LOWER COLORADO RIVER
Multi-Species Conservation Program

Final Programmatic Environmental Impact Statement/ Environmental Impact Report

Volume I

U.S. Department of the Interior
Bureau of Reclamation and U.S. Fish and Wildlife Service
The Metropolitan Water District of Southern California

December 17, 2004

FINAL PROGRAMMATIC EIS/EIR
LOWER COLORADO RIVER MULTI-SPECIES CONSERVATION PROGRAM
VOLUME I

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California State Clearinghouse No. 1999061029
Metropolitan Report No. 1226

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Prepared by:
U.S. Department of the Interior
Bureau of Reclamation (Reclamation) and Fish and Wildlife Service (Service)
The Metropolitan Water District of Southern California (Metropolitan)

This Environmental Impact Statement/Environmental Impact Report (EIS/EIR) evaluates the impacts of implementing the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) Conservation Plan and issuing a section 10(a)(1)(B) (incidental take) permit based on this plan. The planning area extends from the full pool elevation of Lake Mead to the Southerly International Boundary with Mexico. The Conservation Plan is habitat-based and is intended to both promote the recovery of species listed as threatened or endangered under the Endangered Species Act of 1973, as amended, and reduce the possibility that other selected species may become listed along the LCR. The EIS/EIR has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA; Reclamation's Draft National Environmental Policy Handbook; the California Environmental Quality Act (CEQA) of 1970, as amended; and the State CEQA Guidelines, as amended. Reclamation and the Service are the lead agencies for compliance with NEPA, and Metropolitan is the lead agency for compliance with CEQA.

This joint EIS/EIR is a programmatic document intended to identify to agency decisionmakers and the public the potential range of impacts associated with the implementation of the proposed action, including significant and beneficial environmental effects. Additionally, the EIS/EIR will serve as the basis for future project-specific NEPA and CEQA compliance documents that will be required once individual conservation projects under the LCR MSCP are more fully defined. The proposed action does not revisit the authorization of any ongoing covered activity. This EIS/EIR analyzes the impacts of the proposed action and three additional alternatives, including no action, development of a conservation plan that addresses Federally listed species only, and off-site conservation. It also evaluates the cumulative impacts of the proposed action in combination with other projects.

Approximately 360 copies of the Draft EIS/EIR were distributed to agencies, public libraries, Indian tribes, organizations, and individuals for review during a 60-day period ending on August 18, 2004. Comment letters and verbal comments provided during three public hearings held in Henderson, Nevada; Blythe, California; and Phoenix, Arizona are included in LCR MSCP Volume V, along with responses to comments. Volume I, the Final EIS/EIR, incorporates changes to the Draft EIS/EIR made in response to comments and text clarifications. Volume II is the Final LCR MSCP Habitat Conservation Plan, Volume III is the Final Biological Assessment, and Volume IV contains appendices to these four volumes. For further information regarding this EIS/EIR, contact:

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EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Impact Statement/Environmental Impact Report (EIS/EIR) evaluates the impacts of implementing the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) Conservation Plan (Conservation Plan) and issuing a section 10(a)(1)(B) (incidental take) permit based on this plan. The habitat-based Conservation Plan is intended to avoid, minimize, and fully mitigate the incidental take of the covered species from the implementation of the covered activities to the maximum extent practicable. The Conservation Plan also is intended to contribute to the recovery of species listed as threatened or endangered under the Endangered Species Act of 1973, as amended (ESA) (16 United States Code [U.S.C.] 1531-1544), and reduce the likelihood for future listing of unlisted covered species along the LCR. The EIS/EIR has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [C.F.R.] Parts 1500-1508); the U.S. Bureau of Reclamation's (Reclamation) Draft National Environmental Policy Handbook (U.S. Bureau of Reclamation [USBR] 2000a); the California Environmental Quality Act (CEQA) of 1970, as amended (Public Resources Code [P.R.C.] 21000 et seq.); and the State CEQA Guidelines, as amended (California Code of Regulations [C.C.R.], Title 14, Division 6, 15000 et seq.). Reclamation and the U.S. Fish and Wildlife Service (Service) are the lead agencies for compliance with NEPA, and The Metropolitan Water District of Southern California (Metropolitan) is the lead agency for compliance with CEQA. Together, these agencies have the responsibility for the scope, content, and legal adequacy of the document. Because the terminology and specific needs of NEPA and CEQA do not entirely overlap, explanatory text is provided where needed in the document to account for these differences. For example, CEQA uses the term "proposed project" to refer to the subject of the document, whereas NEPA uses the term "proposed action." In this EIS/EIR, the term used is "proposed action."

This joint EIS/EIR is a programmatic document intended to identify to agency decision makers and the public the potential range of impacts associated with the implementation of the proposed action, including significant and beneficial environmental effects. Additionally, the EIS/EIR will serve as the basis for future project-specific NEPA and CEQA compliance documents that will be required once individual conservation projects under the LCR MSCP are more fully defined. The proposed action does not revisit the authorization of any ongoing covered activity. Future covered activities for which incidental take authorization is being sought under the LCR MSCP may require project-specific NEPA/CEQA compliance prior to implementation.

PURPOSE AND NEED

Need for the Proposed Action

The ESA directs Federal agencies to support the conservation of listed species and ensure that their actions do not jeopardize listed species or destroy or adversely modify critical habitat. Additionally, no taking of listed species by non-Federal agencies is allowed without a permit

from the Service. Federal and non-Federal actions related to the ongoing and future operations of the LCR water delivery and power systems may be affecting listed species, critical habitat, and may contribute to future listing of additional species. To address the needs of the species and the need to comply with the ESA, this Conservation Plan is proposed with the purpose of avoiding jeopardy, supporting the conservation of listed species, and reducing any contribution ongoing or future operations may make to new listings. Additionally, the Service will use this analysis to support its decision concerning an incidental take permit for covered non-Federal activities.

As noted, the Federal participants in the LCR MSCP (Reclamation, the U.S. National Park Service [NPS], U.S. Bureau of Indian Affairs [BIA], U.S. Bureau of Land Management [BLM], the Service, and the Western Area Power Administration [Western]), acting within the scope of their legal authority and obligations, currently undertake or may undertake activities along the LCR that have the potential to affect and result in the incidental take of species that are listed under the ESA, or that may be listed in the future. Ongoing and future Federal actions that are covered by the proposed Conservation Plan are outlined in section 1.2.2.1 of this EIS/EIR and more fully described in Chapter 2 of the *Lower Colorado River Multi-Species Conservation Program Biological Assessment* (LCR MSCP BA)[1], which comprises Volume III. Federal agencies are required under section 7(a)(2) of the ESA to ensure that their actions are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify designated critical habitat. Under section 9 of the ESA, Federal agencies also may not "take" listed species without authorization provided by the Service in the incidental take statement contained in its Biological Opinion (BO) issued pursuant to section 7(b).

The actions that the non-Federal participants in the LCR MSCP are engaged in or may become engaged in along the LCR that have the potential to affect and result in the incidental take of species that are listed under the ESA, or that may be listed in the future, are outlined in section 1.2.2.2 of this EIS/EIR and more fully described in Chapter 2 of the LCR MSCP Habitat Conservation Plan (HCP) (Volume II). Under section 9 of the ESA, non-Federal entities may not "take" listed species without authorization. In order to comply with section 9, the non-Federal participants are requesting such authorization based on the implementation of the proposed Conservation Plan.

The Conservation Plan, as outlined in the LCR MSCP HCP, documents the extent of the incidental take for which authorization is being requested under ESA sections 7 and 10(a)(1)(B), and includes measures to avoid, minimize, and mitigate the effect of that level of take to the maximum extent practicable. The Conservation Plan covers both Federal and non-Federal actions over a 50-year period. The Federal participants will submit the Conservation Plan as part of their proposed action for consideration under section 7 consultation. The non-Federal participants will submit the Conservation Plan with their application for a section 10(a)(1)(B) permit to the Service. The Service will use the Conservation Plan as part of its determinations under sections 7 and 10 on issuing an incidental take statement and incidental take permit.

1 To facilitate compliance with section 7(a)(2), Federal agencies may prepare a BA, pursuant to section 7(c)(1) that identifies the likely effects of the Federal action on threatened and endangered species.

The implementation of the Conservation Plan would provide the mechanism to meet the needs of the Service, the Federal participants, and the non-Federal participants for incidental take authorization under the ESA for ongoing and future actions on the LCR.

Purpose of the EIS/EIR

The purpose of the EIS/EIR is to analyze the environmental effects of implementing the LCR MSCP Conservation Plan by both the Federal and non-Federal participants for a 50-year period, as well as analyze the impacts of the incidental take from the covered activities that would be authorized by the section 10(a)(1)(B) permit. There is no parallel requirement to evaluate the environmental effects of authorizing incidental take through an incidental take statement under section 7, although the analysis of incidental take of covered species in this EIS/EIR includes the effects caused by both the Federal and non-Federal actions.

This EIS/EIR and the accompanying BA and HCP contain descriptions of the ongoing and future activities for which incidental take coverage is sought under the ESA by the Federal and non-Federal participants. Except for the effect of the authorized incidental take of covered species, which is part of the proposed action, this EIS/EIR does not evaluate the environmental effects of the covered activities and does not revisit NEPA or CEQA authorizations for ongoing activities or provide NEPA or CEQA authorization for future activities. Implementation of the Conservation Plan would not be contingent on actually undertaking any of the future covered activities, but would proceed pursuant to the schedule outlined in the proposed Conservation Plan as provided in Tables 2.1-8a-d (included in section 2.1.1.6 as part of the description of the proposed action).

Scope of the EIS/EIR

This EIS/EIR evaluates only the impacts of implementing the Conservation Plan and issuance of a section 10(a)(1)(B) permit by the Service based on this plan since these are the two components of the proposed action. The ongoing covered activities have obtained NEPA and/or CEQA authorizations to the extent required by laws in effect at the time they were approved, and future covered activities will be required to obtain the appropriate authorizations. Although specific regions of influence have been developed for individual resources (e.g., socioeconomic and air quality impacts could affect a larger area than noise impacts or impacts to cultural resources, which are site-specific and highly localized), impacts generally would occur in the vicinity of the historic floodplain of the LCR or its tributaries, in proximity to the sites that would be used for conservation area establishment. Implementation of the Conservation Plan and issuance of the section 10(a)(1)(B) permit would not change the amount of water available to the LCR MSCP participants, the amount of water used by these participants, or otherwise result in changes to environmental conditions beyond those analyzed in Chapter 3 of this EIS/EIR.

