and stability of the species on the LCR.
- Important existing habitats at Topock Marsh will not be compromised by lower water levels, and will remain viable.
- Implementation of AMMs will reduce the number of individual birds harassed or harmed during the implementation of covered actions or implementation of the Conservation Plan through avoidance of habitat and work to be completed outside of the breeding season.
- Surveys and focused research on species biology and habitat requirements will provide additional data useful for creating and evaluating species habitats, determining if

contaminants are affecting the species, and to document species status in the future.

- The LCR MSCP Conservation Plan supports several actions in the Yuma Clapper Rail Recovery Plan: (1) maintaining a population on the LCR through protection and management of habitat, and (2) through research on biological and habitat requirements.

Southwestern willow flycatcher

- Loss of habitat from the covered activities (1853 acres) will be offset by the creation of 4,050 acres of habitat, a net gain of 2,197 acres. This additional acreage will be distributed through the planning area and will allow for the expansion of the existing populations, provide additional stops for migrating and dispersing individuals, and contribute to the importance of the LCR for this species' conservation. Habitats created under the LCR MSCP will be maintained for at least 50 years, and replaced as needed after fires, drought, or flood damage to ensure their presence. To a significant extent, this long-term persistence of habitat is not currently provided for the habitats that would be lost, so this is an additional benefit.
- Use of the maintenance fund to provide resources to maintain existing riparian habitats for the species will provide assurance that the current population and distribution of habitat will be maintained over the life of the permit. This provides a desirable addition to the security and stability of the species on the LCR.
- Important existing habitats at Topock Marsh will not be compromised by lower water levels, and will remain viable.
- Implementation of AMMs will reduce the number of individual birds harassed or harmed during the implementation of covered actions or implementation of the Conservation Plan through avoidance of habitat and work to be completed outside of the breeding season.
- Surveys and focused research on species biology and habitat requirements will provide additional data useful for creating and evaluating species habitats, determining if cowbirds are a significant threat to nesting success, and to document species status in the future.
- There would be a loss of habitat acres that are proposed for designation as critical habitat. The created habitats will be located within the area proposed for designation, and will more than replace the habitat lost. In addition, the created habitats will be of higher value to the species than the habitat lost. This is due to the effort to create habitats dominated by cottonwood and willow, not saltcedar, the commitment to manage and maintain these habitats over time, and the provision for adaptive management to assess the habitat development program and adjust desired habitat parameters to better meet species' needs.
- The LCR MSCP Conservation Plan supports several actions in the Southwestern Willow Flycatcher Recovery Plan: (1) increase and improve the quality of habitats and provide for management of those habitats, (2) increase metapopulation stability through protection of habitat and development of additional habitats, (3) improve demographic parameters, particularly for nesting success, and (4) conduct surveys and monitor populations and habitat parameters.

Desert tortoise

- Loss of habitat from the covered activities (192 acres) would be offset by the acquisition of 230 acres of unprotected habitat within the species' range. While the specific location of the habitat to be protected is not known, there are lands identified within critical habitat or conservation areas that could benefit from this protection and thus reduce conflicts within the larger protected area from multiple land ownerships.
- AMMs would provide protection for individual tortoises from implementation of the covered actions and the Conservation Plan. The protocols for surveys, monitoring, and protection for tortoises established in the field survey protocol (USFWS 1992) and handling guidelines (Desert Tortoise Council 1994) will be followed.
- The LCR MSCP Conservation Plan supports the Desert Tortoise Recovery Plan through protection of habitat and reduction of fragmentation.

Bonytail

- Loss of aquatic habitat from the covered activities (399 acres) would be offset by the creation or restoration of 360 acres of backwater habitats within the LCR MSCP planning area. Aquatic habitat includes both riverine and backwater areas and would be replaced solely with backwaters. Up to 275 acres of the created backwaters would be isolated from the main river, and would provide a non-native fish-free environment for the bonytail. Since non-native fish are responsible for predation and competition with the bonytail that prevents successful recruitment of young bonytail to the adult population, these created habitats are of higher value than the connected backwater and main river channel acreage that is lost. The net effect is positive in terms of conservation benefit.
- Funding for the augmentation of up to 620,000 sub-adult bonytail to the LCR MSCP planning area provides the means to re-establish adult populations of a size that permits retention of genetic variance, allows for specific research and monitoring to assess demographics, habitat use, and identify potential management actions that could enable successful recruitment outside of isolated backwaters. With the current populations of bonytail existing at very low levels, this augmentation program is critically important to maintaining the species in the wild as well as fostering research into management directions. The total funding under this measure includes that needed for raising and stocking fish and implementation of other management actions when such are identified.
- AMMs would provide protection for individual bonytail from implementation of the covered actions and the Conservation Plan. An example is the avoidance of effects of dredging through timing of activities outside the bonytail spawning season.
- Monitoring and research on bonytail and their habitats will provide information needed to adaptively manage the augmentation program and the design of created habitats. This information will support efforts to establish self-sustaining populations in the LCR.
- There would be a loss of acres of critical habitat in the LCR due to the reductions in flows that eliminate backwater and main channel habitats. This loss is not fully replaced within the critical habitat, however it will be replaced in the river reach immediately above the critical habitat boundary in areas used by the bonytail. Critical habitat in Lake Mohave and Lake Havasu would not be affected by the covered actions or

implementation of the Conservation Plan. As a result of the conservation measures, no measurable loss of conservation value is likely to result from effects to critical habitat.

- The LCR MSCP Conservation Plan supports several actions in the Bonytail Recovery Goals: (1) reestablish populations with hatchery-produced fish, (2) maintain a genetic refuge in the LCR, (3) provide habitat for all life stages, (4) investigate habitat requirements of all life stages, and (5) ensure adequate protection from diseases and parasites and identify water quality problems.

Humpback chub

- Periodic creation and loss of 62 miles of riverine habitat in the lower reach of Grand Canyon will result from the changing elevations of Lake Mead over the next 50 years. The quality of this habitat to support the humpback chub will be equally variable due to sediment deposition, presence of pools and side channels, and other physical features. No humpback chub occupy the area at present, but some level of use may occur in the future if humpback chub populations expand through the Grand Canyon. The presence or absence of this transitory habitat is not significant to the humpback chub because of the extensive reaches of riverine habitats upstream of Lake Mead that are unaffected by the proposed action.
- The LCR MSCP will contribute $10,000 a year for 50 years to support the implementation of conservation actions that would benefit the humpback chub population in the Grand Canyon area that currently do not have a funding source. These funds will contribute to the conservation of the species beyond the limited extent of adverse effects resulting from the covered actions.

Razorback sucker

- Loss of aquatic habitat from the covered activities (399 acres) would be offset by the creation or restoration of 360 acres of backwater habitats within the LCR MSCP planning area. Aquatic habitat includes both riverine and backwater areas and would be replaced solely with backwaters. Up to 275 acres of the created backwaters would be isolated from the main river, and would provide a non-native fish-free environment for the razorback sucker. Since non-native fish are responsible for predation and competition with the razorback sucker that prevents successful recruitment of young razorback sucker to the adult population, these created habitats are of higher value than the connected backwater and main river channel acreage that is lost. The net effect is positive in terms of conservation benefit.
- Funding for the augmentation of up to 660,000 sub-adult razorback sucker to the LCR MSCP planning area provides the means to re-establish adult populations of a size that permits retention of genetic variance, allows for specific research and monitoring to assess demographics, habitat use, and identify potential management actions that could enable successful recruitment outside of isolated backwaters. With the current populations of razorback sucker existing at very low levels, this augmentation program is critically important to maintaining the species in the wild as well as fostering research

into management directions. The total funding under this measure includes that needed for raising and stocking fish and implementation of other management actions when such are identified.

- AMMs would provide protection for individual razorback sucker from implementation of the covered actions and the Conservation Plan. An example is the avoidance of effects of dredging through timing of activities outside the razorback sucker-spawning season.
- Monitoring and research on razorback sucker and their habitats will provide information needed to adaptively manage the augmentation program and the design of created habitats. This information will support efforts to establish self-sustaining populations in the LCR.
- There would be a loss of acres of critical habitat in the LCR due to the reductions in flows that eliminate backwater and main channel habitats. This loss will be fully replaced within the critical habitat reach below Parker Dam. The critical habitat in Lake Mead would continue to be impacted by fluctuating water levels; however, there is not a significant change from baseline conditions related to fluctuations. The continuation of monitoring and research into the successful recruitment of razorback sucker in Lake Mead is an important component to provide information needed for the conservation of the species throughout its range. Critical habitat in Lake Mohave would not be affected by the covered actions or implementation of the Conservation Plan and ongoing efforts to conserve the species there will continue. As a result of the conservation measures, no measurable loss of conservation value is likely to result from effects to critical habitat.
- The LCR MSCP Conservation Plan supports several actions in the Razorback Sucker Recovery Goals: (1) reestablish populations with hatchery-produced fish, (2) maintain a genetic refuge in the LCR, (3) provide habitat for all life stages, (4) investigate habitat requirements of all life stages, and (5) ensure adequate protection from diseases and parasites and identify water quality problems.

<u>Other covered species</u>

After reviewing the current status of the 21unlisted species proposed for coverage in the HCP, the environmental baseline for the action area, the effects of the proposed actions, and cumulative effects, it is our conference opinion that the action, as proposed, is not likely to jeopardize the continued existence of the following unlisted species. Appendix C contains the species-by-species documentation for our determinations. Incidental take coverage under the section 10(a)(1)(B) permit can be extended upon the listing of these species as threatened or endangered:

Western red bat
Western yellow bat
Colorado River cotton rat
Yuma hispid cotton rat
Western least bittern
California black rail
Yellow-billed cuckoo

Elf owl
Gilded flicker
Gila woodpecker
Vermilion flycatcher
Arizona Bell's vireo
Sonoran yellow warbler
Summer tanager
Flat-tailed horned lizard
Relict leopard frog
Flannelmouth sucker
MacNeill's sootywing skipper
Sticky buckwheat
Threecorner milkvetch

The desert pocket mouse cannot be included as covered species in the section 10(a)(1)(B) permit because there is insufficient information on the status of the species rangewide and in the LCR MSCP planning area. The information supporting this determination is in Appendix D. We recommend the desert pocket mouse be included in the LCR MSCP as evaluation species, with the conservation measures as described in the HCP implemented in full. Additional surveys and monitoring of this is likely to provide the status information needed for a reconsideration of this finding.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, and sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(3)(B)(4) and section 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement. This incidental take statement addresses the total amount of incidental take identified for both the issuance of the section 10(a)(1)(B) permit, and the implementation of the other Federal actions discussed in this BCO.

The proposed LCR MSCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the proposed

HCP, together with the terms and conditions described in the associated IA, and the section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this incidental take statement pursuant to 50 CFR 402.14(I). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the permittees fail to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse.

For the Federal agencies included in this consultation, all conservation measures described in the proposed HCP, together with the terms and conditions described in the associated IA, and in the section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this incidental take statement pursuant to 50 CFR 402.14(I). Such terms and conditions are non-discretionary and must be undertaken for the exemption under section 7(o)(2) of the Act to apply. If the Federal agencies fail to adhere to these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

The incidental take coverage for the six listed species included in the Conservation Plan becomes effective on the signing of the section 10(a)(1)(B) permit, and the acceptance of the BCO by the Federal agencies. For the 20 unlisted species covered by the Conservation Plan, the incidental take statement or permit will become effective upon the listing of these species as threatened or endangered under the Act.

Amount or Extent of Take Anticipated

The amount or extent of incidental take is described on pages 31-43 of the BCO. As described earlier in this BCO, the presence of the covered species within the LCR MSCP planning area has been documented and there is more than reasonable certainty that individuals of the species are present and would be taken as a result of the covered actions and implementation of the Conservation Plan. There are several categories of incidental take included, ranging from that resulting from the implementation of the Federal and non-Federal covered actions, and the implementation of the Conservation Plan. Table 2 lists the take of habitat from the flow-related and non-flow related construction actions, and Table 3 lists the facilities that require maintenance that will also result in take from loss of habitat and harassment. In addition to take defined by habitat loss and harassment, there are other categories of take, particularly that due to water operations, which is described in terms of how the take will occur. The Conservation Plan also contains avoidance and minimization measures designed to reduce the amount of take that could occur from harm or harassment of individuals during implementation of the covered activities and the Conservation Plan.

Effect of the Take

In this BCO, we determine that this level of anticipated take is not likely to result in jeopardy to the covered species, or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

The mitigation, minimization, avoidance, survey, monitoring, and reporting measures provided in the Conservation Plan are incorporated herein by reference as reasonable and prudent measures and terms and conditions to address the incidental take of the covered species. The full description of these reasonable and prudent measures is in Chapter 5 of the HCP and is incorporated herein by reference. No additional reasonable and prudent measures were identified during the consultation.

Reporting requirements to document the implementation of reasonable and prudent measures and terms and conditions are included in the Conservation Plan, the IA, and the section 10(a)(1)(B) permit. As long as those reporting requirements are met, the requirements of this incidental take statement will be met.

Minimization and Mitigation of Incidental Take to the Maximum Extent Practicable

The issuance criteria for a section 10(a)(1)(B) permit require that the incidental take resulting from the covered actions be minimized and mitigated to the maximum extent practicable (50 C.F.R. 17.22(b)(2)(B)). The minimization or avoidance measures included in the Conservation Plan, the IA, or the permit do not encompass all possible measures that would reduce or avoid take. The included measures are effective, efficient, and offset the anticipated take from operations and implementation of both covered actions and Conservation Plan projects. It is our conclusion that the Conservation Plan, fully mitigates for the adverse effects of the covered actions that result in incidental take and therefore meets the permit issuance standard for minimizing and mitigating to the maximum extent practicable.

It is important to understand that this determination is based on the amount of incidental take likely to occur in the future from the implementation of the covered actions (both ongoing and future) and the implementation of the Conservation Plan. There is no incidental take associated with the effects of past actions that have already been manifested in the environmental baseline that exists at the time of this consultation. Incidental take may only occur as effects of ongoing and future actions are manifested in the physical and biological habitats of the LCR.

Disposition of Dead or Injured Listed Animals

Upon finding a dead or injured threatened or endangered animal, initial notification must be made to the FWS' Division of Law Enforcement, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona (480/835-8289), or the office in Torrance, California (310/328-1516), or in Boise, Idaho (208/378-5333) within three working days of its finding. Written notification must be made within five calendar days, and include the date, time, and location of the animal, a photograph, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, remains of intact specimens of listed animal

species shall be submitted as soon as possible to the nearest FWS or state game and fish office, or other institution holding the appropriate state and Federal permits. Arrangements regarding proper disposition of potential museum specimens shall be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian, or other suitable facility in the case of injured fish. Should any treated animal survive, the FWS should be contacted regarding the final disposition of the animal.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects or a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent any Federal agency's complete fulfillment of the section 2(c) or 7(a)(1) responsibilities for the Yuma clapper rail, southwestern willow flycatcher, desert tortoise, bonytail, humpback chub, or razorback sucker. In furtherance of the purposes of the Act, we recommend implementing the following discretionary actions:

- As implementing agency for the Conservation Plan, Reclamation could participate in organized recovery planning for the covered species to ensure coordination of the LCR MSCP mitigation efforts with programs elsewhere in the species range.
- Reclamation could provide guidance on new technologies for the successful creation of riparian habitat for use by other regulatory agencies (such as the COE for the Clean Water Act section 404 permit program) and other interested landowners that would enhance the mitigation benefits derived from those programs.
- The NPS could post informational signs at all angler access areas, including both existing and new fishing docks, informing people about the presence of bonytail and razorback suckers. The information will also include instructions to safely release any bonytail or razorback suckers caught, and to inform NPS authorities.