The Conservation Plan includes measures that would contribute to maintaining existing desirable habitat within the planning area. The LCR MSCP participants would establish a fund early in the term of the program to be expended on assessing and implementing projects for maintaining existing native habitat that could occur anywhere within the planning area. The types of activities that could be conducted include construction of infrastructure for water delivery or movement; maintenance of marsh vegetation by burning, water delivery, dredging,

and other means; maintenance of moist soil conditions in riparian land cover types (e.g., cottonwood-willow); dredging activities to establish backwaters or backwater connection with the main river channel; removal or control of undesirable vegetation such as saltcedar and *Arundo*; and other appropriate means to maintain existing desirable habitat. Specific projects and locations have not been identified (some of the projects are ongoing while others are only proposed), but these maintenance activities would involve actions that are similar to the proposed action and it is reasonable to assume that they would result in impacts that are similar to those described in Chapter 3 of this EIS/EIR. Analyzing the environmental impacts of these measures is beyond the scope of this EIS/EIR, and their implementation would not be authorized by decisions based on this report.

Goals and Objectives for the LCR MSCP Conservation Plan

In developing the LCR MSCP Conservation Plan, the participants identified a set of goals and objectives that they expect to achieve through its implementation. The goals and objectives are as follows:

1. Conserve habitat that may be impacted by the covered activities that the LCR MSCP participants would implement or perform on the LCR;
2. Reduce the likelihood of additional species listings on the LCR under the ESA;
3. Contribute to recovery of listed species on the LCR;
4. Accommodate current water diversions and power production on the LCR;
5. Optimize opportunities for future water and power development on the LCR;
6. Provide the basis for take authorizations for Federal and non-Federal covered activities on the LCR pursuant to the ESA;
7. Provide the basis for assurances for the non-Federal parties pursuant to the ESA against requirements for increased conservation and mitigation measures in the event of changed circumstances or unforeseen circumstances to the maximum extent permitted by law;
8. Comply with the Law of the River;
9. Identify and implement feasible conservation and mitigation measures for the program based on specific economic, social, legal, and technical considerations, including:
    a. Whether an alternative's costs would be prohibitively or substantially greater than other alternatives.
    b. Whether the alternative is technically feasible based on current science or technology, proximity to existing populations of the species, the presence or absence of infrastructure necessary to implement the measures, and the ability to integrate established native land cover types with existing native land cover types.

The Conservation Plan must also meet the criteria for issuance of a section 10(a)(1)(B) permit by the Service:

1. The taking will be incidental to an otherwise lawful activity;
2. The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
3. The applicant will develop an HCP and ensure that adequate funding for the HCP will be provided;
4. The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and
5. The applicant agrees to implement other measures the Service may require as being necessary or appropriate for the purpose of the HCP.

ALTERNATIVES

A number of project alternatives were considered but eliminated from detailed analysis. The action alternatives that were carried forward are considered feasible and meet most or all of the goals and objectives outlined above.

Alternative 1: Implementation of the Proposed Conservation Plan and Issuance of Section 10(a)(1)(B) Permit (Conservation Plan)

Alternative 1 is the proposed action and includes two primary components:

1) Implementation of a regional Conservation Plan by Federal and non-Federal participants that would meet the LCR MSCP goals and objectives.
2) Issuance of an ESA section 10(a)(1)(B) permit by the Service based on the proposed HCP for non-Federal covered activities.

Species proposed for coverage are those that meet one of the following selection criteria:

- Species that are listed or that are proposed or candidates for listing under the ESA or species that are protected under Arizona, California, or Nevada law that could be affected by covered activities and would require take authorization; or
- Species that could become listed during the term of the LCR MSCP Conservation Plan under the ESA or species that could become protected under Arizona, California, or Nevada law that could be affected by covered activities and could require future take authorization.

The Conservation Plan includes a full range of conservation measures for all covered species. Based on application of the selection criteria, 27 of the species considered are proposed for coverage under the ESA section 10(a)(1)(B) permit. The LCR MSCP HCP also includes four "evaluation species." Evaluation species are species that could become listed in future years and that could be added to the covered species list during the term of the LCR MSCP, but for which sufficient information is not available at this time to determine their status in the planning area, the potential effects of covered activities, or to develop specific conservation measures for the species. The Conservation Plan includes research studies and pilot management studies for the evaluation species to determine their status in the planning area

and to determine appropriate conservation measures. None of the four evaluation species are presently protected under the ESA.

The Conservation Plan includes the following types of conservation measures that, in combination, would achieve program objectives for regulatory compliance and contribute to species' recovery:

- Establishment of a $25 million fund to support projects implemented by land use managers in the planning area that maintain existing habitat for listed species that would be covered by the Conservation Plan under this alternative;
- Creation of native land cover types (5,940 acres of cottonwood-willow, 1,320 acres of honey mesquite type III, 512 acres of marsh, and 360 acres of backwaters) to provide covered species habitats;
- Avoidance and minimization of impacts on covered species and their habitat resulting from covered activities and Conservation Plan implementation;
- Population enhancement measures that directly or indirectly increase abundance of covered species;
- Monitoring and research necessary to assess and improve conservation measure effectiveness and adaptively manage implementation of the Conservation Plan over time; and
- Other conservation measures relating to the covered species and the strategies for implementing them.

The Conservation Plan is designed to fully mitigate adverse effects on all covered species resulting from covered activities and to meet the ESA section 10 standard to minimize and mitigate the impacts of the covered activities on covered species to the maximum extent practicable [50 C.F.R. 17.22(b)(2)(B)].

This alternative would be implemented in the planning area, which is the historic floodplain of the LCR, from Lake Mead to the SIB between the United States and Mexico and areas with elevations up to and including the full pool elevations of Lake Mead, Lake Mohave, and Lake Havasu.

Alternative 2: No-Action Alternative

The no action alternative describes a reasonable assumption of the expected future situation that would result if the Conservation Plan were not implemented as proposed and the section 10(a)(1)(B) permit were not issued. This alternative is based on the following assumptions regarding the actions that would be taken in the absence of the LCR MSCP.

Assumptions

- A comprehensive, regional multi-species conservation plan would not be implemented by non-Federal and Federal entities.

- The Service would not issue a comprehensive section 10(a)(1)(B) permit to the states of Arizona, California, and Nevada for incidental take resulting from the covered activities.
- The covered activities described in the LCR MSCP BA and LCR MSCP HCP would likely be implemented, but regulatory compliance would be required and applied on a case-by-case basis as each activity is considered and approved. The types of conservation measures and strategies described for the proposed Conservation Plan would likely be adopted to offset the impacts of each of the activities, but would be planned and implemented independently for each activity. Conservation could occur in the planning area as well as in the off-site conservation areas described below under Alternative 4. These include the lower reaches of the Virgin and Muddy rivers, Bill Williams River, and Gila River. In the absence of a comprehensive, coordinated conservation program, the following would be expected:
  - It is unlikely that funding would be provided to maintain existing habitat that is not impacted by the individual projects.
  - The individual project mitigation programs likely would not provide the regional wildfire suppression and law enforcement funding proposed in the Conservation Plan.
  - Coordinated monitoring and adaptive management programs would not be implemented.
  - Since each individual project would establish its own mitigation sites, it is likely that more maintenance and storage facilities would be required.
  - More, smaller mitigation sites would be established, requiring more infrastructure (access roads and irrigation pipelines/canals and pump facilities).
  - To the extent that the agencies undertaking the covered activities proceed with ESA compliance, there may be a reduced number of covered species because unlisted species likely would not be included. This would result in a reduction in the amount of conservation area required.

Federal Regulatory Compliance Actions

- All Reasonable Prudent Measures (RPMs) and Reasonable Prudent Alternatives (RPAs) for the 1997 and 2002 BOs must be completed by April 30, 2005, when the current BO expires. Reclamation would need to reinitiate consultation with the Service on LCR operations and maintenance activities, and the Service would issue a new BO, which may contain conservation measures or requirements not in the original 1997 BO or the 2002 extension. It is likely that Reclamation's consultation with the Service regarding ongoing operations and maintenance activities would incorporate the future actions for which coverage is provided by the proposed Conservation Plan.
- The provisions of the 2001 BO regarding the change in point of diversion of up to 400 kaf from Imperial Dam to Lake Havasu would remain in effect, assuming that the exchange is accomplished, until the time limits set in the BO expire.

- Future Federal actions would be required to comply with NEPA, the ESA, and other laws and regulations; compliance and permit requirements would be implemented on a case-by-case basis.
- It is likely that conservation measures similar to those of the proposed action would be implemented to comply with regulatory requirements, with the exceptions described above under "Assumptions."

Non-Federal Regulatory Compliance Actions

- Ongoing and future actions in Arizona, California, and Nevada would be required to comply with permit requirements, where appropriate, and all applicable laws and regulations. There is a reasonable possibility that potential non-Federal permittees would conclude that they do not require a section 10(a)(1)(B) permit for their activities, either because they choose not to implement those activities or they determine that their activities do not cause incidental take of protected species.

Ongoing Conservation Actions

- Conservation actions by Federal agencies that are tied to section 7 consultations under section 7(a)(2) would continue to be implemented as part of that proposed action or under the requirements of the BO. Implementation would cease only under the terms of the BO.
- Voluntary conservation actions initiated by Federal agencies under section 7(a)(1) would continue to be implemented at the discretion of the Federal agency.
- Voluntary conservation actions initiated by state agencies, tribes, or private groups would continue to be implemented at the discretion of the funding entity.
- Implementation of existing recovery plans for listed species would continue as Federal and non-Federal partners provide funding for specific projects relevant to the planning area.

Alternative 3: Implementation of a Conservation Plan Addressing ESA-Listed Species Only and Issuance of a Section 10(a)(1)(B) Permit (ESA-Listed Species Only)

This alternative would provide coverage only for those species listed under the ESA, and it would result in the issuance of a section 10(a)(1)(B) permit by the Service. Covered species would be the Yuma clapper rail, southwestern willow flycatcher, desert tortoise, bonytail, humpback chub, and razorback sucker. The amount of take authorized would be as shown on Tables 2.1-2 and 2.1-3 for these species. This alternative would differ from the proposed action primarily in that no honey mesquite and less cottonwood-willow and marsh land cover would need to be established. Additionally, no take permit would be issued for unlisted species, and specific benefits for those species would not occur. Under this alternative, the Conservation Plan would be implemented in the same geographic area as the proposed action and would include the following:

- Establishment of a $25 million fund to support projects implemented by land use managers in the planning area that maintain existing habitat for listed species that would be covered by the Conservation Plan under this alternative;
- Creation of native habitat in the planning area (4,050 acres of cottonwood-willow, 382 acres of marsh, and 360 acres of backwaters);
- Long-term management of established habitat to maintain and preserve ecological functions;
- Avoidance and minimization of impacts resulting from covered activities and Conservation Plan implementation on listed species and their habitat;
- Population enhancement measures intended to directly or indirectly increase abundance of listed species; and
- Adaptive management measures, including monitoring and research necessary to assess and improve conservation measure effectiveness.
- Other conservation measures relating to the listed species and the strategies for implementing them.