REINITATION NOTICE

This concludes formal and conference section 7 consultation with the Reclamation as lead agency for six Federal agencies for their actions on the LCR and intra-Service consultation on the issuance of a permit authorizing incidental take under section 10(a)(1)(B) for the LCR MSCP in Arizona, California, and Nevada. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) any incidental take not authorized herein occurs, (2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this BCO, (3) the agency action is subsequently modified in a way that causes an effect to a listed species or critical habitat that was not considered in this BCO, or (4) a new species is listed or critical

habitat designated that may be affected by this action. In instances where any incidental take not authorized herein occurs, any covered actions or covered activities causing such take must cease pending reinitiation.

The FWS appreciates the level of coordination and cooperation shown during the development of the LCR MSCP by the Permit Applicants, Reclamation, and the other Federal agencies involved.

Field Supervisor — Date: 3/4/05

concur

Regional Director — Date: 4/3/05

Attachments

cc: Director, Fish and Wildlife Service, Arlington, VA (AES)
Regional Director, Region 6, Fish and Wildlife Service, Denver, CO
Manager, California/Nevada Operations Office, Fish and Wildlife Service, Sacramento, CA
Field Supervisor, Carlsbad Fish and Wildlife Office, Fish and Wildlife Service, Carlsbad, CA
Field Supervisor, Ventura Fish and Wildlife Office, Fish and Wildlife Service, Ventura, CA
Assistant Field Supervisor, Las Vegas Fish and Wildlife Office, Fish and Wildlife Service, Las Vegas, NV
Director, Colorado River Recovery Program, Fish and Wildlife Service, Denver, CO

Phil Lehr, Colorado River Commission of Nevada, Las Vegas, NV (for posting to LCR MSCP web page for dissemination to permit applicants)

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Appendix A: List of Acronyms

Act	Endangered Species Act of 1973
AESO	Arizona Ecological Services Office
af	acre foot
afy	acre-foot per year
AGFD	Arizona Game and Fish Department
AHDMS	Arizona Heritage Data Management System
AMM	Avoidance and Minimization Measure
AMWG	Adaptive Management Work Group
BA	Biological Assessment
BCO	Biological and Conference Opinion
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BO	Biological Opinion
C	degrees Centigrade
CAP	Central Arizona Project
CDFG	California Department of Fish and Game
CNDDB	California Natural Diversity Database
CMM	Conservation Area Management Measure
CRB	Colorado River Basin
CRFPA	Colorado River Floodway Protection Act
CRFWLSA	Colorado River Front Work and Levee System Act
CRIT	Colorado River Indian Tribes
GCRM	Grand Canyon River Mile
IID	Imperial Irrigation District
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
EPA	Environmental Protection Agency
FMA	Funding and Management Agreement
FWS	Fish and Wildlife Service
HCP	Habitat Conservation Plan
IA	Implementing Agreement
ISC	Interim Surplus Criteria
ISG	Interim Surplus Guidelines
LCR	Lower Colorado River
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
LHFIP	Lake Havasu Fisheries Improvement Project
LMNRA	Lake Mead National Recreation Area
maf	million acre-feet
mafy	million acre-feet per year
MBTA	Migratory Bird Treaty Act
MODE	Main Outlet Drain Extension
MRM	Monitoring and Research Measure

msl	mean sea level
Metropolitan	The Metropolitan Water District of Southern California
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NIB	Northerly International Boundary
NMFS	National Marine Fisheries Service
NPDES	National Pollutants Discharge Elimination System
NPS	National Park Service
NWR	National Wildlife Refuge
RM	River Mile (Reclamation's Davis Dam to SIB measuring system)
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
SIB	Southerly International Boundary
SDCWA	San Diego County Water Authority
SNWA	Southern Nevada Water Authority
UCREFRP	Upper Colorado River Endangered Fish Recovery Program
Reclamation	U.S. Bureau of Reclamation
USACE	U.S. Army Corps of Engineers
USDOI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
Western	Western Area Power Administration

Appendix B: Concurrence for Bald Eagle

The bald eagle is a rare to uncommon winter visitor along the LCR with as many as 15 birds sighted in a year (Rosenberg *et al*. 1991). Adult, sub-adult, and juvenile birds have been recorded during the October to March period. The nearest confirmed breeding territory to the LCR is approximately 30 miles upstream on the Bill Williams River near Alamo Dam in Arizona and was discovered in 1987.

There are no confirmed records of bald eagles breeding on the LCR. The pre-development habitat conditions with extensive riparian areas and numerous foraging opportunities in backwaters and shallow channel of the main river may have been suitable for breeding. Bald eagles in the southern United States, including central Arizona, breed earlier than those in northern areas, possibly to avoid the summer heat, and this adaptation could allow for breeding on the LCR. In 1975-1979, a pair of young adult bald eagles built and occupied a nest at Topock Marsh on the Havasu National Wildlife Refuge. Nest monitoring did not identify any eggs laid in the nest. The eagles did not return to the nest after 1979 and monitoring was discontinued in 1982. Two nests were reported in Topock Gorge, during the same period (Hunt *et al*. 1992). There was also a report of a nest on the west side of Lake Mohave approximately 15 miles upriver from Davis Dam (Forbis 1984 cited in Hunt *et al*. 1992). In 1996, a nest was observed near Parker Dam with subsequent reports of bald eagles near Gene Wash and Copper Basin reservoirs on the California side. Adult eagles were seen at the Lake Mohave and Parker Dam sites, but no reproduction was documented.

Bald eagles use tall trees, cliffs, or similar structures as roosting or foraging perches. Foraging occurs in backwaters, open areas of marshes, and main-channel habitats where fish are found. The extent of mature riparian habitat along the LCR has changed significantly over time as a result of river management and operational activities. The presence and status of backwaters has also been affected by these past and ongoing activities. For wintering birds, the existing mosaic of habitats is suitable.

Federal covered actions described in the BA (LCR MSCP 2004i) involving river and irrigation system maintenance activities, construction of new irrigation systems, recreational and habitat restoration activities, and diversion of water by Federal agencies are not expected to significantly affect the food resources, foraging opportunities, or availability of roosting habitat for the bald eagle on the LCR. There could be some disturbance of roosting or foraging bald eagles from construction or maintenance activities if an individual is in the vicinity of the action; however, the areas affected by such actions each year are limited and generally would not take place in suitable roosting or foraging habitat. This level of disturbance does not rise to a level where incidental take would be expected.

Implementation of the Conservation Plan is likely to provide conservation benefits to the bald eagle by creating new roosting areas, foraging habitats, and providing for maintenance of existing habitats used by the species through the maintenance fund. Since much of the

significant construction work on habitat-restoration projects would be done in the winter to avoid effects to migratory birds that are covered species, there could be some disturbance to wintering eagles. Roosting or foraging habitat would not be directly affected; the effects would be from noise and dust moving off the site to adjacent areas. The amount of such disturbance would be minimal, and does not rise to the level of incidental take.

The FWS must consider the effects of its action, issuance of a section 10(a)(1)(B) permit, on all listed or proposed species in the action area, even if they are not to be covered by the permit. The effects of the non-Federal covered actions are similar to those proposed by the Federal agencies and have the same level of negligible effect. The loss of riparian, marsh, and backwater habitat through the future changes in points of diversion results in a loss of these habitats for use by wintering bald eagles. However, when considering the amount of such habitat, and the number of eagles present, the effect is not significant. Over the longer term, implementation of the Conservation Plan will provide an increase in the available habitats for the bald eagle on the LCR, which provides conservation benefits for the species.

Based on the analysis provided above, the FWS concurs with a finding of “may affect, not likely to adversely affect” for all Federal actions covered in this BCO for the bald eagle.

Appendix C: Jeopardy/Adverse Modification Biological Opinions

Bonytail

- Lower Colorado River Operations and Maintenance-Lake Mead to Southerly International Boundary. Consultation number: 02-21-95-F-0216. Consulting agency: Reclamation.
- Arizona Water Quality Standards. Consultation number: 02-21-92-F-0550. Consulting agency: EPA.

Humpback Chub

- Glen Canyon Dam and Powerplant Operation. Consultation number: 02-21-87-F-0023 (draft BO prepared, consultation terminated). Consulting agency: Reclamation.
- Operation of Glen Canyon Dam and the Modified Low Fluctuating Flow Alternative. Consultation number: 02-21-93-F-0167. Consulting agency: Reclamation.
- Arizona Water Quality Standards. Consultation number: 02-21-92-F-0550. Consulting agency: EPA.

Razorback Sucker:

- Glen Canyon Dam and Powerplant Operation. Consultation number: 02-21-87-F-0023 (draft BO prepared, consultation terminated). Consulting agency: Reclamation.
- Operation of Glen Canyon Dam and the Modified Low Fluctuating Flow Alternative. Consultation number: 02-21-93-F-0167. Consulting agency: Reclamation.
- Lower Colorado River Operations and Maintenance-Lake Mead to Southerly International Boundary. Consultation number: 02-21-95-F-0216. Consulting agency: Reclamation.
- Arizona Water Quality Standards. Consultation number: 02-21-92-F-0550. Consulting agency: EPA.

Southwestern Willow Flycatcher (Arizona)

- Roosevelt Lake: Raising of Lake Levels and Dam Modifications. Consultation number: 02-21-95-F-0462. Consulting agency: Reclamation.
- Fill Activities at Verde Valley Ranch, Pecks Lake, Verde River. Consultation number: 02-21-94-F-0020. Consulting agency: USACE.
- Lower Colorado River Operations and Maintenance-Lake Mead to Southerly International Boundary. Consultation number: 02-21-95-F-0216. Consulting agency: Reclamation.

Southwestern Willow Flycatcher (New Mexico)

- Farmington District Resource Management Plan. Consulting agency: BLM.
- Mimbres Resource Area Management Plan. Consulting agency: BLM.
- Water Management on the Middle Rio Grande River. Consulting agencies: Reclamation and USACE.

Yuma clapper rail

- Arizona Water Quality Standards. Consultation number: 02-21-92-F-0550. Consulting agency: EPA.

Appendix D: Rangewide and LCR MSCP Planning Area Status, Effects of the Action, and Conservation Measures for Unlisted Covered Species.

Status information presented here is condensed from the HCP (LCR MSCP 2004g) and Appendix I in Volume IV of the program documents (LCR MSCP 2004h). Citations for material presented below from Appendix I are in the literature-cited section of that Appendix. The entire Appendix is incorporated herein by reference. The important information on the effects of the action on these species and amount of take is in Chapter 4 of the HCP (summarized in Tables 4-5 and 4-6). More specific information on the types and magnitude of effects to these non-listed covered species is in the environmental baseline discussions of changes to the physical and biological habitats, and in the effects of the action section for the listed species. Information on the avoidance, minimization, and mitigation provided by the Conservation Plan is in Chapter 5 of the HCP (summarized in Tables 5-4, 5-5, and 5-10). The information from the HCP is only summarized here, and the complete information is incorporated by reference.

Western red bat

Status of the Species

The western red bat is on the list of threatened native wildlife in Arizona, is included on the Arizona Heritage Data Management System (AHDMS) and the Nevada Natural Heritage Program (NNHP), and is a highest priority species for the Western Bat Working Group. The range of the western red bat includes most of Arizona, southern California, southern Nevada, and southwest Utah. It is a summer resident at least in the northern portion of the range, but may be a year-round resident in the south. Rangewide population trends are unclear, but the species has declined significantly in California. This bat roosts singly in riparian and other broad-leaf forests in the thick foliage of trees and large shrubs, and occasionally in caves. Threats to the species include loss of mature riparian forests used as roosting habitat and possibly contaminants in their invertebrate food base.

The western red bat has a limited number of documented records in Arizona, California, and Nevada, and has not been recorded from the LCR corridor. The nearest records are from 2001 on the upper Moapa Valley in Nevada (Williams 2001 cited in Brown and Berry 2003), and from 2002 for a pond on the Bill Williams River seven miles upstream from Lake Havasu (Brown and Berry 2003). Individuals may fly through the area, but it is not known if there is a breeding population associated with the LCR. The loss of mature riparian habitats along the LCR may have affected the western red bat population, but without historical records, it is difficult to assess this hypothesis.

Effects of the Action

Habitat for the western red bat in the LCR planning area is likely provided by cottonwood-willow and honey mesquite. Flow-related effects from changes in points of diversion would result in a loss of up to 161 acres of cottonwood-willow habitat. In addition, there may be a local

reduction in the insect prey base due the drop in the groundwater table. Non-flow related projects, primarily development of new agricultural areas on Tribal lands by BIA, will result in a loss of up to 604 acres of honey mesquite habitat. Implementation of the Conservation Plan would not result in the loss of additional acres of cottonwood-willow or honey mesquite; however, some acres of low-value roosting or foraging sites (saltcedar, saltcedar-honey mesquite) could be lost and replaced by the Conservation Plan's created cottonwood-willow and honey mesquite habitats that will be of higher value as roost sites. There is no take associated with the loss of low-value sites.

In clearing of occupied habitats for agricultural conversions or other footprint impacts, there is a potential for direct mortality of individual bats. In addition, harm and harassment of individual bats may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the western red bat within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands, and extensive clearing of these areas that removes habitat may occur. Since the species is currently not listed, there is no protection under the Act for the species or its habitats.

Conservation Measures

The Conservation Plan proposes to replace the 161 acres of cottonwood-willow habitat lost with 175 acres of new habitat, and the 604 acres of honey mesquite habitat lost with 590 acres of new habitat. These acres are included in the 5,940 acres of cottonwood-willow and 1,320 acres of honey mesquite to be created under the Conservation Plan. Additional habitat for the bat is likely to be created within the total acres of restoration, which would result in a net increase in available habitats. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species. In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the western red bat to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Although detailed rangewide survey information is limited, the current level of information is sufficient to assess the effects of the actions on this species and make a finding.