Alternative 4: Off-Site Conservation and Issuance of a Section 10(a)(1)(B) Permit (Off-Site Conservation)

The off-site conservation alternative would involve the application for and issuance of a section 10(a)(1)(B) permit for the same covered activities and covered species as the proposed action. The level of impacts to covered species, including the amount of authorized take that is requested, is the same for this alternative as for the proposed action, and therefore, the same level of conservation measures would be proposed to mitigate the impacts, including:

- Establishment of a $25 million fund to support projects implemented by land use managers in the planning area that maintain existing covered species habitat;
- Creation of native habitat (5,940 acres of cottonwood-willow, 1,320 acres of honey mesquite type III, 512 acres of marsh, and 360 acres of backwaters);
- Long-term management of created habitat to maintain and preserve ecological functions;
- Avoidance and minimization of impacts resulting from covered activities and Conservation Plan implementation on covered species and their habitat;
- Population enhancement measures intended to directly or indirectly increase abundance of covered species;
- Adaptive management measures, including monitoring and research necessary to assess and improve conservation measure effectiveness; and
- Other conservation measures relating to the covered species and the strategies for implementing them.

The only difference between this alternative and the proposed action is that habitat generally would be created along tributaries to the LCR. Fish conservation, including the creation of 360

acres of backwaters and fish augmentation strategies, would continue to take place in the mainstem, reservoirs, and backwaters of the LCR. For purposes of analysis, it is assumed that created habitat would be equally distributed between the three off-site conservation areas.

Potential off-site locations for implementing the Conservation Plan elements are (1) the lower reaches of the Muddy River/Moapa Valley and Virgin River, proceeding upstream from the confluences with Lake Mead and overlapping the NDOW's Overton Wildlife Management Area; (2) the lower reach of the Bill Williams River, proceeding upstream from the confluence with the LCR and overlapping the Bill Williams NWR, to Alamo Dam; and/or (3) lower Gila River Valley, proceeding upstream from the LCR planning area and extending approximately ten miles east of Mohawk Valley.

SCOPING AND PUBLIC INVOLVEMENT

Public scoping was conducted to help identify areas of concern and specific issues that should be addressed in the EIS/EIR. Notices that a combined EIS/EIR was being prepared were published in 1999 and 2000. Subsequent notices were made in October 2003. The first Notice of Intent (NOI)/Notice of Preparation (NOP) was published in the *Federal Register* (Volume 64, Number 95, pages 27000-27002) on May 18, 1999. A supplemental NOI/NOP was published in the *Federal Register* (Volume 65, Number 134, pages 43031-43034) on July 12, 2000. These two NOI/NOPs are included in Appendix B. A Revised NOP of a Draft EIR was issued by Metropolitan on July 25, 2000 and also is included in Appendix B, as is the NOP issued on October 17, 2003. Three public scoping meetings held in 2000 were supplemental to the original scoping meetings in 1999 and involved a formal presentation on planning progress and conceptual preliminary alternatives. Four additional public information meetings were held in November 2003 in Arizona, California, and Nevada to present information regarding the alternatives being evaluated in this EIS/EIR and to obtain public comments regarding issues to be addressed in this document. Scoping summary reports documenting the issues raised at these meetings are included in Appendix C.

Approximately 360 copies of the Draft EIS/EIR were distributed to agencies, public libraries, Indian tribes, organizations, and individuals for review during a 60-day period ending on August 18, 2004. Additionally, three public hearings were held in Henderson, Nevada; Blythe, California; and Phoenix, Arizona on July 20-22, 2004 in order to receive public comments on the Draft EIS/EIR. Additional information regarding the public involvement program is included in section 7.2.1.

SUMMARY OF IMPACTS

Comparative Description of Alternatives and Effects

The proposed action (Alternative 1) has the potential to cause impacts to environmental resources, as described in Chapter 3. Many of these potential impacts would be caused by construction activities, such as grading required to establish the proper topography for growing riparian vegetation to provide habitat for covered species or to develop backwaters and marsh land cover. Once the habitat has been established, ongoing maintenance activities would not significantly impact most resources. Potential construction-related temporary and less than significant impacts have been identified for aesthetics, biological resources, hazards and

hazardous materials, hydrology, geology, and transportation. Construction also could result in significant impacts to agricultural resources, air quality, biological resources (associated with backwater creation), cultural resources, and noise. Additionally, construction would result in temporary environmental justice impacts (associated with air quality and noise) and transboundary impacts (associated with air quality). It also could result in long-term changes to Indian Trust Assets (ITAs). Mitigation measures have been identified that would reduce most of the potential significant impacts to a less than significant level. (Impacts to aesthetics, hazards and hazardous materials, hydrology, ITAs, geology, transboundary impacts, and transportation do not require mitigation, nor do some impacts to air quality and biological resources.) Depending on the characteristics of specific conservation sites and construction methods implemented, there may be significant temporary impacts to air quality and associated impacts to environmental justice that cannot be avoided.

Potential impacts that may result from the maintenance and monitoring of the conservation sites after construction is completed and from implementing other conservation measures are either less than significant or can be mitigated to be less than significant, with the exception of air quality impacts from the largest prescribed burns and associated environmental justice impacts.

No significant long-term operational impacts have been identified for the proposed action with the exception of potential noise impacts from pump operation and associated environmental justice impacts. The potential long-term effects to agricultural resources, land use, environmental justice, and socioeconomics would be less than significant. Furthermore, the proposed action would result in long-term beneficial impacts on biological resources, aesthetics, and water quality.

The no action alternative (Alternative 2) is assumed to include many of the same conservation measures as the proposed action. These measures would be implemented on a case-by-case basis as required to mitigate the effects of covered actions that are undertaken by the various agencies. Although the construction, maintenance, and operation of these individual conservation projects have the potential to cause impacts that are similar to those of the proposed action, there would be differences in the scope of those impacts. In the absence of a coordinated conservation program, the individual conservation projects are likely to be smaller and more widely scattered. It also is likely that conservation would focus only on listed species, thus reducing the total amount of conservation area that would be created.

These factors may reduce the effects on agricultural resources, land use, environmental justice (loss of agricultural jobs), and socioeconomics below those caused by the proposed action. However, there would likely be similar levels of impacts to aesthetics, air quality, cultural resources, and transportation. The potential for significant air quality and associated environmental justice impacts would still exist, even with adoption of mitigation measures, depending on the location and size of the conservation projects. Although less than significant, impacts would likely be greater than those caused by the proposed action for hazards and hazardous materials and noise because of the increased number of individual projects involved and the greater likelihood that the conservation sites would be located closer to developed areas near existing facilities used in implementing the covered actions. The no action alternative could include conservation in the off-site conservation areas. To the extent that this occurred,

short-term impacts on environmental justice associated with air quality and noise, ITAs, and transboundary impacts would be reduced because these impacts would not occur in the off-site areas.

More importantly, the no action alternative would provide fewer benefits to biological resources, along with reduced benefits to aesthetics and water quality. In the absence of a coordinated program with the capacity to develop large blocks of conservation area, the multiple individual mitigation sites that would be developed under this alternative would be smaller, with greater edge areas proportionate to their size, and are less likely to be located in proximity to existing occupied habitat. These factors would reduce the effectiveness of the mitigation sites as compared to the conservation measures in the proposed action. Furthermore, the absence of a coordinated monitoring and adaptive management program for the individual projects would reduce their likelihood of success in providing the benefits for the biological resources that would result from the program proposed for the LCR MSCP. Impacts to native fish species along the Virgin and Muddy rivers also could occur under this alternative, however, which would represent a greater impact to biological resources than identified for the proposed action.

Overall, under the no action alternative, the short-term, construction-related impacts are potentially greater, while the permanent agricultural and associated environmental justice impacts and biological, aesthetic, and water quality benefits are potentially less than those of the proposed action.

The listed species only alternative (Alternative 3) would require the construction of a smaller amount of conservation area, reducing the short-term, construction-related impacts from the levels that would be caused by the proposed action. Unlike the no action alternative, the construction of the conservation projects would still be a coordinated effort, focusing on creating large size patches of integrated mosaics of vegetation. This approach would likely involve fewer construction sites than would be required under the proposed action, but there would still be the potential for significant unmitigable impacts to air quality and related environmental justice impacts, depending on the location and size of the sites. Other construction-related, short-term impacts would likely be less than those identified for the proposed action. Effects on agricultural resources, land use, environmental justice (from noise and loss of agricultural jobs), and socioeconomics would also likely be less since fewer acres of existing agricultural land would be subject to conversion for conservation area use. As with the proposed action, these effects would be less than significant. However, this alternative would not provide the same level of long-term, beneficial impacts to biological and aesthetic resources and water quality that are provided by the proposed action.

The off-site conservation alternative (Alternative 4) differs from the proposed action in the location, but not the quantity, of the riparian and mesquite land cover types that would be created. As a result, the scope of short-term, construction-related impacts would be similar to those identified for the proposed action, although transboundary and ITA impacts would not occur, and the potential for short-term environmental justice impacts associated with air quality and noise and long-term impacts associated with noise would be greatly lessened. The potential for significant, unmitigable impacts to air quality remains, although the California air quality standards would not be applicable to this alternative since none of the conservation

areas would be created in California. The environmental justice impacts associated with noise and air quality would not occur in the off-site conservation areas since the percentage of low-income and minority populations in these locations is less than in the larger community of comparison; they would be associated only with the creation of 360 acres of backwaters. Effects to agricultural resources, land use, environmental justice (loss of agricultural jobs), and socioeconomics would be similar to the proposed action, and less than significant. Potential impacts to ITAs would be greatly lessened under this alternative because they are not present in the off-site conservation areas, and impacts would occur only in the areas where the 360 acres of backwaters would be created.

This alternative would provide the same long-term benefits to biological resources, aesthetic resources, and water quality as the proposed action, but it has the potential to cause significant unavoidable short- and long-term impacts to biological resources that are present at off-site conservation areas (native common and sensitive fish inhabiting the Virgin and Muddy rivers) that are not present in the planning area. These potential short- and long-term impacts to biological resources offset the difference between this alternative and the proposed action with respect to short-term air quality and associated environmental justice impacts, as well as environmental impacts associated with noise since this impact would be feasibly mitigable. Alternative 4 would not result in transboundary impacts, but these are impacts that would occur in a different location than those of the proposed action; they are not different types of impacts. Alternative 4 also would not result in impacts to ITAs (with the exception of potential impacts from backwater creation), but these, too, are feasibly mitigable.

Comparison of the No Action Alternative and Action Alternatives

Under the no action alternative (Alternative 2), the covered activities described in the LCR MSCP BA and LCR MSCP HCP would likely be implemented, but regulatory compliance would be required and applied on a case-by-case basis as each action is considered and approved. In the absence of a comprehensive, coordinated conservation program, the following would be expected:

- It is unlikely that funding would be provided to maintain existing habitat that is not impacted by the individual projects.
- The individual project mitigation programs likely would not provide the regional wildfire suppression and law enforcement funding proposed in the Conservation Plan.
- Coordinated monitoring and adaptive management programs would not be implemented.
- Since each individual project would establish its own mitigation sites, it is likely that more maintenance and storage facilities would be required.
- More, smaller mitigation sites would be established, requiring more infrastructure (access roads and irrigation pipelines/canals and pump facilities).
- To the extent that the agencies undertaking the covered activities proceed with ESA compliance, there may be a reduced number of covered species because unlisted species likely would not be included.

Thus, the no action alternative would not result in a continuation of existing conditions. Its impacts generally would be similar to those of the action alternatives because similar conservation measures likely would be implemented, and differences in impacts typically would be a matter of degree rather than kind. In general, the impacts that are directly associated with the amount of conservation area established (including beneficial impacts) would be comparable to those of Alternative 3 and less than those of Alternatives 1 and 4.

The no action alternative would result in similar types of construction-related impacts as the action alternatives. In some cases, the intensity of the impact would be comparable to Alternative 3 and less than under Alternatives 1 and 4 (e.g., short-term aesthetic impacts to conservation area establishment sites; impacts from erosion). In other cases (e.g., air quality, noise), short-term impacts would be greater because the lack of a comprehensive, coordinated effort could result in more, smaller projects, and the need to develop more infrastructure and support facilities. As noted above, this may reduce the effects to agricultural resources, land use, environmental justice (loss of agricultural jobs) and socioeconomics below those caused by the proposed action and Alternative 4 (off-site conservation).

Beneficial impacts to aesthetic resources and water quality would be less than under Alternatives 1 and 4 because a smaller amount of conservation area would be created and comparable to those of Alternative 3 because similar amounts of conservation area would be created. Beneficial impacts to biological resources that are directly linked to the amount of conservation area created would be less than under Alternatives 1 and 4 and comparable to Alternative 3. Beneficial impacts of all action alternatives to biological resources would be reduced under the no action alternative because funding would not be provided to maintain existing habitat that is not impacted by the individual projects, regional wildfire suppression and law enforcement funding likely would not be provided, and coordinated monitoring and adaptive management programs would not be implemented.

Long-term noise from pump operation could be slightly greater than under the proposed action and Alternative 4 because conservation measures would be more likely to be implemented closer to developed areas and approximately equal to those of Alternative 3.

The no action alternative could include conservation in the off-site conservation areas. To the extent that this occurred, short-term impacts on environmental justice associated with air quality and noise, ITAs, and transboundary impacts identified for Alternatives 1 and 3 would be reduced because these impacts would not occur in the off-site areas. Impacts to native fish species along the Virgin and Muddy rivers could occur under this alternative, as is the case for Alternative 4. This would represent a greater impact to biological resources than identified for Alternatives 2 or 3.

Environmentally Preferred Alternative

As discussed above, each of the alternatives would have the potential to cause short-term, construction-related impacts to many of the resources analyzed in this EIS/EIR. Although these potential impacts may be less for Alternatives 2 (no action), and 3 (listed species only), they can be mitigated to less than significant levels for all of the alternatives, except for the potential impacts to air quality and associated environmental justice impacts. Some impacts would not occur or would be reduced under Alternatives 2 and 4 because ITAs are not present in the off-

site conservation areas, and transboundary impacts and environmental justice impacts associated with noise and air quality would not occur as a result of construction in these off-site areas. These impacts would all be feasibly mitigable with the exception of air quality-related impacts, as noted above. Depending on the location and size of conservation project sites, there may be significant air quality impacts that cannot be mitigated to a less than significant level, and this potential exists for each alternative, although the associated environmental justice impacts would be greatly reduced under Alternative 4, and the transboundary impacts would be avoided. To the extent that conservation occurred in the off-site conservation areas as part of Alternative 2, these impacts would be reduced or avoided as well.

Similarly, each of the alternatives could cause long-term impacts through ongoing maintenance of created habitat. These impacts would be less than significant for each alternative, with the exception of air quality impacts from prescribed burns, which could be unavoidable for the largest burns. The effects to agricultural resources, land use, environmental justice, and socioeconomics would be less for Alternatives 2 and 3, although environmental justice impacts associated with noise and air quality could be lessened under Alternative 2 to the extent that conservation occurred in the off-site conservation areas. Alternatives 2 and 3, however, would not provide the same level of long-term biological, aesthetic, or water quality benefits as the proposed action or Alternative 4 (off-site conservation). These long-term benefits would offset the less than significant short-term effects to other resources. Alternative 4, like Alternative 2, would potentially cause greater biological impacts than the proposed action, which would offset the equal benefit that it would provide to these resources. These long-term biological beneficial impacts would outweigh the short-term air quality and environmental justice impacts and the feasibly mitigable environmental justice impact associated with noise from pumps that would be avoided under Alternative 4.

Overall, most of the short-term, construction-related impacts that would potentially occur under each alternative can be mitigated to less than significant levels. The potentially significant air quality impacts would exist for all the alternatives and do not provide a basis for distinguishing between them, although short-term air quality impacts associated with environmental justice would be lessened under Alternative 4, and transboundary impacts, which are not considered substantial impacts, would not occur. The long-term impacts, with the implementation of the mitigation measures identified in this EIS/EIR, would similarly be less than significant for all the alternatives. The primary difference between the alternatives lies with the level of benefit that is provided to the biological resources. Both Alternatives 1 and 4 provide the same level of benefit, but Alternative 4 poses the potential for short- and long-term impacts to endangered fish species that inhabit the Virgin and Muddy rivers where the off-site conservation projects would be sited. Therefore, Alternative 1 is the environmentally preferred alternative.

A summary of the potential impacts and proposed mitigation measures identified for Alternatives 1, 2, 3, and 4 is provided in Table ES-1.

Table ES-1. Summary of Impacts and Mitigation Measures

Impact	APPLICABLE ALTERNATIVE				
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	*Mitigation Measure*[3]
AESTHETICS					
AESTH-1: Construction/maintenance activities would temporarily lessen the visual quality of the conservation area establishment sites located on or near visually sensitive resources (*less than significant impact*).	X	X	X	X	None required
AESTH-2: The construction of field facilities and fish-rearing facilities could be required, which could alter the visual quality of the selected sites (*less than significant impact*).	X	X	X	X	None required
AESTH-3: Conservation area establishment would return sites to a more natural appearance (*beneficial impact)*.	X	X	X	X	None required
AGRICULTURAL RESOURCES					
AG-1: Important Farmland could be converted to a nonagricultural use (*less than significant impact*).	X	X	X	X	None required
AG-2: Waterfowl attracted to established backwaters and marshes could destroy crops grown on adjacent farmland *(less than significant impact*).	X	X	X	X	None required
AG-3: Runoff from established conservation areas could alter the slopes of adjoining laser-leveled fields (*significant impact*).	X	X	X	X	AG-1: Develop grading plans for newly established conservation areas that direct runoff away from adjacent agricultural lands to ensure that flow rates from the conservation area do not exceed existing discharge rates.
AG-4: Covered species attracted to established conservation areas could disperse to other lands within the planning area *(less than significant impact*).	X	X	X	X	None required
AIR QUALITY					
AQ-1: The use of fossil fuel-fired construction equipment during construction, maintenance, and operational activities would result in intermittent combustive emissions that would not violate any air quality standard or contribute substantially to an existing or projected air quality violation (*less than significant impact*).	X	X	X	X	None required

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
AIR QUALITY					
AQ-2: The development of the largest projects would produce fugitive dust emissions that could exceed an ambient 24-hour PM10 standard (*significant impact*).	X	X	X	X	AQ-1: Implement standard operating practices to minimize fugitive dust (PM10) emissions during construction activities.
AQ-3: Emissions from the largest prescribed burns during terrestrial vegetation establishment or maintenance activities would produce emissions that could contribute to an exceedance of an ambient 24-hour PM10 standard (*significant impact*).	X	X	X	X	AQ-2: Implement a smoke management plan for all construction and maintenance activities involving the use of fire.
AQ-4: Air emissions from proposed conservation area establishment activities and facility construction could exceed the MDAQMD daily NOx or PM10 emission significance thresholds, which would result in a cumulatively considerable net increase of a nonattainment pollutant (*significant impact*).	X	X	X		See Mitigation Measure AQ-1.
AQ-5: Air emissions from the proposed conservation area establishment activities would not expose sensitive receptors to substantial pollutant concentrations (*less than significant impact*).	X	X	X	X	None required
AQ-6: Air emissions from the proposed conservation area establishment activities would not create objectionable odors that affect a substantial number of people (*less than significant impact*).	X	X	X	X	None required
BIOLOGICAL RESOURCES					
BIO-1: Issuance of the section 10(a)(1)(B) permit would authorize the incidental take of up to 27 covered species from implementation of both the covered activities and the Conservation Plan (*less than significant impact*).		X	X	X	None required

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
BIOLOGICAL RESOURCES					
BIO-2: The establishment of 7,260 acres of cottonwood-willow and honey mesquite land cover would increase the extent of cottonwood-willow riparian forest and mesquite woodland sensitive communities (*beneficial*).	X	X	X[4]	X	None required
BIO-3: Clearing, grading, planting, and site maintenance during conversion of agricultural lands to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing low value habitat used by resident and migratory wildlife, removal of weedy vegetation and crops, alteration of habitat characteristics through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required
BIO-4: Clearing, grading, planting, and site maintenance during conversion of undeveloped lands (primarily saltcedar) to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing non-native vegetation and the habitat it provides for wildlife, short-term effects on habitat characteristics from alteration of local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required
BIO-5: Clearing, grading, planting, and site maintenance during establishment of marsh would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
BIOLOGICAL RESOURCES					
BIO-6: Clearing, grading, and site maintenance during establishment of backwaters would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant* or *significant short-term impacts; beneficial long-term impacts).*	X	X	X	X	BIO-1: Conduct site-specific surveys for non-covered sensitive species during selection of habitat establishment or enhancement (e.g., existing backwaters) areas and, if any are found, then implement measures appropriate for the specific site and species to avoid or minimize impacts to the extent feasible without causing impacts on covered species. These may include measures specified in the Conservation Plan to avoid or minimize potential effects on covered species (e.g., scheduling to avoid breeding times).
BIO-7: Maintenance of established habitats would result in the removal of invasive non-native vegetation, alteration of habitat characteristics through changes in local hydrology, and short-term elimination or displacement of resident wildlife (*less than significant short-term impacts; less than significant or beneficial long-term impacts*).	X	X	X	X	None required
BIO-8: Population enhancement activities for covered fish and bird species could adversely affect existing individuals or populations of covered or sensitive species (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required
BIO-9: Native land cover type establishment and maintenance could temporarily affect wetlands and waters of the U.S (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required
BIO-10: Land cover type establishment and maintenance activities could result in periodic short-term impacts on sensitive and common native fishes inhabiting the Virgin and Muddy rivers (*less than significant impact*).	X			X	None required