The western red bat has declined in California and its status elsewhere is uncertain due to the limited survey records. The scarcity of historical or recent records implies that this species may not have been common in the LCR, or has become less common due to loss of the mature riparian forests preferred for roosting. Additional losses to roosting habitat would occur with the

covered actions; however, these are fully offset by the creation of an equal amount of habitat under the Conservation Plan. Additional acres of cottonwood-willow and honey mesquite habitats in the more mature types (I, II, and III) created beyond that needed to fully offset habitat losses will add to the total amount of habitat present for the species in the LCR area. While not all of the restored habitat would be protected in perpetuity, the long-term nature of the LCR MSCP program provides for considerable conservation. Existing habitats would also benefit from maintenance actions funded by the Maintenance Fund. With the habitat restoration provided, the geographic position of the LCR in the center of the species' range may enable this area to become an effective migration corridor, and perhaps foster development of a breeding population.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the western red bat extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is not known to be an important area for the species, and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to species conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Western yellow bat

Status of the Species

The western yellow bat is a wildlife species of special concern in Arizona, is included on the AHDMS and the NNHP, and is a highest priority species for the Western Bat Working Group. This tropical bat has a limited range in the United States. It has been recorded from across southern Arizona east to Texas and north along the LCR corridor to the Muddy River in Nevada. It is likely a year-round resident. Western yellow bats roost singly or in small groups in broadleaf trees and palm trees. Threats to the species include the loss of native riparian trees for roosting, removal of palm groves, and possibly contaminants in their invertebrate food base.

The western yellow bat is known from several locations along the LCR, including Yuma, Imperial NWR, the Parker Strip, and Lake Havasu City. Records for areas near the LCR include the Bill Williams River and the upper Moapa Valley. There is some evidence that this species has expanded its range along the LCR in response to the planting of palm trees (Brown and Berry 2003).

Effects of the Action

Native riparian habitat for the western yellow bat in the LCR planning area is provided by cottonwood-willow and honey mesquite. Flow-related effects from changes in points of diversion would result in a loss of up to 161 acres of cottonwood-willow habitat. In addition, there may be a local reduction in the insect prey base due the drop in the groundwater table. Non-flow related projects, primarily development of new agricultural areas on Tribal lands by BIA, will result in a loss of up to 604 acres of honey mesquite habitat. Implementation of the Conservation Plan would not result in the loss of additional acres of cottonwood-willow or honey mesquite; however, some acres of low value roosting or foraging sites (saltcedar, saltcedar-honey mesquite) could be lost and replaced by the Conservation Plan's created cottonwood-willow and honey mesquite habitats. There is no take associated with the loss of low-value sites.

In clearing of occupied habitats for agricultural conversions or other footprint impacts, there is a potential for direct mortality of individual bats. In addition, harm and harassment of individual bats may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the western yellow bat within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands, and extensive clearing of these areas that removes habitat may occur. Since the species is currently not listed, there is no protection under the Act for the species or its habitats.

Conservation Measures

The Conservation Plan proposes to replace the 161 acres of cottonwood-willow habitat lost with 175 acres of new habitat, and the 604 acres of honey mesquite habitat lost with 590 acres of new habitat. These acres are included in the 5,940 acres of cottonwood-willow and 1320 acres of honey mesquite to be created under the Conservation Plan. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species. In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the western yellow bat to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Although detailed rangewide survey information is limited, the current level of information is sufficient to assess the effects of the actions on this species and make a finding.

The western yellow bat may be expanding its range in the United States, particularly along the LCR MSCP corridor. Its status elsewhere is uncertain. The magnitude of effects from loss of native riparian areas in the LCR corridor on the species' distribution is difficult to assess due to its use of palm trees. Additional losses to roosting habitat would occur with the covered actions; however, these are fully offset by the creation of an equal amount of habitat under the Conservation Plan. In addition, additional acres cottonwood-willow and honey mesquite habitats in the more mature types (I, II, and III) created beyond that needed to fully offset habitat losses will add to the total amount of habitat present for the species in the LCR area. While not all of the restored habitat would be protected in perpetuity, the long-term nature of the LCR MSCP program provides for considerable conservation. Existing habitats would also benefit from maintenance actions funded by the Maintenance Fund. Even with the geographic position of the LCR at the edge of the species' range, habitat restoration may provide an enhanced migration corridor, and perhaps foster development of a larger breeding population.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the western yellow bat extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is not known to be an important area for the species, the species appears to be expanding into the existing habitat areas, and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to species conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

<u>Desert pocket mouse</u>

Status of the Species

The desert pocket mouse is included on both the AHDMS and NNHP. It is a high-priority evaluation species under the Clark County MSHCP. As an evaluation species, there is no incidental take coverage for the desert pocket mouse in the plan, there are no specific conservation measures included for the species, and no designated funding is identified.

The range of the desert pocket mouse is southern Nevada to southwest Utah and south along the LCR corridor to Davis Dam in Arizona and Nevada. Habitat consists of open, shrubby xeric riparian mixed shrub community on alluvial sands. (Zane Marshall, Southern Nevada Water Authority, personal communication 2004). It is not a riparian-dependent species, but occupied

habitat is often adjacent to riparian areas. Threats to the desert pocket mouse include loss or disturbance of habitat conditions.

The desert pocket mouse has been reported from locations on the Muddy and Virgin rivers above Lake Mead, along the Overton Arm of Lake Mead, at Las Vegas Wash above Lake Mead, and along the Colorado River south of Hoover Dam to the vicinity of Big Bend State Park near Laughlin, Nevada and possibly as far downstream as Topock Gorge. The amount of desert pocket mouse habitat and the status of those populations within the LCR MSCP planning area are not known. Additional surveys are needed to refine the extent of occupied habitat within the planning area.

Effects of the Action

Direct loss of desert scrub habitat for the desert pocket mouse may occur from implementation of non-flow related covered actions and habitat restoration and maintenance under the Conservation Plan. These losses are likely to be minimal and have not been quantified, since most activities will not take place in the preferred habitats of the pocket mouse. There may be harm and harassment to pocket mice in suitable habitats adjacent to work areas due to noise, dust, and other disturbances. Some direct mortality of pocket mice may occur if any work is done in their habitats. The amount of this disturbance-related take cannot be quantified.

The analysis of effects to the desert pocket mouse assumes, based on the described range that no covered actions would occur in their habitats. However, extension of the possible range of the pocket mouse to Topock Gorge could result in agricultural development on the Fort Mojave Reservation removing an unknown amount of pocket mouse habitat. This is new information and is not analyzed in the HCP.

The lack of information on desert pocket mouse distribution prevents an effective analysis of cumulative effects. The desert scrub habitats potentially occupied by the species are widespread, and are afforded limited protection from development or other disturbances.

Conservation Measures

To the extent practicable, implementation of non-flow related covered actions and implementation of the Conservation Plan would avoid desert pocket mouse habitats. Because the extent of pocket mouse distribution within the LCR MSCP planning area is not fully understood, surveys will be conducted to define the distribution of the species to better allow for avoidance of its habitat.

Finding: Insufficient Information on Status to Adequately Address

The standard for coverage of an unlisted species in a section 10(a)(1)(B) permit is that the species be “adequately covered” in the HCP, and that level of information is sufficient for the FWS to evaluate the status of the species and the effects of the action to make a determination

that the action is not likely to jeopardize the continued existence of the species. This standard has not been met for the desert pocket mouse.

The desert pocket mouse is a species with a fragmented and limited distribution that makes it vulnerable to habitat loss and stochastic events that could eliminate local populations. The baseline population condition for the species is unclear, and the amount of protection for the species and its habitat through existing laws and regulations is extremely limited. There was insufficient information to include the desert pocket mouse as a covered species in the Clark County MSHCP, and we are unaware of any additional information developed since that planning process.

The extent of adverse effects to the desert pocket mouse from the Conservation Plan is very small, and the conservation measure to avoid impacts or replace habitat is sufficient to address that level of effect. There is no analysis of the potential adverse effects of habitat loss due to agricultural development. That fact, together with the uncertainty about the status of the species significantly reduces the level of certainty for the FWS that the HCP measures would satisfy permit issuance criteria if the species were listed, which is the standard we must use in this BCO. As a covered species with future incidental take coverage under the section 10(a)(1)(B) permit, and the existence of "no surprises" assurances in the permit that limit future exposure to additional conservation requirements, inclusion of the desert pocket mouse as a covered species does not satisfy the requirements of the Act. We suggest that this species be included as an evaluation species in the LCR MSCP, with the same conservation measures as contained in the HCP, until such time that information on the status of the species is obtained. In addition, efforts to define pocket mouse habitats that could be affected by footprint impacts of agricultural development should be a priority.

<u>Colorado River cotton rat</u>

Status of the Species

The Colorado River cotton rat is included on the AHDMS and the California Natural Diversity Database (CNDDB). It is also a species of special concern in California. This subspecies of the Arizona cotton rat is isolated from the rest of the species' range in central and southeastern Arizona. The range of the Colorado River cotton rat is confined to the LCR corridor in Arizona and California. Populations in Nevada are considered extirpated. Within that range, the distribution is in isolated patches, not a continuous band. Habitat is found in areas with moist soils containing grasses and forbs, generally in or adjacent to marshes. Irrigated croplands may also provide suitable habitats in some areas. Threats to the Colorado River cotton rat include the loss of habitat related to drying of the floodplains and loss of moist riparian areas, although creation of irrigated cropland that provides suitable habitat components may offset the loss of native habitats. Hoffmeister (1986) reported cotton rats were common in agricultural fields near Parker. Populations are believed to have declined, but there is limited survey information.

The entire range of the Colorado River cotton rat is in, or immediately adjacent to, the LCR

MSCP planning area. Known locations on the LCR include Topock Marsh, the vicinity of Parker Dam, lands in the vicinity of Headgate Rock Dam, lands near Blythe, and in the vicinity of the Cibola NWR. Additional surveys are needed to refine occupied habitat within the planning area.

Effects of the Action

Moist grassy areas adjacent to and within cattail/ bulrush marshes provide habitat for the Colorado River cotton rat. They are not found in upland habitats. Flow-related effects from changes in points of diversion would result in a loss of up to 59 acres of marsh habitat. Non-flow related projects, primarily maintenance of boat launch and similar facilities, will result in a loss of 3 acres of marsh habitat, and implementation of habitat restoration actions may eliminate up to 5 acres of low-value marsh habitat. There is no take associated with the loss of low-value sites. Clearing of drains was not determined to result in losses to cotton rat habitat. Implementation of the Conservation Plan would not result in the loss of additional acres of marsh habitats, except that up to 125 acres of degraded marsh habitat may be temporarily lost if those areas are restored to functional status as part of the 512 acres of marsh to be created under the Conservation Plan.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual cotton rats. In addition, harm and harassment of individual cotton rats may occur in the areas of the created habitats during vegetation maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the Colorado River cotton rat within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands, and extensive clearing of these areas may occur. Since the species is currently not listed, there is no protection under the Act for the species or its habitats.

Conservation Measures

The Conservation Plan proposes to replace the 67 acres of marsh habitat lost with 125 acres of new marsh habitat. These acres are included in the 512 acres of marsh contained in the Conservation Plan. Depending on the final location of the remaining marsh habitats created under the Conservation Plan, additional marsh habitat would be available to contribute to species conservation within the known range. Existing habitat that is maintained in suitable conditions through actions funded by the Maintenance Fund will also contribute to the conservation of the species. Avoidance of flow-related effects to Topock Marsh also provides protection for 16 existing acres of Colorado River cotton rat habitat. In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the Colorado River cotton rat to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

The standard for coverage of an unlisted species in a section 10(a)(1)(B) permit is that the species be "adequately covered" in the HCP, and that level of information is sufficient for the FWS to evaluate the status of the species and the effects of the action to make a determination that the action is not likely to jeopardize the continued existence of the species. The extremely restricted range of the Colorado River cotton rat requires special consideration of this standard.

Virtually the entire range of the Colorado River cotton rat is within the LCR MSCP planning area. This species has a very limited distribution that makes it vulnerable to habitat loss and stochastic events that could eliminate local populations. The baseline population condition for the species is unknown, and the degree to which created habitats (agricultural areas) meet the needs of the species is unclear. Within the range of the subspecies, there are three NWRs (Havasu, Bill Williams River, and Cibola) that possess suitable habitat for the cotton rat. The subspecies has been documented on Havasu and Cibola, and near the Bill Williams River in the vicinity of Parker Dam. The habitat on the refuges is protected, and maintenance actions will ensure long-term presence of suitable habitat. The amount of suitable habitat has not been measured.

Much of the rest of the cotton rat's habitat is not protected. The cotton rat has also been found on CRIT lands near Palo Verde and likely it is found along the river near created and maintained backwaters containing cattail marshes and dense grassy/weedy areas nearby. Some of these potentially occupied areas are protected through Federal ownership or withdrawal, and may be mitigation areas maintained by Reclamation for past river management actions. Implementation of covered actions to maintain those areas would require surveys prior to the disturbance of habitat to assess the presence of cotton rats.

The extent of adverse effects to the Colorado River cotton rat from the LCR MSCP is 125 acres of presumed suitable habitat, and the conservation measure to avoid impacts or replace habitat is sufficient to address that level of effect. With the addition of the conservation measure described above, and the ability of the maintenance fund to protect existing habitats, the LCR MSCP provides a level of protection and habitat certainty not currently available to the Colorado River cotton rat. In addition, focused research and monitoring would contribute to our understanding of the species, and enable interested parties to work together to add to the level of conservation provided by the LCR MSCP. We believe, based on the information available on the Colorado River cotton rat, that the benefits of inclusion in the LCR MSCP as a covered species are significant. All covered activities must take into account the presence of the species, and equal habitat mitigation is provided. Habitat on protected lands can be maintained, and additional information acquired to contribute to implementation of effective recovery actions.

The known range of the Colorado River cotton rat is largely within the planning area of the LCR MSCP. Protection of significant amounts of habitat on NWRs, Reclamation mitigation lands, and possibly other managed areas is part of the existing condition that would be enhanced by the

inclusion as a covered species. In addition, habitat mitigation and maintenance would provide stability to extant populations. This review is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species. The LCR MSCP planning area contains the core for the subspecies' population, and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Yuma hispid cotton rat

Status of the Species

The Yuma hispid cotton rat is included on both the AHDMS and CNDDB. It is also a species of special concern in California. The range of the Yuma hispid cotton rat is the vicinity of the LCR in Yuma County, Arizona, Imperial County, California, and along the Colorado River delta in Mexico. Populations in Arizona and California appear to be stable or expanding. The status of the species in Mexico is uncertain. Habitat for the species is found in riparian areas with moist soils containing grasses and forbs, and irrigated croplands. Threats to the Yuma hispid cotton rat include loss of native habitats, although the species may have expanded its range through the creation of irrigated cropland.

The entire range of the Yuma hispid cotton rat is in or immediately adjacent to the LCR MSCP planning area. Known locations occur from the Yuma area south along the Colorado River to the border with Mexico. Additional surveys are needed to refine the extent of occupied habitat within the planning area.