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
BIOLOGICAL RESOURCES					
BIO-11: Construction to establish/enhance native land cover types could result in the long-term loss or degradation of sensitive native fish habitats in the Virgin and Muddy rivers (*significant impact*).	X[5]			X	BIO-2: Design site-specific habitat establishment plans to avoid and minimize potential effects on sensitive native fish habitats along the Virgin and Muddy rivers. Preparation of the design plans shall be coordinated with and approved by the Service as part of section 7 consultation. If appropriate, design plans shall include measures to rehabilitate any affected habitat.
CULTURAL AND HISTORIC RESOURCES					
CULT-1: Disturbance of the ground surface could directly or indirectly disturb or destroy significant archaeological or historical resources, particularly in undeveloped or previously undisturbed areas (*significant impact*).	X	X	X	X	CULT-1: Consult with the appropriate SHPO(s), tribes, and other interested parties, perform archival research, interview informants, and conduct cultural resource inventories; evaluate all identified cultural resources for potential listing on the National Register of Historic Places or state or local registers; modify project design, when feasible, to avoid cultural resources eligible for listing; develop and implement a pre-construction Testing and Evaluation Plan, pre-construction Data Recovery Plan, and Cultural Resources Construction Monitoring Plan as appropriate; re-direct construction as needed if new cultural resources sites are found, document new discoveries, and avoid sites or implement a data recovery program; initiate consultation with any known lineal descendants and relevant Indian tribes as per NAGPRA or follow state and local laws as appropriate; incorporate these procedures into all archaeological testing and/or data recovery plans and the Cultural Resources Construction Monitoring Plan.

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
CULTURAL AND HISTORIC RESOURCES					
CULT-2: Cultural resources may be affected by unauthorized artifact collection during construction or by a lack of awareness of cultural resource mitigation measures on the part of construction personnel (*significant impact*).	X	X	X	X	See Mitigation Measure CULT-1
ENERGY AND DEPLETABLE RESOURCES					
Minor impact associated with use of diesel fuel and electrical power during construction and operations. Negligible impact to hydropower production due to consumptive use of water for conservation areas.	X	X	X	X	None required
ENVIRONMENTAL JUSTICE					
EJ-1. Significant, short-term air quality impacts from construction activities and prescribed burns in or near agricultural areas could result in disproportionate impacts to minority and low-income populations.	X[6]	X	X	X[6]	Implement Mitigation Measures AQ-1 and AQ-2
EJ-2. Noise from construction and pumps that exceeded local standards could disproportionately affect minority and low-income populations.	X[6]	X	X	X[6]	Implement Mitigation Measures NOI-1 and NOI-2
EJ-3: If agricultural land were converted to conservation areas, the loss of agricultural jobs would disproportionately affect minority and low-income populations.	X	X	X	X	EJ-1: Reclamation shall work with local jurisdictions and/or growers to ensure that agricultural workers are notified as soon as possible of the potential for a loss of jobs once specific project locations have been identified. Reclamation will encourage the local jurisdictions and/or growers to provide timely information and assistance to agricultural workers regarding the availability of alternative employment.

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
HAZARDS AND HAZARDOUS MATERIALS					
HAZ-1: The use of pesticides, lubricants, fuels, and other hazardous materials during construction, operations, and maintenance could result in localized spills, which could create a hazard to the environment (*less than significant impact*).	X	X	X	X	None required
HAZ-2: The increase in riparian and backwater areas could result in an increase in vectors (*less than significant impact).*	X	X	X	X	None required
HAZ-3: Construction activities could cause wildfires (*less than significant impact).*	X	X	X	X	None required
HAZ-4: Fire used as a construction and maintenance tool could escape control and become a wildland fire (*less than significant impact).*	X	X	X	X	None required
HAZ-5: Conservation area establishment actions implemented within an Accident Potential Zone of an airport or near a private airstrip could cause a comparatively minor increase in bird populations (*less than significant impact).*	X	X	X	X	None required
HYDROLOGY AND WATER QUALITY					
HYDRO-1: Habitat establishment activities could result in erosion-induced siltation (*less than significant impact*).	X	X	X	X	None required
HYDRO-2: Habitat establishment could have a short-term adverse effect to water quality if irrigation mobilized (released) pesticides, salts, or other contaminants (*less than significant impact*).	X	X	X	X	None required
HYDROLOGY AND WATER QUALITY					
HYDRO-3: Water quality in created or restored backwaters and marshes could be affected by increasing concentrations of various naturally occurring and man-made chemicals (both in the soil and the water column) that result from evaporation of water (*less than significant impact*).	X	X	X	X	None required

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
HYDRO-4: Conservation area establishment would result in a long-term improvement to water quality if agricultural land were used (*beneficial impact*).	X	X	X	X	None required
INDIAN TRUST ASSETS					
ITA-1: Implementing conservation measures on tribal land could result in changes to all classes of ITAs.	X[7]	X	X	X[7]	None required.
LAND USE					
No significant impacts specific to land use were identified, although significant land use conflicts were identified in the agricultural resources and noise analyses (Impacts AG-3, AG-4, NOI-1, and NOI-2).	X	X	X	X	Implement Mitigation Measures AG-1, NOI-1, and NOI-2**.**
NOISE					
NOI-1: Construction activities could cause a temporary, substantial increase in ambient noise levels that could exceed local standards if construction occurred in proximity to noise-sensitive receptors (*significant impact).*	X	X	X	X	NOI-1: As needed, select quieter equipment; use noise control devices on equipment, locate equipment away from sensitive receptors; notify nearby neighbors prior to work; minimize idling, use noise barriers; and where possible, limit construction to non-mating, non-nesting seasons of noise-sensitive species.
NOI-2: Pumps located near noise-sensitive receptors could cause a substantial increase in ambient noise levels or exceed regulatory thresholds (*significant impact).*	X	X	X	X	NOI-2: If pumps cannot be located at sufficient distances from sensitive receptors to avoid the exceedance of a local noise standard or a substantial increase in the ambient noise level at the sensitive receptors, construct barriers or enclosures to ensure adherence to local standards.
POPULATION AND HOUSING					
No impact on population or housing.	X	X	X	X	None required
PUBLIC SERVICES AND UTILITIES					
Minimal impacts to water treatment, storm drainage, and water supply from the potential construction and operation of two field facilities. Minor impacts to landfill capacity from construction and operations.	X	X	X	X	None required

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
RECREATION					
REC-1: The implementation of certain conservation measures could result in the loss of recreational opportunities (*less than significant impact*).	X	X	X	X	None required
SOCIOECONOMICS					
SOC-1: Agricultural jobs would be lost if agricultural land were converted to conservation areas.	X	X	X	X	None required
SOC-2: Agricultural-related revenue would be lost if agricultural land were converted to conservation areas.	X	X	X	X	None required
SOC-3: Local property tax revenues could be reduced if privately owned land were leased or acquired by the Federal or state participants in the LCR MSCP.	X	X	X	X	None required
SOCIOECONOMICS					
SOC-4: Local sales tax from the purchase of products related to agricultural uses would be reduced if privately owned agricultural land was placed in public ownership.	X	X	X	X	None required
TOPOGRAPHY, GEOLOGY, SOILS, AND MINERAL RESOURCES					
GEO-1: Activities associated with conservation area establishment could result in erosion-induced siltation of the Colorado River (*less than significant impact*).	X	X	X	X	None required
TRANSBOUNDARY IMPACTS					
TRANS-1: PM_{10} and combustive emissions from the construction and maintenance of created conservation areas in Reach 7 could disperse to Mexico.	X[8]	X	X		None required

Table ES-1. Summary of Impacts and Mitigation Measures (continued)

Impact	APPLICABLE ALTERNATIVE				*Mitigation Measure*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*	
TRANSPORTATION					
Minor impact from construction traffic.	X	X	X	X	None required

1 The no action alternative would result in similar types of impacts as the proposed action since similar conservation measures likely would be implemented. It is likely, however, that a smaller amount of conservation area would be established or maintained, thus reducing the intensity or magnitude of the impacts, including beneficial impacts. Some conservation could occur in the off-site conservation areas, and impacts could occur in these areas as well as in the planning area.

2 The listed species only alternative would result in the establishment of a smaller amount of conservation area than the proposed action. The same types of impacts would occur, but the intensity, or magnitude, would be reduced, including that of beneficial impacts.

3 The development and implementation of mitigation measures for the no action alternative is outside the authority of the lead agencies for this EIS/EIR. The mitigation measures included in this table are examples of measures that could be implemented to reduce impacts associated with the no action alternative.

4 Less cottonwood-willow habitat and no honey mesquite habitat would be established under this alternative.

5 These impacts could occur under the no action alternative to the extent that conservation area creation occurred in the off-site conservation areas.

6 Under Alternative 2, these impacts would not occur to the extent that conservation areas were created in the off-site conservation areas. Air quality and noise impacts would not disproportionately affect minority and low-income populations in the off-site conservation areas. Under Alternative 4, impacts would be associated only with the creation of 360 acres of backwaters along the LCR.

7 Under Alternative 2, these impacts would not occur to the extent that conservation areas were created in the off-site conservation areas. Under Alternative 4, impacts would be associated only with the creation of 360 acres of backwaters along the LCR. No tribal lands or ITAS are present in any of the off-site conservation areas.

8 Transboundary impacts would not occur if conservation occurred only in the off-site conservation areas or in Reaches 1-6.