Effects of the Action

Habitat for the Yuma hispid cotton rat in the LCR planning area is provided by cottonwood-willow stands with moist soils supporting grasses and forbs, and man-made habitats associated with irrigated agriculture. There are no flow-related habitat losses for this species because its range is below the reach of the LCR that would be affected by changes in points of diversion. However, because this species is associated with moist habitats in agricultural areas, any actions that would result in fallowing farmland to provide water for other uses (for example, changes in points of diversion for water presently used to irrigate fields) within the range of the species could result in a loss of these agricultural-related habitats. Fallowing of fields to provide water for transfers is not a covered action under the LCR MSCP. Effects of fallowing would be considered in project-specific analyses done at the time the transfer is proposed. Non-flow related effects from agricultural conversions and other river management actions will result in a loss of up to 71 acres of cottonwood-willow habitat. Creation of agricultural areas may, depending on water management, provide for new habitats suitable for the species. Implementation of habitat-restoration actions may eliminate up to 5 acres of low-value habitat. There is no take associated with the loss of low-value sites. Implementation of the Conservation

Plan would not result in the loss of additional acres of suitable habitats; however, an undetermined amount of low-value habitats may be lost if those areas are included in the restoration areas created under the Conservation Plan.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual cotton rats. In addition, harm and harassment of individual cotton rats may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the Yuma hispid cotton rat within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands, and extensive clearing of these areas, or changes in agricultural uses that that removes habitat may occur. Since the species is currently not listed, there is no protection under the Act for the species or its habitats.

Conservation Measures

The Conservation Plan provides for the creation of 76 acres of Yuma hispid cotton rat habitat within the 5,940 acres of cottonwood-willow habitat contained in the plan. Depending on the final sites of the cottonwood-willow habitats, additional areas of suitable habitat within the species' range may be available. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species. In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the Yuma hispid cotton rat to address potential losses to existing habitats during implementation of the Conservation Plan, covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Although detailed rangewide survey information is limited, the current level of information is sufficient to assess the effects of the actions on this species and make a finding.

The Yuma hispid cotton rat is as species known only from a limited range in which much of its natural habitat has been lost. However, new habitats associated with agricultural development appear to be suitable for the species, and its range may have expanded up the LCR and into the Imperial Valley as a result. There is limited information on current population status and distribution; however, the information that the species is expanding its range despite loss of natural habitats provides an indication that species is not highly at risk. With that assumption, firm data on the population can be obtained after permit issuance through implementation of the survey and monitoring activities. The level of effects to Yuma hispid cotton rat habitats from the covered actions will be completely offset by the mitigation, and the significant increase in available natural habitat through cottonwood-willow restoration in reaches 6 and 7 (Figure 5.1 of

the HCP) would provide a significant expansion of the existing habitat. While not all of the restored habitat would be protected in perpetuity, the long-term nature of the LCR MSCP program provides for considerable conservation. Existing habitats could also benefit from maintenance actions funded by the Maintenance Fund. With the habitat restoration provided, the LCR will be an important habitat area for the species, and perhaps foster development of a larger breeding population.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

The amount of agricultural land that could be fallowed to provide water for upstream transfers is not likely to represent a significant amount of the available habitat; however, the amount should be documented as part of the species' monitoring. It should be noted that land fallowing is not a covered action under the LCR MSCP, and additional environmental compliance would be accomplished for any such actions related to water transfers in the future. A significant amount of habitat loss from future non-LCR MSCP actions is not anticipated. Based on the assumption that water uses in Mexico within the range of the species are not likely to change significantly, changes to existing habitats in Mexico are not likely to occur.

Because the range of the Yuma hispid cotton rat extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important area for the species, the species appears to be expanding into the human-made habitat areas, and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

<u>Western least bittern</u>

Status of the Species

The western least bittern is included on both the AHDMS and CNDDB. It is a marsh bird species of special concern in Arizona and California. It is protected under the Migratory Bird Treaty Act (MBTA). The most recent information indicates that the eastern least bittern (*Ixobrychus exilis exilis*) and western least bittern (*I. e. hesperis*) likely do not constitute separate subspecies (Gibbs *et al*. 1992). Because the two occupied areas are widely separated by the Great Plains and Rocky Mountains, this analysis will focus on the populations in the west that were termed the *hesperus* subspecies with the assumption that interactions between the two

former subspecies are limited, and the effects of the action are best considered for the western population only.

The range of the western least bittern is central Oregon, California, northwestern Mexico, and the LCR corridor in Arizona and California (Gibbs *et al*. 1992). Life history information is also found in Gibbs *et al*. 1992 and Gibbs and Melvin 1992. A summer breeder throughout the range, it may also be a year-round resident in the southern portions. Habitat for western least bitterns is in dense, freshwater marshes. Marshes over 5 acres in size provide more suitable habitat than smaller patches. Threats to the western least bittern include loss of marsh habitat. Contamination of the forage base by selenium may also be a threat to the species.

Populations in central California have been moderately reduced, with threats to the species described as being sufficient to reduce the extent of the species within California 10-15 % over the next 20 years (California Bird Species of Special Concern information is available from the Point Reyes Bird Observatory website at www.prbo.org). The degree of threats to the species put the western least bittern in the third priority for conservation attention. Western least bitterns are listed as peripheral or naturally rare on the Oregon Sensitive Wildlife Species List (www.dfw.state.or.us). This category is for species at the edge of their range, or that had limited historical distribution in the state due to natural limiting factors. The goal for these species is to maintain current population levels. Western least bittern populations in Mexico are concentrated in marshes along the Colorado River Delta and the Cienega de Santa Clara (Eddleman 1989, Hinojosa-Huerta *et al*. 2004) and along the Sonoran coast of the Sea of Cortez (Russell and Monson 1998).

The largest populations of the species within the LCR MSCP planning area are at Topock, Cibola Lake, and the marshes near Imperial Dam (Rosenberg *et al.* 1991). Densities of birds in these larger habitat areas may reach 40 birds per 100 acres (Rosenberg *et al*. 1991). Smaller groups are present in other suitable marsh habitats along the LCR. Additional surveys are needed to refine the extent of known occupied habitat within the planning area.

Effects of the Action

Habitat for the western least bittern in the LCR planning area is provided by cattail-bulrush marshes. Flow-related effects from changes in points of diversion will result in the loss of up to 133 acres of marsh habitat. Non-flow related effects from river management actions including dredging will result in a loss of up to 70 acres of marsh habitat. Implementation of habitat-restoration actions may eliminate up to 10 acres of low-value habitat. Maintenance of canals and drains will result in the repeated loss of 30 acres of habitat over 557 miles of these facilities. Implementation of the Conservation Plan would not result in the loss of additional acres of suitable habitats; however, an undetermined amount of low-value habitats may be lost if those areas are included in the restoration areas created under the Conservation Plan. For marsh habitat, up to 512 acres of degraded marsh could be used to create 512 acres of functional marsh.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for

direct mortality of individual least bitterns. In addition, harm and harassment of individual least bitterns may occur in the areas of the created habitats during vegetation maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the western least bittern within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps with the Yuma clapper rail, protections for marsh habitats on the LCR from Federal actions also extend to the western least bittern.

Conservation Measures

The Conservation Plan proposes to replace the 243 acres of marsh habitat lost with 512 acres of new marsh habitat. Requirements for minimum patch size for marsh habitats for the Yuma clapper rail will provide for western least bittern habitat. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the western least bittern to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species and potential increases in selenium concentrations. Avoidance of flow-related effects to Topock Marsh also provides protection for 16 existing acres of western least bittern habitat.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Although detailed rangewide survey information is limited, the current level of information is sufficient to assess the effects of the actions on this species and make a finding.

Populations of the western least bittern have declined; however, the losses have not reduced the range or decreased populations to critical levels in California or Arizona. The future of the bittern is dependent on the extent and quality of cattail-bulrush marsh habitats that can be preserved or developed, especially within California and along the LCR. The status of the species in Mexico is largely dependent on the maintenance of the marshes at the Cienega de Santa Clara.

Sufficient habitat exists in the LCR to support significant populations of this species to contribute to the species' overall status. The loss of marsh habitat due to LCR MSCP actions will be fully offset by creation of new marsh. Additional marsh that would be created beyond that needed to replace habitat losses will provide additional habitat for the species and allow for expansion of existing populations. Most of the existing marsh habitat is in Federal ownership, and for some areas there are maintenance requirements. Existing marshes are also likely to be a

focus for maintenance activities funded by the Maintenance Fund, which will help ensure the continuity of existing habitats into the future.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

The impact of current levels of selenium on bitterns in the planning area is unknown. Selenium may be an issue of concern for the ability of habitats created by the LCR MSCP to meet suitable conditions for occupancy by covered species.

Because the range of the western least bittern extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species to ensure the LCR can contribute fully to the conservation needs. The certainty of water for the Cienega de Santa Clara is not influenced by the covered actions in this BCO. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

<u>California black rail</u>

Status of the Species

The California black rail is included on both the AHDMS and CNDDB. It is listed as threatened under the California Endangered Species Act (CESA) and is a bird species of special concern in Arizona. It is protected under the MBTA. The range of the California black rail extends through central and southern California, the LCR corridor, and into Mexico. Life history and habitat information is summarized in Eddleman *et al*. 1994. The black rail may be a recent colonizer of the LCR (possibly due to the creation of more stable marsh habitats), as the first record is from 1969 below Imperial Dam (Rosenberg *et al.* 1991). It is not known from Nevada. Habitat of the species includes both salt and freshwater marshes with shallow water and dense vegetation. Some populations are migratory. Threats to the California black rail are primarily related to the loss of coastal and freshwater marsh habitats.

California black rail populations have declined significantly over recent years. Two main population centers remain; one in northern California (Sacramento Valley and the San Francisco Bay area), and one in the LCR region (including south-central California and the LCR Delta region of Mexico). Many sites in both northern and southern California, particularly the coastal

marshes, no longer support black rails, and historical sites in the Imperial Valley have also been lost (current status summarized in Courtney *et al*. 2002). Surveys in the San Francisco Bay area found black rails restricted to the northern reaches (cited in Eddleman *et al*. 1994)) and with the loss of much of the historical marsh habitat in the bay, the extent of available habitat has declined significantly. Surveys of historical black rail sites outside of the northern California population area in 2000-2001 documented 131 black rails, of which 100 were on or near the LCR and 21 were at sites along the All-American Canal in California (Conway *et al*. 2002). Some sites that once contained black rails were no longer occupied. Surveys in Mexico around the Colorado River Delta in 2000 documented 19 black rails, of which 16 were in the Cienega de Santa Clara (Hinojosa-Huerta *et al*. 2000, 2001b).

The LCR MSCP planning area contains a significant amount of the remaining occupied habitat for the California black rail. The species is a permanent resident of marshes near Imperial Dam including Mittry Lake, where the largest population exists. The Bill Williams River upstream of the planning area also supports a population, as do the seep marshes along the All-American Canal. The recent survey of the LCR (Conway *et al.* 2002) included all possible California black rail habitats below Hoover Dam, and is the most definitive information on location and abundance of populations in the LCR planning area.

Effects of the Action

Habitat for the California black rail in the LCR planning area is provided by cattail-bulrush marshes. Flow-related effects from changes in points of diversion will result in the loss of up to 37 acres of marsh habitat. Non-flow related effects from river management actions including dredging would result in a loss of up to 31 acres of marsh habitat. Implementation of habitat restoration actions may eliminate up to 5 acres of low-value habitat. Maintenance of canals and drains will result in the repeated loss of 30 acres of habitat patches over 557 miles of these facilities. The actual extent of habitat in these facilities is not known. Implementation of the Conservation Plan would not result in the loss of additional acres of suitable habitats; however, an undetermined amount of low-value habitat may be lost if those areas are included in the restoration areas created under the Conservation Plan. For marsh habitat, up to 512 acres of degraded marsh could be used to create 512 acres of functional marsh.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual black rails. In addition, harm and harassment of individual black rails may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the California black rail within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps to some extent with the Yuma clapper rail, protections for marsh habitats on the LCR from Federal actions also partially extend to the California black rail.

Conservation Measures

The Conservation Plan proposes to replace the 103 acres of marsh habitat lost with 130 acres of new marsh habitat. Depending on the final location and design of the remaining marsh habitats created under the Conservation Plan, additional marsh habitat could be available to contribute to the species' conservation. Existing habitat that is maintained in suitable conditions through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the California black rail to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species and potential increases in selenium concentrations. Avoidance of flow-related effects to Topock Marsh also provides protection for 16 existing acres of black rail habitat.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is available for this species and is sufficient to assess the effects of the actions on this species and make a finding.

The LCR planning area contains a significant amount of the remaining habitat for the species in the United States and is critical to the long-term conservation of the species. While populations have declined over the last 20 years, black rails may have become more common in the LCR since the pre-development period as a result of changes to river management that resulted in creation of larger and longer-lasting marsh habitats. However, many of these marshes are declining in quality and, without active management, their value to the species declines and this may be a cause of the recent population declines noted in surveys between the 1980s and today. With the loss of the south-central California populations, the LCR and Mexican populations are more isolated from those in northern California and are at a higher risk of extirpation due to stochastic events and loss of habitat. Available habitat will increase with the implementation of the Conservation Plan, and existing habitats could benefit from habitat-maintenance activities funded by the Conservation Plan. The increase in managed habitat may provide sufficient area to support a genetically viable, self-sustaining population that will contribute to conservation needs.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

The impact of current levels of selenium on black rails in the planning area is unknown.