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1.0 INTRODUCTION

This Environmental Impact Statement/Environmental Impact Report (EIS/EIR) evaluates the impacts of implementing the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) Conservation Plan (Conservation Plan) and issuing a section 10(a)(1)(B) (incidental take) permit based on this plan. The habitat-based Conservation Plan is intended to avoid, minimize, and fully mitigate the incidental take of the covered species from the implementation of the covered activities to the maximum extent practicable. The Conservation Plan also is intended to contribute to the recovery of species listed as threatened or endangered under the Endangered Species Act of 1973, as amended (ESA) (16 United States Code [U.S.C.] 1531-1544), and reduce the likelihood for future listing of unlisted covered species along the LCR. The EIS/EIR has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [C.F.R.] Parts 1500-1508); the U.S. Bureau of Reclamation's (Reclamation) Draft National Environmental Policy Handbook (U.S. Bureau of Reclamation [USBR] 2000a); the California Environmental Quality Act (CEQA) of 1970, as amended (Public Resources Code [P.R.C.] 21000 et seq.); and the State CEQA Guidelines, as amended (California Code of Regulations [C.C.R.], Title 14, Division 6, 15000 et seq.). Reclamation and the U.S. Fish and Wildlife Service (Service) are the lead agencies for compliance with NEPA, and The Metropolitan Water District of Southern California (Metropolitan) is the lead agency for compliance with CEQA. Together, these agencies have the responsibility for the scope, content, and legal adequacy of the document. Because the terminology and specific needs of NEPA and CEQA do not entirely overlap, explanatory text is provided where needed in the document to account for these differences. For example, CEQA uses the term "proposed project" to refer to the subject of the document, whereas NEPA uses the term "proposed action." In this EIS/EIR, the term used is "proposed action."

1.1 BACKGROUND

1.1.1 Development of the LCR MSCP

The LCR MSCP[1] is proposed to serve as a coordinated, comprehensive conservation approach for the LCR basin for a period of 50 years. The program has been developed and would be implemented and funded by a partnership of state, Federal, and other public and private stakeholders in Arizona, California, and Nevada with interests in managing the water and related resources of the LCR. The LCR MSCP planning area (planning area) extends from the full pool elevation of Lake Mead to the Southerly International Boundary (SIB) with Mexico (Figure 1.1-1). The impetus for the creation of the LCR MSCP was the recognition by the Federal and non-Federal participants of the potential for their activities to affect species listed as threatened or endangered under the ESA, as well as designated critical habitat along the LCR. The participants agreed to form a partnership to develop and implement a long-term

1 In this EIS/EIR, the term "LCR MSCP" is used to describe the broad program and its participants. The term "Conservation Plan" is used to describe the proposed conservation measures included in Chapter 5 of the LCR MSCP Habitat Conservation Plan (HCP) (Volume II) and described in Chapter 2 of this EIS/EIR.

endangered species compliance and management program for the historic floodplain of the LCR.

1.1.2 ESA Provisions

Section 9 of the ESA provides for the prohibition of "take" of any fish or wildlife species listed as threatened or endangered under the ESA unless specifically authorized by regulation. Take, as defined by the ESA, means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in such conduct" (16 U.S.C. section 1531[18]). "Harm" is further defined to include significant habitat modifications or degradation that actually kill or injure wildlife by significantly impairing behavioral patterns such as breeding, feeding, and sheltering (50 C.F.R. section 17.3). "Harass" is further defined to include intentional or negligent acts or omissions that create the likelihood of significant injury to wildlife through disruption of normal behavior patterns, including breeding, feeding, or sheltering (50 C.F.R. section 17.3). "Incidental take" is defined by the ESA as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (50 C.F.R. section 17.22 and 17.32).

The Service, under the provisions of sections 7 and 10 of the ESA, must provide for the authorization of incidental take where such authorization is not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify designated critical habitat.

1.1.3 Overview of the Proposed Action

The proposed action includes two primary components:

1. Implementation of a Conservation Plan by Federal and non-Federal participants that would meet the LCR MSCP goals and objectives, described in Chapter 2.
2. Issuance of an ESA section 10(a)(1)(B) permit by the Service based on the proposed Conservation Plan for non-Federal covered activities described in section 1.2.2 below.

The Conservation Plan is a comprehensive, habitat-based approach developed to provide ESA compliance for a suite of species that are currently listed under the ESA or that may become listed in the future. It was designed to meet ESA requirements for the issuance of a permit under section 10(a)(1)(B), and it includes specific conservation measures for species and habitats[2] that would avoid, minimize, and fully mitigate the incidental take of the covered species to the maximum extent practicable and contribute to the listed species' recovery. It also would reduce the likelihood for future listing of unlisted covered species. Because the LCR MSCP is seeking compliance for a 50-year period, the Conservation Plan includes minimization and mitigation measures for species not currently listed under the ESA that may become listed within the term of the permit. The Conservation Plan was developed in accordance with the laws and regulations that govern the operation of the LCR. Collectively, these are referred to as

2 For purposes of the Conservation Plan, habitat is defined as the specific places where the environmental conditions (i.e., physical and biological conditions) are present that are required to support occupancy by individuals or populations of a given species. For further detail, refer to Appendix W in Volume IV.

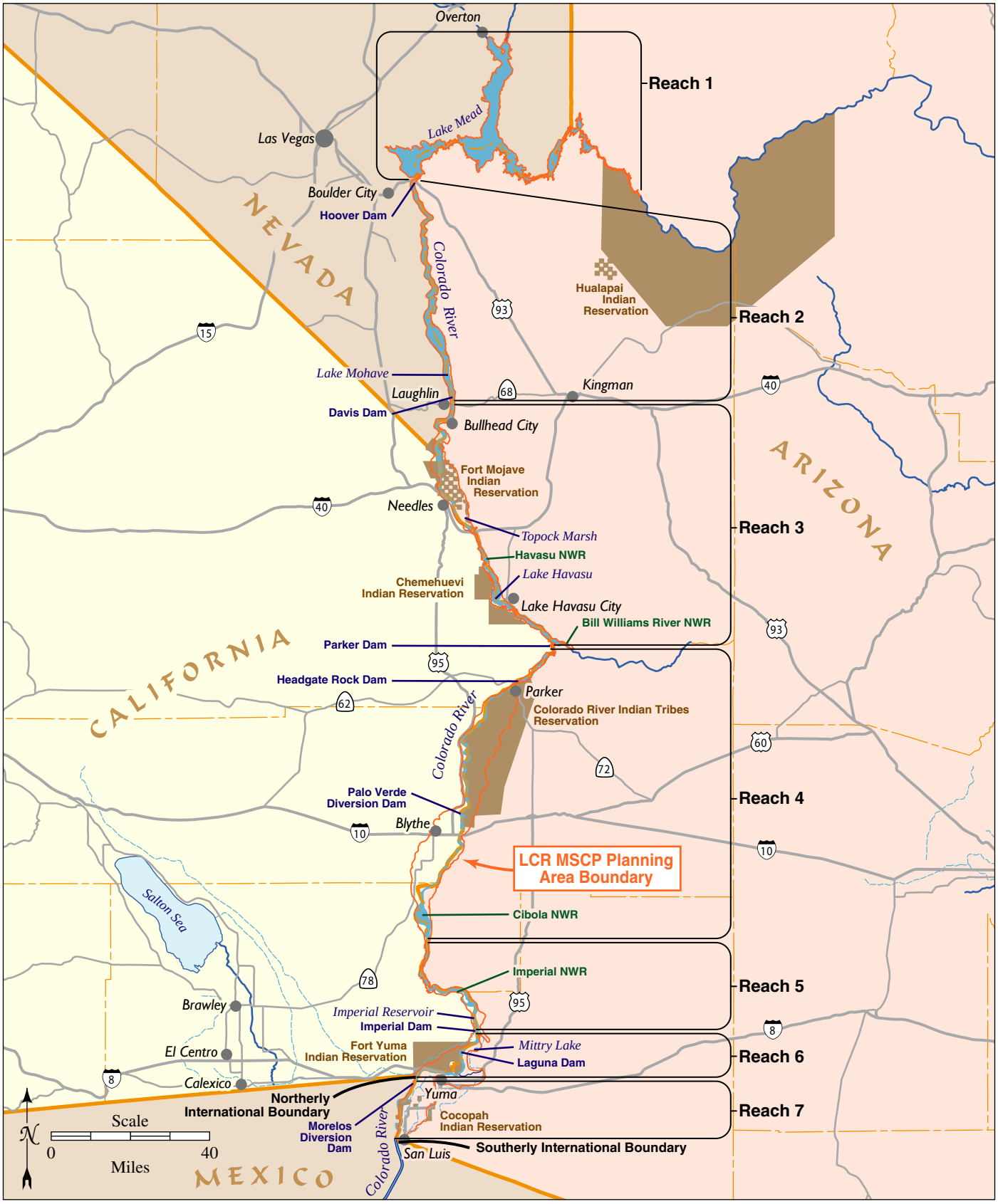

Figure 1.1-1. LCR MSCP Planning Area and River Reaches

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the "Law of the River" and include, but are not limited to, Federal and state laws, interstate compacts, an international treaty, court decisions, Federal contracts, Federal and state regulations, and multi-party agreements. Selected documents that comprise the Law of the River are summarized in Appendix A.

1.1.4 Use of the EIS/EIR

This joint EIS/EIR is a programmatic document intended to identify to agency decision makers and the public the potential range of impacts associated with the implementation of the proposed action, including significant and beneficial environmental effects. As described below and in section 1.4, each of the three lead agencies has independent regulatory compliance needs that are served by this EIS/EIR. Additionally, the EIS/EIR will serve as the basis for future project-specific NEPA and CEQA compliance documents that will be required once individual conservation projects under the LCR MSCP are more fully defined. The proposed action does not revisit the authorization of any ongoing covered activity. Future covered activities described in section 1.2.2 for which incidental take authorization is being sought under the LCR MSCP may require project-specific NEPA/CEQA compliance prior to implementation.

1.1.4.1 U.S. Fish and Wildlife Service

Issuance of a section 10(a)(1)(B) permit by the Service is an action subject to NEPA compliance. This EIS/EIR addresses the impacts to the environment, including the effects of the incidental take that would be permitted, if the Service were to issue a section 10(a)(1)(B) permit based on the implementation of the proposed action or alternatives.

1.1.4.2 U.S. Bureau of Reclamation

The implementation and funding of the Conservation Plan by Reclamation is an action that is subject to NEPA compliance, even though it would be implemented for beneficial environmental purposes. This EIS/EIR addresses the potential environmental effects that may result from implementing the proposed action and alternatives, including the implementation of a Conservation Plan.