Selenium may be an issue of concern for the ability of the habitats created by the LCR MSCP to meet suitable conditions for occupancy by covered species

Because the range of the California black rail extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. The California black rail in northern California is the subject of active management actions to ensure the continuation of that population. The certainty of water for the Cienega de Santa Clara is not influenced by the covered actions in this BCO. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

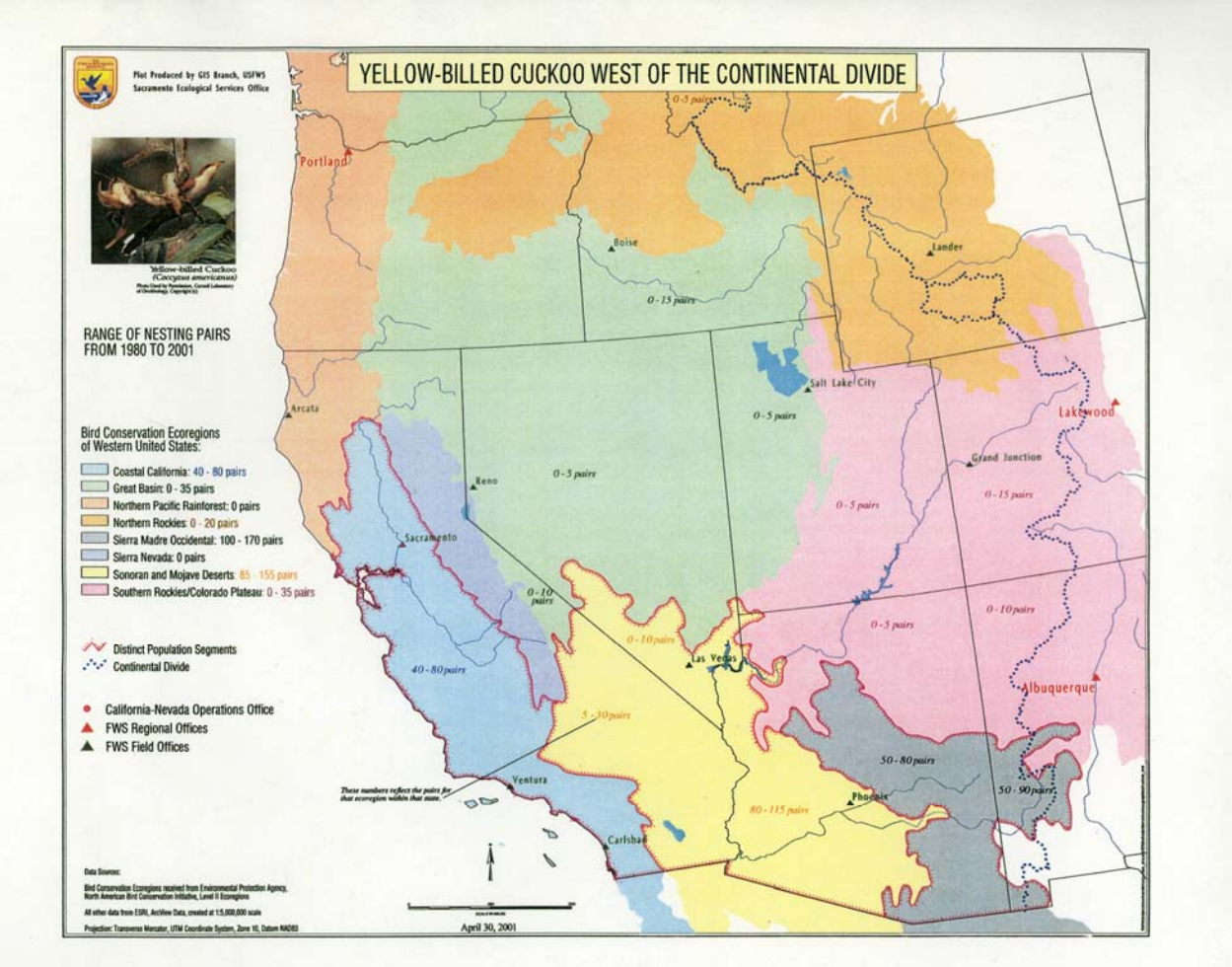
Yellow-billed cuckoo

Status of the Species

The yellow-billed cuckoo is a candidate for listing under the Act. It is included in the AHDMS, the CNDDB, and the NNHP, is listed as endangered under CESA, and is a bird species of special concern in Arizona. It is a covered species under the Clark County MSHCP, the Western Riverside MSHCP, and the Salt River Project Roosevelt Lake HCP. It is protected under the MBTA. The taxonomic status of the yellow-billed cuckoo remains a subject of biological controversy. The FWS, in its 2000 90-Day Administrative Finding on a petition to list the western yellow-billed cuckoo, determined that there was not sufficient information to support the validity of a separate western subspecies, or that would support a finding of a Distinct Vertebrate Population Segment (DPS) under requirements of the Act and subsequent regulations (USFWS 2000). In 2001, the FWS (USFWS 2001c) issued a 12-month finding, which determined that the western populations of the yellow-billed cuckoo did constitute a DPS. Listing of the DPS has been determined to be warranted, but has been precluded by higher-priority listing actions. Based on this finding, this analysis will only consider the status of the western DPS for the yellow-billed cuckoo.

The range of the yellow-billed cuckoo in the western United States extends from the Pacific Northwest, south through California to Arizona, and eastward to the Rocky Mountain States. The largest populations are in Arizona and California, with it being locally common in suitable habitats in the other states. Life history and habitat information is summarized in Hughes (1999) and Laymon (1998). Populations have declined significantly throughout its range (summarized in Halterman 2001, Hughes 1999). A map showing numbers of nesting pairs of cuckoos by bird conservation eco-regions, and based on data from 1980-2001, showed between 260 and 495 pairs recorded in that period (Figure 2). The majority of those pairs were in the

Figure 2: Yellow-Billed Cuckoo Western Population Distribution



Sonoran-Mohave Desert of Arizona, California, and Nevada; and in the Sierra Madre Occidental of Arizona and New Mexico. Important populations persist in areas along the Sacramento and Kern Rivers in California, and rivers in southeastern Arizona (Corman and Magill 2000, Furtek and Tomlinson 2003, Halterman 2001,2002; Hughes 1999, Laymon 1998). This migratory species uses mature riparian woodlands for nesting. Loss of these mature woodlands has been the most significant threat to the species.

The only significant population of yellow-billed cuckoo in the LCR MSCP planning area is at the Bill Williams River NWR above Lake Havasu. That population declined from 20-25 pairs to six pairs in 1999, increasing to 10-13 in 2000 (Halterman 2001). Other occupied sites include the Virgin River delta, Cibola NWR, Ehrenberg, Imperial NWR, Picacho State Park, Walker Lake, the confluence of the Gila and Colorado rivers, and at Gadsden Bend near Yuma (Rosenberg *et al*. 1991). This species has also been found recently in areas being restored with native cottonwood and willow. Additional survey information for this species is contained in McKernan and Braden (2002).

Effects of the Action

Habitat for the yellow-billed cuckoo in the LCR planning area is provided by cottonwood-willow vegetation. Flow-related effects from changes in points of diversion would result in a loss of up to 1,425 acres of cottonwood-willow habitat. An undetermined amount of cuckoo habitat around Lake Mead may be created and eliminated over the 50-year period. Non-flow related projects, primarily agricultural conversion and river management actions, will result in a loss of up to 99 acres of habitat and implementation of habitat restoration actions may eliminate up to 10 acres of low-value habitat. Implementation of the Conservation Plan would not result in the loss of additional acres of cottonwood-willow habitats, except that some areas of low-value habitat may be lost if those areas are restored to functional status as part of the habitat to be created under the Conservation Plan.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual cuckoos. In addition, harm and harassment of individual cuckoos may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the yellow-billed cuckoo within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for mature riparian habitats on the LCR from Federal actions also partially extend to the yellow-billed cuckoo.

Conservation Measures

The Conservation Plan provides for the creation of 4,050 acres of yellow-billed cuckoo habitat

within the 5,940 acres of cottonwood-willow habitat contained in the plan. Depending on the final siting of the cottonwood-willow habitats, additional areas of suitable habitat within the species' range may be available. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the cuckoo to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species. Avoidance of flow-related effects to Topock Marsh also provides protection for 133 existing acres of cuckoo habitat.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is available for this species and is sufficient to assess the effects of the actions on this species and make a finding.

The LCR planning area contains a significant amount of the remaining habitat for the species in the western United States and is critical to the long-term conservation of the species in the west. Although populations have declined as a result of habitat loss within the planning area, this is still an important area for the species to connect populations in central and southern Arizona with those in California and Nevada. Available habitat will increase with the implementation of the Conservation Plan, and existing habitats could benefit from habitat-maintenance activities funded by the Conservation Plan. The increase in managed habitat may provide sufficient area to support a genetically viable, self-sustaining population that will contribute to conservation needs of the DPS.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the yellow-billed cuckoo extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important habitat area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. The species is included as a covered species on three HCPs within the DPS unit, and the LCR MSCP will be complementary to those efforts. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Elf owl

Status of the Species

The elf owl included on the AHDMS and CNDDB. It is listed as endangered under CESA, and is a Nevada State Protected species. It is protected under the MBTA. The range of the elf owl extends from west Texas to southern California, north to southern Nevada, and south into Mexico. The elf owl is a migratory species and, as a cavity nester, requires mature woodlands with large trees or desert areas with large columnar cactus (Henry and Gehlbach 1999). Life history and habitat information is given in Henry and Gehlbach (1999). Loss of riparian woodlands, both of cottonwood-willow and mesquite, constitute significant threats to the species in this portion of its range.

The LCR planning area is at the extreme western edge of the range of the elf owl. Known locations include the Fort Mojave area, Bill Williams River NWR, Headgate Rock Dam, Wilson Road, Waterwheel Camp, Aha Quin Camp, Waters Camp, Cibola NWR, and Picacho State Park (Rosenberg *et al*. 1991). The species was once found south in the Yuma area but has not been recorded there recently. The majority of the elf owls in California are located along the LCR. Additional surveys are needed to refine the extent of known occupied habitat within the planning area. Some survey information for this species is contained in McKernan and Braden (2002).

Effects of the Action

Habitat for the elf owl in the LCR planning area is provided by cottonwood-willow and honey mesquite. Flow-related effects from changes in points of diversion would result in a loss of up to 161 acres of cottonwood-willow habitat. Non-flow related projects, primarily agricultural conversion and river management actions, would result in a loss of up to 590 acres of cottonwood-willow and honey mesquite habitat. Implementation of the Conservation Plan would not result in the loss of additional acres of habitats, except that some areas of low-value habitat may be lost if those areas are restored to functional status as part of the habitat to be created under the Conservation Plan. There is no take associated with the loss of low-value sites.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual elf owls. In addition, harm and harassment of individual elf owls may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the elf owl within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for mature riparian habitats on the LCR from Federal actions also partially extend to the elf owl.

Conservation Measures

The Conservation Plan provides for the creation of 600 acres of elf owl habitat within the 5,940 acres of cottonwood-willow habitat, and 1,184 acres of honey mesquite within the 1,320 acres contained in the plan. Depending on the final siting of this habitat, additional areas of suitable habitat within the species' range may be available. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the elf owl to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species. The measures also include placement of nest boxes and research into the species' interactions with European starlings.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is not available for this species; however, the local information is sufficient to assess the effects of the actions on this species and make a finding.

The elf owl in the LCR MSCP planning area is near the western edge of its range and the populations there are likely not a significant component of the overall population. The LCR MSCP planning area is an important component for the remaining populations in California, and that importance is noted.

Losses to mature riparian habitat likely resulted in a decline in the number of birds along the LCR over the last 100 years. Habitat losses from the covered actions would be fully replaced, with additional habitat created for the elf owl above that amount replaced. Surveys and monitoring will document the effects of management actions and provide for effective habitat creation. Available habitat will increase with the implementation of the Conservation Plan, and existing habitats could benefit from habitat maintenance activities funded by the Conservation Plan. The increase in managed habitat may provide sufficient area to support a viable population at this western extent of the range.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, directed research on habitat needs, and species interactions with competitors such as starlings.

Because the range of the elf owl extends beyond the LCR MSCP planning area, the FWS must

consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in a loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important habitat area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Gilded flicker

Status of the Species

The gilded flicker is a woodpecker included on the AHDMS and CNDDB. It is listed as endangered under CESA. It is protected under the MBTA. The gilded flicker was recently elevated to full species status and is no longer considered a subspecies of the northern flicker. This species' range is in the Sonoran Desert area of the southwestern portion of the United States into northern Mexico (Moore 1995). The gilded flicker remains a common species in much of its range, with local populations subject to habitat losses. Life history and habitat information is provided in Moore (1995). Habitat includes deserts with large cacti, mature riparian woodlands, and similar areas where nest cavities in trees can be hollowed out. Loss of riparian woodlands is a significant threat to the species in this portion of their range.

The LCR planning area is at the western edge of the range of the gilded flicker. Recent records for a substantial population are from riparian areas along the Bill Williams River. Small numbers also persist at Fort Mojave, the Colorado River Indian Reservation, Topock Marsh, Lake Havasu, Ehrenberg, Cibola NWR, Walker Lake, Imperial NWR, and the riparian area between Imperial and Laguna dams (Rosenberg *et al*. 1991). Some survey information for this species is contained in McKernan and Braden (2002).

Effects of the Action

Habitat for the gilded flicker in the LCR planning area is provided by cottonwood-willow. Flow-related effects from changes in points of diversion would result in a loss of up to 1,425 acres of cottonwood-willow habitat. Non-flow related projects, primarily agricultural conversion and river-management actions, will result in a loss of up to 99 acres of habitat and implementation of habitat restoration actions may eliminate up to 10 acres of low-value habitat. Implementation of the Conservation Plan would not result in the loss of additional acres of habitats, except that some areas of low-value habitat may be lost if those areas are restored to functional status as part of the habitat to be created under the Conservation Plan.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual gilded flickers. In addition, harm and harassment of individual flickers may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust,

and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the gilded flicker within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state and Federally owned lands. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for mature riparian habitats on the LCR from Federal actions also partially extend to the gilded flicker.

Conservation Measures

The Conservation Plan provides for the creation of 4,050 acres of gilded flicker habitat within the 5,940 acres of cottonwood-willow habitat contained in the plan. Depending on the final siting of the cottonwood-willow habitats, additional areas of suitable habitat within the species' range may be available. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the flicker to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species. Installation of artificial snags to provide nest sites is also included.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is not available for this species; however, the local information is sufficient to assess the effects of the actions on this species and make a finding.

The gilded flicker in the LCR MSCP planning area is near the western edge of its range and the populations there are likely not a significant component of the overall population. The LCR MSCP planning area is an important component for the remaining populations in California, and that importance is noted.

Losses to mature riparian habitat likely resulted in a decline in the number of birds along the LCR over the last 100 years. Habitat losses from the covered actions would be fully replaced, with additional habitat created for the gilded flicker above that amount replaced. Surveys and monitoring will document the effects of management actions and provide for effective habitat creation. Available habitat will increase with the implementation of the Conservation Plan, and existing habitats could benefit from habitat maintenance activities funded by the Conservation Plan. The increase in managed habitat may provide sufficient area to support a viable population at this western extent of the range.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the

Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the gilded flicker extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important habitat area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Gila woodpecker

Status of the Species

The Gila woodpecker is included on the AHDMS and CNDDB. It is listed as endangered under CESA. It is protected under the MBTA. The range of the Gila woodpecker includes most of the southwestern portion of the United States and parts of western Mexico (Edwards and Schnell 2000, Robertson and Hammerson 2001). Life history and habitat information are provided in Edwards and Schnell (2000). The species is a year-round resident of Sonoran Desert and riparian habitats, using saguaro cacti or large riparian trees for nest cavities. The species will also use parklands, residential neighborhoods, and orchards where large trees are present (Robertson and Hammerson 2001). Large, contiguous areas of habitat appear more suitable than small or narrow bands of habitat. Loss of desert cactus and riparian woodlands and competition with non-native bird species such as European starlings for nest cavities are significant threats to the species in this portion of its range.

The LCR planning area is near the western edge of the range of the Gila woodpecker in south-central California. Recent records of populations generally occur between Needles, California and Yuma, including the Bill Williams River delta on Lake Havasu, the Parker Strip, Blythe, Cibola NWR, Picacho State Park, and the Imperial to Laguna Dam area (Rosenberg *et al*. 1991). Additional surveys are needed to refine the extent of known occupied habitat within the planning area.