1.1.4.3 The Metropolitan Water District of Southern California

The implementation and funding of the Conservation Plan is a project that is subject to CEQA compliance. The California participants are requesting a section 10(a)(1)(B) incidental take permit for their covered activities on the basis of their participation in the implementation and funding of the LCR MSCP Habitat Conservation Plan (HCP), of which the Conservation Plan is a part. (A non-Federal entity is required to develop an HCP in order to be granted an incidental take permit under section 10(a)(1)(B) of the ESA. The entire LCR MSCP HCP is included in Volume II. In addition to the Conservation Plan, which is included in Chapter 5, the HCP contains a number of required sections, such as descriptions of covered activities, impacts on covered species expected to result from the covered activities, LCR MSCP governance structure, and implementation costs, that would not result in impacts to the environment and thus are not specifically addressed in this EIS/EIR.) Additionally, the LCR MSCP EIS/EIR and HCP may be used in support of a section 2081 permit from the California Department of Fish and Game (CDFG) for incidental take of species by California's covered activities in compliance with the

California Endangered Species Act (CESA). This EIS/EIR addresses the potential environmental effects that may result from implementing the proposed action and alternatives, including the impact of the authorized incidental take of covered species that is being requested by the California participants and the impacts of implementing a Conservation Plan.

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.2.1 Need for the Proposed Action

The ESA directs Federal agencies to support the conservation of listed species and ensure that their actions do not jeopardize listed species or critical habitat. Additionally, no taking of listed species by non-Federal agencies is allowed without a permit from the Service. Federal and non-Federal actions related to the ongoing and future operations of the LCR water delivery and power systems are affecting listed species and critical habitat, and may contribute to future listing of additional species. To address the needs of the species and the need to comply with the ESA, this Conservation Plan is proposed with the purpose of avoiding jeopardy, supporting the conservation of listed species, and reducing any contribution that ongoing or future operations may make to new listings. Additionally, the Service will use this analysis to support its decision concerning an incidental take permit for covered non-Federal activities.

As noted, the Federal participants in the LCR MSCP (Reclamation, the U.S. National Park Service [NPS], U.S. Bureau of Indian Affairs [BIA], U.S. Bureau of Land Management [BLM], the Service, and the Western Area Power Administration [Western]), acting within the scope of their legal authority and obligations, currently undertake or may undertake activities along the LCR that have the potential to affect and result in the incidental take of species that are listed under the ESA, or that may be listed in the future. Ongoing and future Federal actions that are covered by the proposed Conservation Plan are outlined in section 1.2.2 of this EIS/EIR and more fully described in Chapter 2 of the *Lower Colorado River Multi-Species Conservation Program Biological Assessment* (LCR MSCP BA) [3], which comprises Volume III. Federal agencies are required under section 7(a)(2) of the ESA to ensure that their actions are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify designated critical habitat. Under section 9 of the ESA, Federal agencies also may not "take" listed species without authorization provided by the Service in the incidental take statement contained in its Biological Opinion (BO) issued pursuant to section 7(b).

The actions that the non-Federal participants in the LCR MSCP are engaged in or may become engaged in along the LCR that have the potential to affect and result in the incidental take of species that are listed under the ESA, or that may be listed in the future, are outlined in section 1.2.2 of this EIS/EIR and more fully described in Chapter 2 of the LCR MSCP HCP. Under section 9 of the ESA, non-Federal entities may not "take" listed species without authorization. In order to comply with section 9, the non-Federal participants are requesting such authorization based on the implementation of the LCR MSCP HCP, which includes the proposed Conservation Plan.

3 To facilitate compliance with section 7(a)(2), Federal agencies may prepare a BA, pursuant to section 7(c)(1) that identifies the likely effects of the Federal action on threatened and endangered species.

The Conservation Plan, as outlined in the LCR MSCP HCP, documents the extent of the incidental take for which authorization is being requested under ESA sections 7 and 10(a)(1)(B), and includes measures to avoid, minimize, and mitigate the effect of that level of take to the maximum extent practicable. The Conservation Plan covers both Federal and non-Federal actions over a 50-year period. The Federal participants will submit the Conservation Plan as part of their proposed action for consideration under section 7 consultation. The non-Federal participants will submit the Conservation Plan with their application for a section 10(a)(1)(B) permit to the Service. The Service will use the Conservation Plan as part of its determination under sections 7 and 10 on issuing an incidental take statement and incidental take permit.

The implementation of the Conservation Plan would provide the mechanism to meet the needs of the Service, the Federal participants, and the non-Federal participants for incidental take authorization under the ESA for ongoing and future actions on the LCR. Implementation of the Conservation Plan would not be contingent on actually undertaking any of the future covered activities, but would proceed pursuant to the schedule outlined in the proposed Conservation Plan as provided in Tables 2.1-8a-d (included in section 2.1.1.6 as part of the description of the proposed action).

1.2.2 Actions for Which ESA Coverage is Requested

The proposed action is the implementation of a regional Conservation Plan and issuance of incidental take authorizations for the covered activities over the 50-year term of the LCR MSCP. In order to obtain comprehensive ESA coverage for the covered activities, the Federal and non-Federal participants have included future flow- and non-flow related activities that are reasonably expected to be implemented or undertaken during the term of the LCR MSCP. Examples of such future activities include the development of additional tribal lands for agriculture by BIA and the change in point of diversion of water on the LCR by non-Federal participants. These future activities are not part of the proposed action and are not part of the actions analyzed in this EIS/EIR. The potential environmental effects of conducting these future activities in combination with those of the proposed action are considered in the cumulative impact analysis set out in Chapter 4.

The following describes the ongoing and future Federal and non-Federal projects, actions, and activities (i.e., covered activities) for which ESA coverage is being sought. The environmental impacts of these activities are not being evaluated in this EIS/EIR, with the exception of those impacts to covered species as a result of incidental take authorization. Four categories of covered activities are included:

- ongoing flow-related activities;
- future flow-related activities;
- ongoing non-flow-related activities; and
- future non-flow-related activities.

Certain ongoing activities have been subject to previous NEPA and/or CEQA compliance actions; others pre-date these laws. This EIS/EIR does not revisit the authorization of any ongoing covered activity; rather, it is limited to assessing the impacts of the ESA take

authorization being requested for the covered activities and the impacts of the Conservation Plan that is the basis for the incidental take permit.

ESA coverage also is being sought for incidental take of covered species that would occur as a result of actions required to implement the Conservation Plan. All of the covered activities would be implemented within the LCR MSCP planning area.

1.2.2.1 Federal Ongoing and Future Flow-Related and Non-Flow-Related Actions[4]

Federal ongoing and future covered activities for which incidental take authorizations are being sought under the ESA are as follows:

Reclamation

Ongoing flow-related river management operations for which incidental take authorization is being sought under the ESA include the following:

- Flood control releases from dams along the LCR and management of flood control space and target elevations of reservoirs.
- Delivery of Colorado River water to Arizona, California, and Nevada within each state's apportionment to individual entitlement holders in that state pursuant to water delivery contracts or other delivery obligations; the cumulative water apportionment for these three states is 7.5 million acre-feet (maf) for normal water years.
- Annual operation of the Colorado River in accordance with the Long-Range Operating Criteria.
- Daily operation of the Colorado River below Hoover, Davis, and Parker dams and at Senator Wash, Imperial, and Laguna dams.
- Electric power generation at Hoover, Davis, and Parker powerplants.
- Preparation and maintenance of Decree Accounting reports (reports of the diversion and use of Colorado River water, as well as some other operational parameters).
- Delivery of Mexico's basic apportionment as provided by the *Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande – Treaty Between the United States of America and Mexico*, dated February 3, 1944 (1944 Water Treaty) (annual delivery of 1.36 maf of water from the Colorado River at the Northerly International Boundary [NIB] with Mexico and up to 140,000 acre-feet [af] at the SIB).
- Temporary emergency delivery of a portion of the 1944 Water Treaty waters in the vicinity of the City of Tijuana, Mexico, resulting in a temporary change in point of diversion and delivery of these waters from the NIB to Lake Havasu.
- Execution and administration of individual Water Supply Project contracts under the Lower Colorado River Water Supply Act, allowing water to be diverted for Water

4 Federal actions are described in detail in Chapter 2 of the LCR MSCP BA.

Supply Project purposes by users at any approved location along the California border adjoining the Colorado River once a contract is executed.

Future flow-related actions for which incidental take authorization is being sought under the ESA include the following:

- Application of specific surplus and shortage guidelines that would allow for the release of water (excluding 1944 Water Treaty water) in excess of the 7.5 maf of entitlement waters in surplus years or less than the 7.5 maf in shortage years.
- U.S. entitlement holders may be permitted to divert and beneficially use water released for flood control purposes in excess of downstream demand. Total diversions by U.S. entitlement holders would be limited to the maximum amount of, and only for the duration of, the specific flood control release.
- Specific administrative actions related to the delivery and use of Colorado River water in the Lower Division States (Arizona, Nevada, and California).

Ongoing non-flow-related river management operations for which incidental take authorization is being sought under the ESA include the following:

- Channel maintenance from Davis Dam to the SIB, including (a) wash fan removal, (b) maintenance and care of unprotected banklines, (c) levee location and maintenance, (d) dredging of settling basins, (e) maintenance of jetties and training structures, (f) stockpile replenishment, and (g) riprap placement and haul roads.
- Operation and maintenance of major Federal facilities (e.g., the Central Arizona Project at Lake Havasu; Palo Verde Diversion Dam; and Imperial, Laguna, and Senator Wash dams) and miscellaneous features, (e.g., drains, wasteways, weirs, siphons, boat ramps, gauges, survey markers, and drainage and groundwater monitoring wells); maintenance activities at the SIB.
- Maintenance of backwater areas created by various features associated with river management.
- Maintenance in the Limitrophe Division of the Colorado River, which extends from the NIB to the SIB. Actions include maintaining the bankline road, the levee, various wasteways and drains flowing to the river, and the Bypass Drain that carries agricultural drainage water to the Cienega de Santa Clara in Mexico.

Future non-flow-related actions for which incidental take authorization is being sought under the ESA include the following:

- Operation and maintenance of dikes and outlet works at Topock Marsh. Future restoration and habitat improvement at the marsh may be necessary and would be coordinated between the Service and Reclamation.
- Implementation of the Laguna Reservoir Restoration and Enhancement Project, which includes creation of incremental storage capacity by excavating a large channel that extends upstream from the pool near the face of Laguna Dam; potential habitat restoration; and construction of a small inlet canal.

- Stabilization and maintenance of unprotected banklines.
- Construction of up to 41 jetties.
- Establishment of new stockpiles (e.g., riprap, gravel), including access roads.

Western Area Power Administration

Incidental take authorization is being sought under the ESA for the continuation of current contract conditions and practices related to the release of LCR water for the operation of hydroelectrical power generating facilities throughout the 50-year term of the LCR MSCP. It is assumed that power generated at Hoover Dam will continue to be marketed pursuant to the 1928 Boulder Canyon Project Act and other relevant authorities. Hydropower availability will continue to be subject to water schedules and interagency coordination will continue pursuant to Reclamation and Western's Joint Operating Agreement.