Effects of the Action

Habitat for the Gila woodpecker in the LCR planning area is provided by mature cottonwood-willow riparian vegetation. Flow-related effects from changes in points of diversion would result in a loss of up to 819 acres of cottonwood-willow habitat. Non-flow related projects, primarily agricultural conversion and river-management actions, will result in a loss of up to 26 acres of habitat, and implementation of habitat restoration actions may eliminate up to 10 acres of low-value habitat. Implementation of the Conservation Plan would not result in the loss of additional

acres of habitats, except that some areas of low-value habitat may be lost if those areas are restored to functional status as part of the habitat to be created under the Conservation Plan.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual woodpeckers. In addition, harm and harassment of individual woodpeckers may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the Gila woodpecker within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for mature riparian habitats on the LCR from Federal actions also partially extend to the Gila woodpecker.

Conservation Measures

The Conservation Plan provides for the creation of 1,702 acres of Gila woodpecker habitat within the 5,940 acres of cottonwood-willow habitat contained in the plan. Depending on the final siting of the cottonwood-willow habitat, additional areas of suitable habitat within the species' range may be available. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the woodpecker to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species. Installation of artificial snags to provide nest sites is also included.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is not available for this species; however, the local information is sufficient to assess the effects of the actions on this species and make a finding.

The Gila woodpecker in the LCR MSCP planning area is near the western edge of its range and the populations there are likely not a significant component of the overall population. Losses to mature riparian habitat likely resulted in a decline in the number of birds along the LCR over the last 100 years. The LCR MSCP planning area is an important component for the remaining populations in California, and that importance is noted.

Losses to mature riparian habitat likely resulted in a decline in the number of birds along the LCR over the last 100 years. Habitat losses from the covered actions would be fully replaced, with additional habitat created for the Gila woodpecker above that amount replaced. Surveys and monitoring will document the effects of management actions and provide for effective

habitat creation. Available habitat will increase with the implementation of the Conservation Plan, and existing habitats could benefit from habitat-maintenance activities funded by the Conservation Plan. The increase in managed habitat may provide sufficient area to support a viable population at this western extent of the range.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the Gila woodpecker extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important habitat area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Vermilion flycatcher

Status of the Species

The vermilion flycatcher is a species of special concern in California, and is a covered species in the Clark County MSHCP. It is protected under the MBTA. The range of the vermilion flycatcher is the southwestern United States including, southeastern California east to Texas, and south through Mexico (Wolf and Jones 2000). In the United States, the species is a breeding or year-round resident of riparian woodlands, with open foraging areas immediately adjacent to the woodlands an important component. Life history and habitat information is available in Wolf and Jones (2000). Loss of riparian woodlands is a significant threat to the species in this portion of its range.

The LCR MSCP planning area is at the northwestern edge of the range of the vermilion flycatcher. There are resident populations in southern Nevada, but most California birds are found only as breeding populations. Vermilion flycatchers are not found in the low deserts east of the LCR, but are in higher-elevation woodlands. Historically, they were more common (Grinnell 1914), but are now a minor part of the bird community along the LCR (Wolf and Jones 2000). Populations along the LCR have declined; however, significant extant populations are at Bill Williams River NWR, the Blythe golf course, Clark Ranch, the Parker Dam residences, and Willow Valley Estates (Rosenberg *et al*. 1991). This species has also been found recently in areas being restored with native cottonwood and willow. Additional surveys are needed to refine the extent of known occupied habitat within the planning area.

Effects of the Action

Habitat for the vermilion flycatcher in the LCR planning area is provided by cottonwood-willow and honey mesquite. Flow-related effects from changes in points of diversion would result in a loss of up to 1,890 acres of cottonwood-willow habitat. An undetermined amount of flycatcher habitat around Lake Mead may be created and eliminated over the 50-year period. Non-flow related projects, primarily agricultural conversion and river-management actions will result in a loss of up to 714 acres of cottonwood-willow and honey mesquite habitat, and implementation of habitat restoration actions may eliminate up to 10 acres of low-value habitat. Implementation of the Conservation Plan would not result in the loss of additional acres of habitat, except that some areas of low-value habitat may be lost if those areas are restored to functional status as part of the habitat to be created under the Conservation Plan.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual flycatchers. In addition, harm and harassment of individual flycatchers may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the vermilion flycatcher within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for mature riparian habitats on the LCR from Federal actions also partially extend to the vermilion flycatcher.

Conservation Measures

The Conservation Plan provides for the creation of 4,008 acres of vermilion flycatcher habitat within the 5,940 acres of cottonwood-willow habitat, and 1,200 acres of honey mesquite within the 1,320 acres contained in the plan. Depending on the final siting of these two habitats, additional areas of suitable habitat within the species' range may be available. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the vermilion flycatcher to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species. The measures also include research into brown-headed cowbird nest parasitism on this species with provisions for cowbird management actions to be taken if needed.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is not available for this species; however, the local information is sufficient to assess the effects of the actions on this species and make a finding.

The vermilion flycatcher in the LCR MSCP planning area is near the western edge of its range and the populations there are likely not a significant component of the overall population. Losses to mature riparian habitat likely resulted in a decline in the number of birds along the LCR over the last 100 years. The LCR MSCP planning area is an important component for the remaining populations in California, and that importance is noted.

Habitat losses from the covered actions would be fully replaced, with additional habitat created for the vermilion flycatcher above that amount replaced. Surveys and monitoring will document the effects of management actions and provide for effective habitat creation. Available habitat will increase with the implementation of the Conservation Plan, and existing habitats could benefit from habitat-maintenance activities funded by the Conservation Plan. The increase in managed habitat may provide sufficient area to support a viable population at this western extent of the range.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the vermilion flycatcher extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important habitat area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

<u>Arizona Bell's vireo</u>

Status of the Species

The Arizona Bell's vireo, a songbird, is included on the AHDMS and CNDDB, and it is listed as endangered under CESA. It is a covered species under the Clark County MSHCP. It is protected under the MBTA. The Arizona Bell's vireo is one of four recognized subspecies. The range of Arizona Bell's vireo is defined by the river systems of the Southwest, including the LCR valley, and tributaries in southern Utah, from Nevada southward and eastward through Arizona and into northern Mexico (Brown 1993). Life history and habitat information are presented in Brown (1993). This migratory species breeds in riparian scrub habitats along major

river systems and may be extending its range in higher-elevation areas as riparian habitats suitable for nesting develop (cited in Brown 1993). It has remained common throughout much of its range (Hunter *et al*. 1987); however, populations in California have experienced significant declines. Losses of nesting habitats and nest parasitism by cowbirds are significant threats to the species, especially in more marginal habitats (Deeble 1999).

Populations of Arizona Bell's vireo in the LCR MSCP planning area have declined significantly, but still occur in numerous sites between Fort Mojave and the SIB (Rosenberg *et al*. 1991). There also are populations on the Virgin River and through Grand Canyon, where populations appear to be expanding their range eastward. This species has also been found recently in areas being restored with native cottonwood and willow. Some survey information for this species is contained in McKernan and Braden (2002).

Effects of the Action

Habitat for the Arizona Bell's vireo in the LCR planning area is provided by cottonwood-willow and honey mesquite. Flow-related effects from changes in points of diversion would result in a loss of up to 1,654 acres of cottonwood-willow habitat. An undetermined amount of vireo habitat around Lake Mead may be created and eliminated over the 50-year period. Non-flow related projects, primarily agricultural conversion and river-management actions, will result in a loss of up to 1,309 acres of cottonwood-willow and honey mesquite habitat, and implementation of habitat restoration actions may eliminate up to 20 acres of low-value habitat. The covered actions include a total of 3,832 acres of lower-value honey mesquite (honey mesquite type IV) that could be lost to agricultural conversion in addition to the higher-value habitat (honey mesquite type III) included in the non-flow related category. Implementation of the Conservation Plan would not result in the loss of additional acres of habitat, except that some areas of low-value habitat may be lost if those areas are restored to functional status as part of the habitat to be created under the Conservation Plan.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual vireos. In addition, harm and harassment of individual vireos may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the Arizona Bell's vireo within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for riparian habitats on the LCR from Federal actions also partially extend to the Arizona Bell's vireo.

Conservation Measures

The Conservation Plan provides for the creation of 1,738 acres of vireo habitat within the 5,940

acres of cottonwood-willow habitat and 1,200 acres of honey mesquite within the 1,320 acres contained in the plan. Depending on the final siting of these two habitats, additional areas of suitable habitat within the species' range may be available. This amount of honey mesquite mitigation fully covers the loss of the 610 acres of more valuable type III habitat. The need for and amount of additional mitigation for the category IV habitat will be evaluated when those agricultural projects are implemented and are not included in this HCP. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the vireo to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species. The measures also include research into brown-headed cowbird nest parasitism on this species with provisions for cowbird management actions to be taken if needed.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is not available for this species; however, the local information is sufficient to assess the effects of the actions on this species and make a finding.

Arizona Bell's vireo populations have declined in some areas where riparian vegetation has been lost, remained stable in some higher-elevation habitats, and has expanded into areas where riparian scrub has been created. The populations along the LCR proper have declined due to the loss of riparian habitat. The LCR is an important corridor for migration from Mexico to the more northern portions of the species range. The LCR MSCP planning area is an important component for the remaining populations in California, and that importance is noted.

Losses to mature riparian habitat likely resulted in a decline in the number of birds along the LCR over the last 100 years. The creation of new cottonwood-willow and honey mesquite type III, will provide a considerable amount of habitat within the LCR MSCP planning area. Some of the additional cottonwood-willow habitat created under the Conservation Plan may be suitable for Arizona Bell's vireo, and that would increase the amount of available habitat along the LCR and provide for population expansion. Identification of significant threats to the breeding population from brown-headed cowbird nest parasitism would result in implementation of cowbird management actions. While the effectiveness of such measures is not known, this provides opportunities for development and evaluation of such measures.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the Arizona Bell's vireo extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important habitat area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Sonoran yellow warbler

Status of the Species

The Sonoran yellow warbler, a songbird, is included on the CNDDB. It is a species of special concern in California. It is protected under the MBTA. The yellow warbler is a widespread species in North America, breeding as far north as the tundra regions of Canada (Lowther *et* al. 1999). A habitat generalist, the yellow warbler remains common in much of its range. The range of the Sonoran yellow warbler includes the southwestern portion of the United States into northern Mexico. Life history and habitat information is found in Lowther *et al*. (1999). This migratory species is an obligate riparian-nesting species in the lower elevations of the southwest that include the LCR corridor, and may be a winter resident in those habitats. Loss of riparian habitats and nest parasitism by cowbirds are significant threats to the species in this portion of its range.

Sonoran yellow warblers were common breeding birds on the LCR, but were extirpated as a breeding species in the LCR MSCP planning area by the mid-1950s (Rosenberg *et al.* 1991). Recently, the species has returned to the LCR, with breeding pairs recorded from locations from the Virgin River, through the Fort Mojave to Lake Havasu reach, Bill Williams River delta, and Parker Dam to the SIB (McKernan and Braden 2002). This species has also been found recently in areas being restored with native cottonwood and willow. Some survey information for this species is contained in McKernan and Braden (2002).

Effects of the Action

Flow-related covered activities will result in the loss of up to 2,929 acres of cottonwood-willow habitat, with up to 183 acres of honey mesquite lost due to non-flow related activities. An undetermined amount of warbler habitat around Lake Mead may be created and eliminated over the 50-year period. Habitat restoration activities could result in the loss of up to 10 acres of degraded, low-value habitat. Removal of some low-value habitats may result from use of these lands for restoration purposes under the Conservation Plan.

In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual warblers. In addition, harm and harassment of individual warblers

may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the Sonoran yellow warblers within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for riparian habitats on the LCR from Federal actions also partially extend to the Sonoran yellow warbler.

Conservation Measures

The Conservation Plan will create 4,050 acres of cottonwood-willow habitat for Sonoran yellow warblers within the 5,940 acres of cottonwood-willow habitat contained in the plan. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, the Conservation Plan contains avoidance and minimization measures for the warbler to address potential losses to existing habitats during implementation of the Conservation Plan and covered actions involved in non-flow maintenance and new project effects, surveys and monitoring, and research into habitat requirements for the species. The measures also include research into brown-headed cowbird nest parasitism on this species with provision for cowbird management actions to be taken if needed.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is not available for this species; however, the local information is sufficient to assess the effects of the actions on this species and make a finding.

Sonoran yellow warblers were extirpated as a breeding population from the LCR area but have returned as breeding birds and are in several areas. They are a common breeder above the LCR MSCP planning area in the Grand Canyon. The habitat losses from the covered actions are fully offset by the creation of new cottonwood-willow habitat. Some of the additional cottonwood-willow habitat created under the Conservation Plan may be suitable for Sonoran yellow warblers, and that would increase the amount of available habitat along the LCR and provide for population expansion. Identification of significant threats to the breeding population from brown-headed cowbird nest parasitism would result in implementation of cowbird management actions. While the effectiveness of such measures is not known, this provides opportunities for development and evaluation of such measures. There is a net benefit for the species.

Losses to mature riparian habitat likely resulted in a decline in the number of birds along the LCR over the last 100 years. The creation of new cottonwood-willow and honey mesquite type III, will provide a considerable amount of habitat within the LCR MSCP planning area. Some of the additional cottonwood-willow habitat created under the Conservation Plan may be suitable

for Sonoran yellow warblers, and that would increase the amount of available habitat along the LCR and provide for population expansion. Identification of significant threats to the breeding population from brown-headed cowbird nest parasitism would result in implementation of cowbird management actions. While the effectiveness of such measures is not known, this provides opportunities for development and evaluation of such measures.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the Sonoran yellow warbler extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important habitat area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. The return of this species to the LCR MSCP planning area indicates that the species can colonize newly created habitat. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Summer tanager

Status of the Species

The summer tanager, a songbird, is included on the AHDMS and CNDDB and it is a species of special concern in California. It is a covered species under the Clark County MSHCP. It is protected under the MBTA. The range of the summer tanager extends across the southern United States from the vicinity of the LCR corridor to the central portions of the east coast. Although still widespread in many areas of the range, populations in the west have declined. In the west, it is found north into the southern tip of Nevada and south into Mexico (Robinson 1996). Life history and habitat information is found in Robinson (1996). Habitat for this migratory species is in mature riparian woodlands with tall trees. Loss of these mature forests is a significant threat to the species in this portion of its range.

Populations of summer tanager in the LCR MSCP planning area declined precipitously since the 1970s but are still present in small numbers from the Bill Williams River delta south to near Yuma (Rosenberg *et al*. 1991). This species has also been found recently in areas being restored with native cottonwood and willow. Additional surveys may be needed to refine occupied habitat within the planning area. Some survey information for this species is contained in McKernan and Braden (2002).

Effects of the Action

Flow-related covered activities will result in the loss of up to 161 acres of habitat, with up to 14 acres lost due to non-flow related activities. An undetermined amount of tanager habitat around Lake Mead may be created and eliminated over the 50-year period. Removal of some low-value habitats may result from use of these lands for restoration purposes under the Conservation Plan. In clearing of occupied habitats for restoration or other footprint impacts, there is a potential for direct mortality of individual tanagers. In addition, harm and harassment of individual tanagers may occur in the areas of the created habitats during vegetation-maintenance activities and in habitat adjacent to covered activities or Conservation Plan activities where noise, dust, and other disturbances may occur.

There may be cumulative effects that would have significant adverse effects to the summer tanager within the LCR MSCP planning area. Suitable habitat is present on private, Tribal, state, and Federal lands. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for riparian habitats on the LCR from Federal actions also partially extend to the summer tanager.

Conservation Measures

The Conservation Plan will create 602 acres of cottonwood-willow habitat for tanagers within the 5,940 acres of cottonwood-willow habitat contained in the plan. Existing habitat that is maintained in suitable condition through actions funded by the Maintenance Fund will also contribute to the conservation of the species.

In addition to habitat replacement, conservation measures for the summer tanager include avoidance and minimization of work activities within suitable habitat, surveys and research to better define distribution and habitat preferences of the species, monitoring and management of habitat, and research into brown-headed cowbird nest parasitism on this species with provisions for cowbird management actions to be taken if needed.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is not available for this species; however, the local information is sufficient to assess the effects of the actions on this species and make a finding.

Summer tanagers are a widespread species and remain common in many areas. Their population along the LCR is regionally significant. The habitat losses from the covered actions are fully offset by the creation of new cottonwood-willow habitat. Some of the additional cottonwood-willow habitat created under the Conservation Plan may be suitable for summer tanagers, particularly habitats created for the yellow-billed cuckoo, and that would increase the amount of available habitat along the LCR and provide for population expansion. Identification of significant threats to the breeding population from brown-headed cowbird nest parasitism would result in implementation of cowbird management actions. While the effectiveness of such

measures is not known, this provides opportunities for development and evaluation of such measures. There is a net benefit for the species.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, additional surveys and population monitoring, and directed research on habitat needs.

Because the range of the summer tanager extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is an important habitat area for the species and the conservation measures would increase the availability of habitat and contribute to understanding of the species. Coverage for the species on the LCR would be compatible with the coverage afforded by the Clark County MSHCP. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Flat-tailed horned lizard

Status of the Species

The flat-tailed horned lizard is included on the AHDMS and CNDDB. It is a wildlife species of special concern in Arizona and California. There is a range-wide management strategy in effect for the species developed to preclude the need to list it under the Act (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). The range of the flat-tailed horned lizard is the desert area in extreme southwest Arizona, extreme southeast California, and adjacent areas of Mexico. The habitat for the species is sparsely vegetated creosote bush scrub or other similar open vegetation communities. Loss of habitat to agricultural and urban development, and off-road vehicle activity are significant threats to the species.

The flat-tailed horned lizard is not found in the LCR floodplain, but is present in areas affected by Reclamation activities along the United States-Mexico border, and on the California side of the river near the All-American Canal. Specific population estimates for these areas are not available, and surveys will be needed prior to implementation of covered actions.

Effects of the Action

Non-flow related activities would result in a loss of up to 128 acres of habitat. There may be some direct mortality of individuals from the implementation of these non-flow related activities, and harassment of lizards on lands adjacent to work areas from use of vehicles (risk of running over a lizard, and other disturbances. This amount of take from direct mortality and harassment

cannot be quantified.

There may be cumulative effects that would have significant adverse effects to the flat-tailed horned lizard within the LCR MSCP planning area. Suitable habitat is present on private, state, and Federal lands, and developments or other planned uses of these areas may adversely affect the lizard. Federal and state agencies that have agreed to implement the Flat-Tailed Horned Lizard Rangewide Management Strategy (Flat-Tailed Horned Lizard Interagency Coordinating Committee 2003) consider the lizard and its conservation needs in their project activities, which provide a level of protection. Since the species is currently not listed, there is no protection under the Act for the species or its habitat.

Conservation Measures

The Conservation Plan will provide for the acquisition and long-term protection of 230 acres of existing flat-tailed horned lizard habitat that is currently unprotected. Activities taken under the covered actions will be designed to avoid or minimize effects to the lizard and its habitat. These measures are in accordance the conservation needs identified in the Rangewide Management Strategy.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Rangewide habitat and survey information is available. The current level of information is sufficient to assess the effects of the actions on this species and make a finding.

The flat-tailed horned lizard habitat contained within the LCR planning area is under control of agencies, including Reclamation, that have agreed to implement the Rangewide Management Strategy. The habitat area that would be included is not a significant amount of the available habitat for the species, and the Conservation Plan provides for the protection of 230 acres of identified, currently unprotected habitat.

Research and monitoring of the species within the LCR area will contribute to understanding the species, its distribution, and habitat needs. This will benefit conservation efforts under the LCR MSCP as well as those undertaken for the species elsewhere in its range. The measures in the Conservation Plan are compatible with management needs identified for the species. These include protection and restoration of habitats, and additional surveys and population monitoring.

Because the range of the flat-tailed horned lizard extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation that may be needed to address effects to the species elsewhere. The LCR MSCP planning area is not a significantly large habitat area, and the conservation measures would increase the availability of habitat and contribute to understanding of the species. There are not likely to be any adverse effects to the species' conservation elsewhere in the range from the issuance of an incidental take permit for the LCR MSCP.

Relict leopard frog

Status of the Species

The relict leopard frog is a candidate for listing under the Act. It is included on the AHDMS and NNHP and is a protected species in Nevada and a wildlife species of special concern in Arizona. This species is a covered species in the Clark County MSCHP. The range of the relict leopard frog includes the Virgin River drainage, including portions of the Muddy River, in Arizona, Nevada, and Utah, the vicinity of the mainstem Colorado River in the Black Canyon below Hoover Dam, and possibly small tributaries to the Colorado River in the Grand Canyon (Blomquist *et* al. 2003, David Bradford, Environmental Protection Agency, personal communication, 2004). Springs, marshes, and shallow pools or ponds provide habitat for this species. Adjacent areas of moist soils with emergent and riparian vegetation are important components of habitat. Loss of habitat and competition with non-native amphibian and fish species are significant threats to the relict leopard frog.

The relict leopard frog is known from springs near the Overton Arm of Lake Mead, and adjacent to the Colorado River in Black Canyon below Hoover Dam. The actual population sites are outside of the boundaries of the LCR MSCP planning area. The two Virgin River populations are believed extirpated (Bradford *et al*. 2004). A new population may have been located within the planning area in Surprise Canyon in Grand Canyon National Park (David Bradford, EPA, personal communication 2004) adjacent to the mainstem Colorado River. Preliminary genetic information indicates this frog may be more closely related to the northern leopard frog (*R. yavapaiensis*) than to the relict leopard frog (Haley 2004), but additional specimens will be needed to confirm the species. If the Surprise Canyon frogs are relict leopard frogs, other small canyons in that area, including Spencer Canyon, may also contain the species.

Effects of the Action

No loss of relict leopard frog habitats is anticipated from the implementation of the covered actions or the Conservation Plan. If habitat-restoration actions and maintenance activities for marshes are undertaken in relict leopard frog habitat, there may be some temporary disturbance of habitat, but there would be no long-term loss. Access corridors between habitat areas in Black Canyon may be affected by river operations in this area that result in fluctuating flows and coldwater conditions.

The extant populations of relict leopard frog are on Federal lands (Lake Mead National Recreation Area), so there are no cumulative effects to consider.

Conservation Measures

The relict leopard frog is a covered species under the Clark County MSHCP (Regional Environmental Consultants 1998) and is the subject of ongoing development of a conservation

assessment and strategy between state and Federal entities in Arizona and Nevada. The Clark County MSHCP does not provide for recovery above the level of mitigation. The LCR MSCP will contribute $100,000.00 ($10,000.00 a year for 10 years) to fund identified but unfunded conservation measures for the species that would contribute to recovery. This funding may be used for management actions, monitoring, research, or other conservation needed by the species.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is available and is sufficient to assess the effects of the actions on this species and make a finding.

The status of the relict leopard frog is very precarious. Loss of the Virgin River populations was significant, and remaining populations are small and isolated. Direct effects to relict leopard frog from the LCR MSCP covered activities are not expected and habitats would not be lost. The contribution of funds for conservation measures will benefit the species through enhancement of existing conservation programs beyond that needed to strictly mitigate for incidental take.

Because the range of the relict leopard frog extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation opportunities for the species. The majority of the species' populations are already covered under the Clark County MSHCP, and, with the coordination of LCR MSCP funding to those efforts, there is not likely to be any adverse effects to the species' conservation from issuance of an incidental take permit for the LCR MSCP.

<u>Flannelmouth sucker</u>

Status of the Species

The flannelmouth sucker, a catostomid fish endemic to the Colorado River Basin, is included on the CNDDB and NNHP. It is a wildlife species of concern in Arizona. The range of the flannelmouth sucker includes medium to large rivers in the Colorado River Basin. Adults prefer mainstem habitats including mid-channel bars and the mouths of tributaries. Young fish use more sheltered shorelines and backwaters. Loss of habitat to water-resource development and predation and competition with non-native fish species are the significant threats to the flannelmouth sucker (Colorado Fish and Wildlife Council 2004).

Native populations of flannelmouth sucker occur in the Colorado River in the riverine reach above Lake Mead and are also present in the Virgin and Muddy rivers. The AGFD stocked 611 flannelmouth suckers from the Paria River into the Colorado River below Davis Dam in 1976. This introduced population is now estimated at 2,286 individuals and is apparently self-sustaining (Mueller 2003).

Effects of the Action

Implementation of flow-related covered actions would result in the loss of up to 85 acres of backwater habitat that may be used by flannelmouth suckers. Habitat restoration in and around existing backwaters may result in temporary disturbance of habitats. Implementation of non-flow related river and riverside facilities maintenance may harm or harass individuals and has a potential for direct mortality. There is some opportunity for flannelmouth suckers to enter canals or other diversion structures; however, the largest of such diversions within the occupied area of the LCR is to the Havasu NWR and the water is circulated through Topock Marsh and back to the river without hindrance to passage.

No significant cumulative effects to the species were identified. While the species is not protected under the Act, the razorback sucker and bonytail chub inhabit the same river areas and measures to protect them would extend a degree of protection to the flannelmouth.

Conservation Measures

The Conservation Plan will create 85 acres of backwater habitats available for use by the flannelmouth sucker population below Davis Dam. That amount of conservation fully mitigates for the loss of aquatic habitats for the species. The plan will also contribute $400,000.00 ($80,000.00 a year for five years) to research and monitor the flannelmouth population below Davis Dam to define habitat use and preferences, identify factors that allow for successful recruitment, and to support decisions on habitat- and species-management strategies. Research in and of itself is not considered as mitigation; however, the success of this population in achieving self-sustaining status in an area dominated by non-native fish species could be a critical element in the rangewide conservation for the species.

Avoidance and minimization measures for impacts from contaminant loads in runoff from habitat restoration areas, limiting effects of implementation of non-flow activities, increases to selenium levels, and from habitat construction and maintenance activities under the Conservation Plan are also included.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is available and is sufficient to assess the effects of the actions on this species and make a finding.

The population of flannelmouth suckers in the LCR is the result of a deliberate re-introduction and, while successful, is not a significant component of the rangewide population. The amount and types of mitigation are appropriate to address the level of effects to this population.

Because the range of the flannelmouth sucker extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss

of conservation opportunities for the species. The LCR population is not a critical component to the species conservation; however, information gained from research on this species may provide considerable benefit to conservation elsewhere. There are not likely to be any adverse effects to the species' conservation from issuance of an incidental take permit for the LCR MSCP.

MacNeill's sootywing skipper

Status of the Species

The MacNeill's sootywing skipper, a butterfly, is included on the AHDMS and NNHP. The range of the sootywing skipper is western Arizona, southeastern California (including the Coachella and Imperial valleys), southern Nevada, the southwest corner of Utah, and Baja California in Mexico (Austin and Austin 1980, Emmell and Emmel 1973, MacNeill 1970, USGS no date). Within this range, populations are scattered, but where the species occurs it is common to abundant. Habitat needs are met by dense honey mesquite, which provides nectar for the adults and stands of quailbush, which is the larval host plant. High groundwater levels may be important to creating a proper microclimate or density of vegetation. Density of the vegetation is an important habitat component that provides shade for the species and allows proper thermoregulation in the hot climate of the LCR (Wiesenborn 1998, 1999). The sootywing skipper is not a strong flyer, and adults cannot travel far from quailbush to nectar sources, so the two types must be adjacent or in close proximity. Development within the floodplain that removed extensive areas of mesquite and quailbush to create agricultural areas may have had very significant effects to the species and resulted in the current patchy and fragmented distribution. Continuing loss of mesquite forests and associated quailbush stands in areas with high groundwater is the significant threat to the species. Use of pesticides in adjacent agricultural areas may also be a threat.

Within the LCR MSCP planning area, MacNeill's sootywing skipper is found along the Colorado River from Lake Mead south to at least Cibola NWR. Important populations are found along the lower Bill Williams River and at Cibola NWR. Additional surveys are needed to refine occupied habitat within the planning area.

Effects of the Action

Implementation of flow-related covered actions would result in the loss of up to 222 acres of habitat for the sootywing skipper out of the 256 acres identified as habitat in the planning area. This entire habitat is in Reach 4 (Parker Dam to Cibola). This loss is based on the decline of groundwater levels under the honey-mesquite/quailbush association that provides habitat for the species. It is not anticipated that the trees and shrubs would be lost, but there could be adverse effects to the microclimate or the density of the vegetation that would reduce or eliminate its value to the species. Non-flow related covered actions, primarily agricultural development, would eliminate the trees and shrubs from some of the species habitat within the area already affected by groundwater declines. There may also be small habitat losses associated with creation and maintenance of new or restored habitats under the plan. Maintenance losses would

be temporary. Activities in and adjacent to sootywing skipper habitat may result in direct mortality of individuals, as well as harm and harassment due to dust and other disturbances.

Conservation Measures

The Conservation Plan provides for the creation of at least 222 acres of MacNeill's sootywing skipper habitat that will be managed for the species. Additional areas of honey mesquite and quailbush associations constructed as part of the landscape mosaic under the Conservation Plan may also provide additional conservation for the species. Avoidance and minimization measures will reduce the effects of actions in and adjacent to sootywing skipper habitat. Surveys and monitoring of the sootywing skipper will also contribute to defining the species range, and locating suitable habitats within the planning area.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

Detailed rangewide survey information is not available, however the existing information is sufficient to assess the effects of the actions on this species and make a finding.

The population status of the MacNeill's sootywing skipper is unknown, but where it is found it is locally common. Because of the fragmentation of suitable habitat, known populations are isolated and vulnerable to loss of habitat or stochastic events. There is no recent data documenting declines of the populations; however there is concern because the species is not found in all apparently suitable areas, that the species is at risk Known habitats on Cibola and Bill Williams River NWRs are likely protected from additional development pressures (including conversion to other habitat types); however, the status and level of protection of the remaining habitat is not clear.

Because the range of MacNeill's sootywing skipper extends beyond the LCR MSCP planning area, the FWS must consider the potential effect of this action on the species as a whole. This is to ensure that any potential "no surprises" assurances covering this population do not result in loss of conservation opportunities for the species. The LCR population is within the core of the species range, and is likely a critical component to the species conservation. Provision of protected habitats for the species and information gained from directed research and monitoring on this species is likely to provide benefits for conservation elsewhere in the range. There are not likely to be any adverse effects to the species' conservation from issuance of an incidental take permit for the LCR MSCP.

<u>Sticky buckwheat</u>

Status of the Species

The sticky buckwheat is included on the NNHP and is listed as a critically endangered plant in Nevada. It is a covered species in the Clark County MSHCP. The range of the sticky buckwheat includes the extreme northwest corner of Arizona and southeastern Nevada, centered on the

vicinity of the Muddy and Virgin rivers. It is also found in the Overton Arm of Lake Mead, which was part of the Virgin River prior to the construction of Hoover Dam. Habitat for this annual plant species is characterized by areas of fine-grained soils with caliche-capped sands or weathered calcareous rock. Sand dunes, washes, and open flats support populations. Loss of habitat (including periodic loss from inundation by Lake Mead), off road traffic, and competition from non-native plants that can densely occupy the preferred open habitats are significant threats.

The suitable habitat for this species with the full pool elevation of Lake Mead is within the LCR MSCP planning area. The amount of this habitat is not known, but is generally along the Overton Arm including the confluence areas with the Muddy and Virgin rivers. Additional surveys are needed to refine the extent of known occupied habitat within the planning area.

Effects of the Action

An unknown amount of sticky buckwheat habitat will be repeatedly inundated and exposed due to the water level fluctuations of Lake Mead. The amount of this habitat loss cannot be quantified, largely due to the uncertainty of future Lake Mead elevations.

Conservation Measures

The sticky buckwheat is a covered species under the Clark County MSHCP (Regional Environmental Consultants 1998). Conservation efforts are undertaken by the BLM and NPS under that program. There may also be conservation activities identified that may not be covered by the mitigation requirements of the Clark County MSHCP. The LCR MSCP will contribute $10,000.00 per year until 2030 to the Clark County MSHCP Rare Plant Workgroup to fund identified conservation activities for the sticky buckwheat and threecorner milkvetch that would contribute to recovery.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

The population status of the sticky buckwheat is reasonably well known, and the existing Clark County MSHCP provides considerable conservation for the species. The LCR MSCP would have effects to a portion of the species' habitat through inundation, the extent of which would vary from year to year depending on Lake Mead elevations. Provision of funding to the Clark County MSHCP to enable additional conservation measures to be implemented would enhance the conservation of the species. There are not likely to be any adverse effects to the species' conservation from issuance of an incidental take permit for the LCR MSCP.

<u>Threecorner milkvetch</u>

Status of the Species

The threecorner milkvetch is included on the AHDMS and NNHP, and is listed as a critically endangered plant in Nevada. It is a covered species in the Clark County MSHCP. The range of

the threecorner milkvetch includes the extreme northwest corner of Arizona and southeastern Nevada, centered on the vicinity of the Colorado, Muddy, and Virgin rivers. It is also found along the northern shores of Lake Mead. Habitat for this annual plant species is characterized by sandy soils in flats, dunes, gullies, and washes associated with creosote bush scrub. Loss of habitat (including periodic loss from inundation by Lake Mead) and competition from non-native plants that can densely occupy the preferred open habitats are significant threats.

The suitable habitat for this species with the full pool elevation of Lake Mead is within the LCR MSCP planning area. The amount of this habitat is not known, but is generally along the Overton Arm including the confluence areas with the Muddy and Virgin rivers. While the general area of habitat for this species overlaps with that of sticky buckwheat, the specific soil conditions preferred by each species do not. Additional surveys are needed to refine the extent of known occupied habitat within the planning area.

Effects of the Action

An unknown amount of threecorner milkvetch habitat will be repeatedly inundated and exposed due to the water level fluctuations of Lake Mead. The amount of this habitat loss cannot be quantified, largely due to the uncertainty of future Lake Mead elevations.

Conservation Measures

The threecorner milkvetch is a covered species under the Clark County MSHCP (Regional Environmental Consultants 1998). Conservation efforts are undertaken by the BLM and NPS under that program. There may also be conservation activities identified that may not be covered by the mitigation requirements of the Clark County MSHCP. The LCR MSCP will contribute $10,000.00 per year until 2030 to the Clark County MSHCP Rare Plant Workgroup to fund identified conservation activities for the sticky buckwheat and threecorner milkvetch that would contribute to recovery.

Finding: Not Likely to Jeopardize the Continued Existence of the Species

The population status of the sticky buckwheat is reasonably well known, and the existing Clark County MSHCP provides considerable conservation for the species. The LCR MSCP would have effects to a portion of the species' habitat through inundation, the extent of which would vary from year to year depending on Lake Mead elevations. Provision of funding to the Clark County MSHCP to enable additional conservation measures to be implemented would enhance the conservation of the species. There are not likely to be any adverse effects to the species' conservation from issuance of an incidental take permit for the LCR MSCP.

Appendix E: Formal Section 7 Consultations Involving the LCR MSCP Planning Area, April 2002-Present

National Park Service:

Lake Mead National Recreation Area Lake Management Plan

- Species: southwestern willow flycatcher, bonytail (with critical habitat), razorback sucker (with critical habitat), desert tortoise
- "Not likely to adversely affect" concurrence: bald eagle, Yuma clapper rail
- Date of biological opinion: October 7, 2002
- Determination: no jeopardy or adverse modification
- Consultation number: 02-21-01-F-0263

Lake Mead National Recreation Area Fire Plan

- Species: Mexican spotted owl, desert tortoise (with designated critical habitat)
- "Not likely to adversely affect" concurrence: southwestern willow flycatcher, Yuma clapper rail, bald eagle, California condor
- Date of biological opinion:
- Determination: no jeopardy or adverse modification
- Consultation number: 02-21-02-F-0509

Bureau of Land Management

Prescribed Burns at Mittry Lake and Imperial Ponds

- Species: Yuma clapper rail
- "Not likely to adversely affect" concurrence: southwestern willow flycatcher, bald eagle
- Date of biological opinion: February 17, 2005
- Determination: no jeopardy
- Consultation number: 02-21-05-F-0176

Bureau of Reclamation:

Transfer of 347 Acres of Bureau of Reclamation Land to the Greater Yuma Port Authority and U.S. General Services Administration

- Species: flat-tailed horned lizard
- Date of conference opinion: August 29, 2002
- Determination: no jeopardy
- Consultation number: 02-21-02-F-0124

U.S. Army Corps of Engineers:

Colorado River Marina

- Species: razorback sucker

- "Not likely to adversely affect" concurrence: Yuma clapper rail
- Date of biological opinion: September 23, 2002
- Determination: no jeopardy
- Consultation number: 02-21-02-F-0129

Fish and Wildlife Service:

Prescribed Burns on Imperial National Wildlife Refuge at Field 11 and Headquarters Pond

- Species: Yuma clapper rail
- "Not likely to adversely affect" concurrence: southwestern willow flycatcher, bald eagle, razorback sucker
- Date of biological opinion: February 5, 2003
- Determination: no jeopardy
- Consultation number: 02-21-03-F-0107

Prescribed Burns on Imperial National Wildlife Refuge at Field 12 and Island Lake

- Species: Yuma clapper rail
- "Not likely to adversely affect" concurrence: southwestern willow flycatcher, bald eagle, razorback sucker
- Date of biological opinion: January 29, 2004
- Determination: no jeopardy
- Consultation number: 02-21-04-F-0080

Prescribed Burns on Imperial National Wildlife Refuge Field 13 and Triangle

- Species: Yuma clapper rail
- "Not likely to adversely affect" concurrence: southwestern willow flycatcher, bald eagle, razorback sucker
- Date of biological opinion: February 15, 2005
- Determination: no jeopardy
- Consultation number: 02-21-05-F-0231

Pesticide Use Proposal for Lower Colorado River Fish and Wildlife Service Refuges in FY 04

- Species: bonytail (with critical habitat), razorback sucker (with critical habitat)
- "Not likely to adversely affect" concurrence: southwestern willow flycatcher, Yuma clapper rail
- Date of biological opinion: January 30, 2004
- Determination: no jeopardy or adverse modification
- Consultation number: 02-21-04-F-0036

Activities taken by Bureau of Reclamation under 02-21-95-F-0216R for which specific notice was given to the Fish and Wildlife Service, and concurrence with determination that the proposed actions were covered under the 2002 biological opinion was requested

August 2, 2002:

- Dredge two wash fans (Aha Quin and Walters Camp)
- Dredge backwater C-8 outlet channel
- Repair up to 350 feet of stabilized bankline in California

October 10, 2002:

- Dredge Martinez Lake outlet, Fishers Landing outlet, and inlet and outlet of small backwater below Fishers Landing

May 7, 2003:

- Dredge five wash fans (Gould Wash [3 sites], Mohave Wash, and Mule Wash)

February 9, 2004:

- Repair Rockwood Weir (placement of riprap on existing stabilized area)

August 10, 2004

- Dredging above Imperial Dam

Appendix F: Lake Mead End-of-December Water Elevations—Comparison of Baseline to Action Alterative Conditions for Previous and New Modeling.

Figure 3
Lake Mead End-of-December Water Elevations—Comparison of Baseline to Action Alternative Scenarios for 90th, 75th, 50th, 25th, and 10th Percentile Values

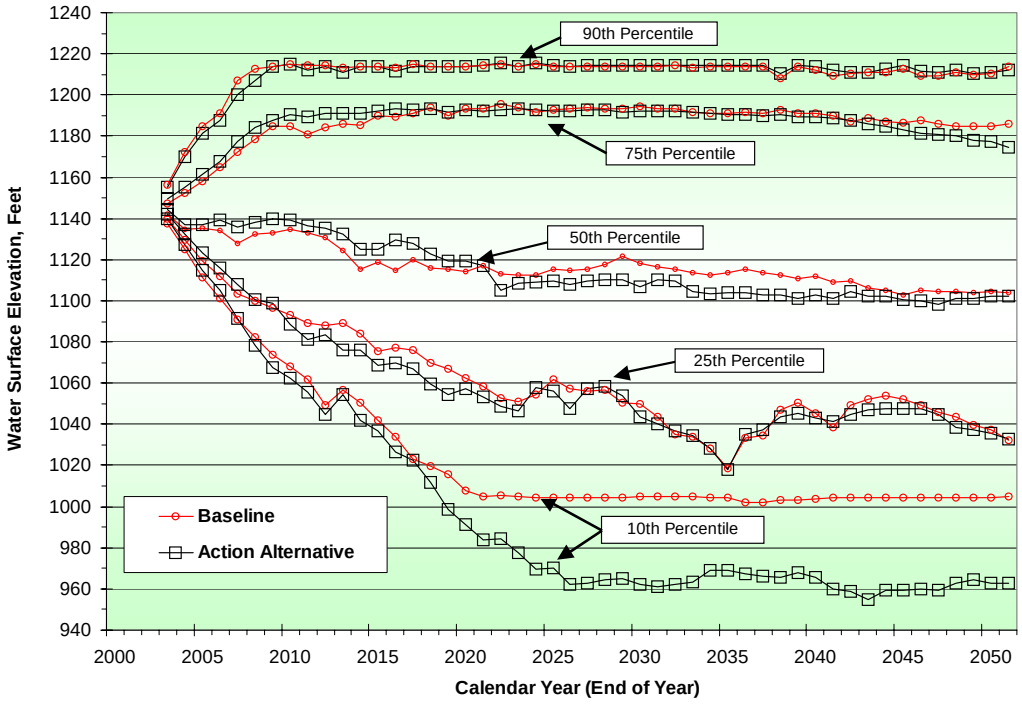
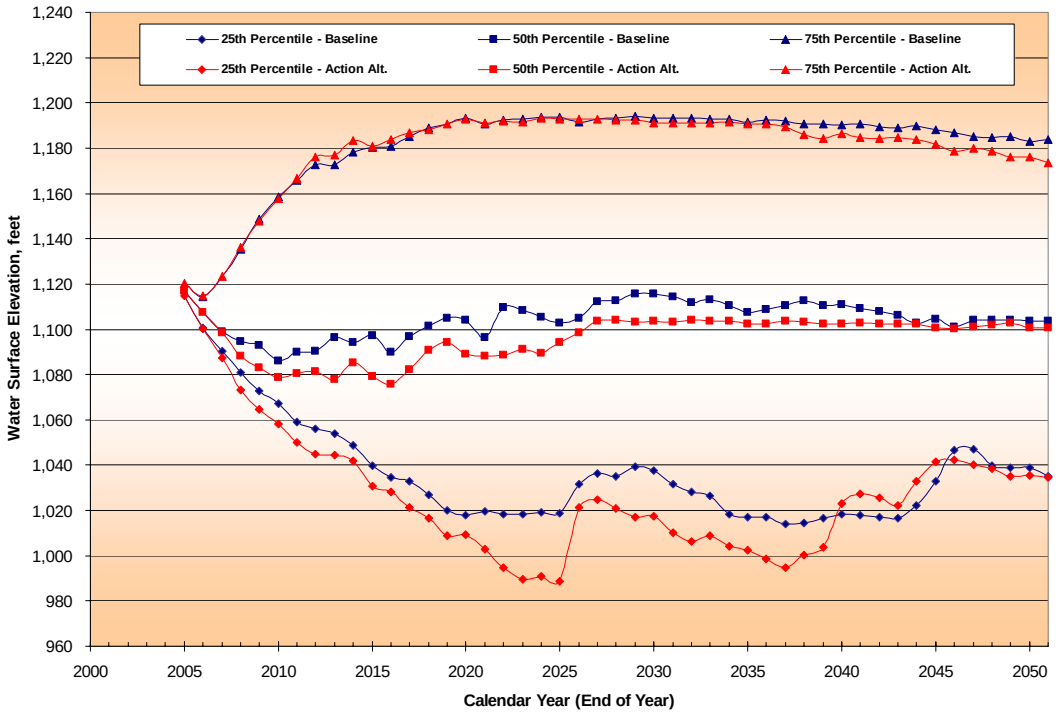



Figure 4
New Modeling
Lake Mead End-of-December Water Elevations
Comparison of Baseline to Action Alternative
for 75th, 50th, and 25th Percentile Values