National Park Service

Three broad categories of non-flow-related projects in the Lake Mead National Recreation Area (NRA) for which incidental take authorization is being sought under the ESA include the following:

- Riparian habitat restoration by replacing non-native species with native vegetation, including potential projects on both Lake Mead and Lake Mohave.
- Fishery management, including both native fish propagation and the enhancement of sportfishing opportunities in Lake Mead and Lake Mohave.
- Boating access improvements, including maintenance of existing boating access and the potential for enhancement of existing ramps at Lake Mead and Lake Mohave.

Additionally, incidental take authorization is being sought under the ESA for the following flow-related actions:

- In managing the Lake Mead NRA, the NPS makes decisions regarding the temporal and spatial diversion (i.e., whether to divert surface flows or pump) of its Colorado River water rights and, in some situations, return flows to the river.

Bureau of Indian Affairs

Ongoing activities for which incidental take authorization is being sought under the ESA include the following:

- Irrigation system operation and maintenance.
- Water conservation practices intended to make the most efficient use on the tribal lands of the water diverted to the irrigation systems.
- Riparian habitat rehabilitation and restoration.
- Wildland fire suppression activities, including fuel hazard reduction around dwellings (e.g., tree and brush trimming or removal as appropriate).

- Woodland and shoreline maintenance project on the Chemehuevi Indian Reservation.
- Tribal decisions regarding the temporal and spatial diversion (i.e., whether to divert surface flows or pump) of their Colorado River water rights and, in some situations, return flows to the river.

Future activities for which incidental take authorization is being sought under the ESA include the following:

- Patching or re-lining canals that are currently lined, or lining un-lined stretches of canal.
- Continuing ongoing water conservation practices into the future and possibly intensifying these practices. Other options include storage of water and increased reuse of irrigation and other reclaimed water.
- Farmland development, including construction of irrigation systems.
- Riparian habitat rehabilitation and restoration.
- Headgate Rock Dam water and power operations and maintenance.
- Wildland fire management, including the management of fuels/hazardous vegetation through the use of, or combination of, mechanical treatments, prescribed fire, wildland fire use, and chemical treatments as approved by the local tribal leadership.

U.S. Fish and Wildlife Service

The Service is not requesting ESA coverage for any of its activities on National Wildlife Refuges (NWR) or National Fish Hatcheries in the planning area. The Service does have LCR water allocations and information on these is provided below. These allocations are included within the 7.5 maf of diversions for which the LCR MSCP participants are requesting coverage.

In managing the four NWRs along the LCR, the Service would continue to make decisions regarding the temporal and spatial diversion (diverting surface flows or pumping) of its Colorado River water rights and, in some situations, return flows to the river. Specifically:

- Havasu NWR has an entitlement in annual quantities reasonably necessary to fulfill the purposes of the refuge, not to exceed 41,839 af of water diverted from the Colorado River mainstem or 37,339 af of consumptive use of mainstem water, whichever is less. Bill Williams River NWR withdraws less than 2 af of Colorado River water from its headquarter's pump under Havasu's water rights.

- Cibola NWR has an entitlement for the diversion of 27,000 af annually (afy) from the mainstem or the consumptive use of 16,793 afy from the mainstem, whichever is less, with a priority date of August 21, 1964. Additionally, Cibola has a diversionary right for 7,500 afy, for the purpose of circulation through Cibola Lake.

- Imperial NWR has an entitlement in annual quantities reasonably necessary to fulfill the purposes of the refuge, not to exceed 28,000 af of water diverted from the mainstem or 23,000 af consumptive use of mainstem water, whichever is less.

Bureau of Land Management

BLM makes decisions regarding the temporal and spatial diversion (i.e., whether to divert surface flows or pump) of its Colorado River water rights and, in some situations, return flows to the river. BLM is not seeking coverage for any additional actions. It completed a previous section 7 consultation on its discretionary actions along the LCR. Lands managed by BLM may be selected, through cooperative planning between the LCR MSCP Executive Director and BLM, for the use in implementation of LCR MSCP–sponsored conservation projects along the LCR.

1.2.2.2 Non-Federal Ongoing and Future Flow-Related and Non-Flow-Related Actions[5]

Non-Federal ongoing covered activities for which incidental take authorizations are being sought under the ESA are as follows:

Arizona

Arizona's ongoing flow-related projects for which incidental take authorization is being sought include the following:

- Diversion of up to 2.8 maf of Arizona's full annual entitlement, plus surplus, plus Arizona's share of any unused apportionment, plus the volume of return-flow as applicable.
- Operation, maintenance, and replacement of existing water diversion and conveyance facilities and electrical generation and transmission facilities within the planning area.
- The continued contracting for, ordering of, and scheduling of Federal hydroelectric power by purchasers in Arizona to maximize the economic value of such power generation within the constraints of the water release schedule(s).

Future flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Colorado River water contracts for the approximately 20,000 af of unallocated Arizona Colorado River water.
- Diversions, discharges, and return flows through existing facilities on the LCR.
- Permanent transfers of entitlement and change in points of diversion of up to 200,000 afy.
- Full use of Colorado River entitlements (change in point of diversion) by existing contractors and decreed water right holders, including but not limited to the City of Kingman and the City of Quartzite.

5 Non-Federal actions are described in detail in Chapter 2 of the LCR MSCP HCP.

- Temporary and intermittent water exchanges, forbearances, and associated changes in points of diversion for Arizona water banking activities or short-term (i.e., less than 5 years) leasing.

- Execution, administration, and operation of extended, renewed, new, or additional contracts for hydroelectric power from hydroelectric facilities at Hoover Dam, Davis Dam, Parker Dam, Headgate Rock Dam, Siphon Drop, and Pilot Knob Power Plant by power users in Arizona.

Ongoing non-flow-related projects:

- Operation, maintenance, and replacement of existing water diversion and conveyance facilities and electrical generation and transmission facilities within the planning area.

Ongoing non-flow-related Arizona Game and Fish Department (AGFD) programs and activities for which incidental take authorization is being sought under the ESA include the following:

- Vegetation and habitat management programs.

- Fish surveys (surveys are not for threatened or endangered species) and fish stocking activities.

- Maintenance of aids to navigation and boating access.

- Law enforcement patrol activities.

Future non-flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Maintenance and replacement of existing water diversion and conveyance facilities and electrical generation and transmission facilities within the planning area.

- AGFD programs and activities described above and AGFD projects related to implementation of the Conservation Plan.

California

Ongoing flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Diversion of up to 4.4 maf of California's full annual entitlement (consistent with the Quantification Settlement Agreement [QSA][6] executed among three California water

[6] The QSA would implement major components of California's Draft Colorado River Water Use Plan (California Plan) and provide part of the mechanism for California to reduce its diversions of Colorado River water to the state's normal year apportionment of 4.4 maf. The QSA components would provide a framework for conservation measures and water transfers for a period of up to 75 years. The Coachella Valley Water District, Imperial Irrigation District, and Metropolitan are signatory to the QSA.

agencies on October 10, 2003), plus California's share of any unused apportionment and designated surpluses, plus return flows as applicable.

- All operation, maintenance, and replacement activities associated with existing water diversion and conveyance facilities, and electrical power generation and transmission facilities within the planning area.

- Contracting for, ordering of, and scheduling of Federal hydroelectric power by purchasers in California to maximize the economic value of such power generation within the constraints of the water release schedule(s).

Future flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Diversions, discharges, and return flows of mainstem Colorado River water through existing facilities on the LCR.

- Change of up to 800,000 afy of diversions, discharges, and return flows by administrative actions, which may include changes to points of diversion (e.g., associated with the LCR Water Supply Project), interstate water banking, forbearance, inadvertent overruns, water marketing, and water transfers, or any other actions as made possible from any future agreements and/or measures taken by the Colorado River Board of California or contract holder(s). Included within the 800,000 afy change in point of diversion are: (1) the change in point of diversion of up to 200,000 afy from Imperial Dam to Lake Havasu pursuant to the Agreement for Transfer of Conserved Water by and between the Imperial Irrigation District and the San Diego County Water Authority, dated April 29, 1998, as amended; and (2) the change in point of diversion of up to 77,700 afy from Imperial Dam to Lake Havasu transferred to the San Diego County Water Authority, as described in the Allocation Agreement among the United States of America, the Metropolitan Water District of Southern California, Coachella Valley Water District, Imperial Irrigation District, San Diego County Water Authority, the La Jolla, Pauma, Pala, Rincon, and San Pasqual Bands of Mission Indians, the San Luis Rey River Indian Water Authority, the City of Escondido, and Vista Irrigation District, dated October 10, 2003. Future changes in points of diversion within the 800,000 afy are projects that would be implemented in accordance with the QSA or contemplated in the Draft California Colorado River Water Use Plan.

- Execution, administration, and operation of extended, renewed, new, or additional contracts for hydroelectric power from hydroelectric facilities at Hoover Dam, Davis Dam, Parker Dam, and Headgate Rock Dam, Palo Verde Diversion Dam, Siphon Drop Power Plant and Pilot Knob Power Plant by power users in California.

Ongoing non-flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Operation, maintenance and replacement of existing water diversion and conveyance facilities, and electrical generation and transmission facilities within the planning area.

Future non-flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Operation, maintenance and replacement of existing water diversion and conveyance facilities, and electrical generation and transmission facilities within the planning area.

Nevada

Ongoing flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Diversion of up to 0.3 maf of Nevada's full annual entitlement, plus surplus flows, plus Nevada's share of any unused apportionment, plus volume of return flows as applicable.

- All operation, maintenance, and replacement of existing water diversion and conveyance facilities and electrical generation and transmission facilities within the planning area.

- Contracting for, ordering of, and scheduling of Federal hydroelectric power by purchasers in Nevada to maximize the economic value of such power generation within the constraints of the water release schedule(s).

Future flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Change of future volumes of diversions, discharges, and return by administrative actions, which may include changes to points of diversion, new points of diversion, interstate water banking, water marketing, and water transfers, or any other actions as made possible from any future agreements and/or measures taken by the Colorado River Commission of Nevada or contract holder(s). The potential changes in flows from future projects by Nevada are not expected to exceed 233,000 af of consumptive use. Consumptive use includes return flows from activities on the LCR.

- Potential changes to existing flows into Lake Mead from the Muddy and Virgin rivers (i.e., inflows discharging within the high pool elevation of Lake Mead), which may affect lake levels. Flows from the Muddy and Virgin rivers pass into Lake Mead and could be increased by augmentation from potential future projects implemented outside of the LCR MSCP planning area along the Muddy and Virgin rivers (e.g., actions such as purchasing irrigation water shares), or decreased by construction of upstream water diversion and conveyance facilities. Those activities that would be implemented outside of the planning area and that could affect lake levels, however, are not covered under the Conservation Plan, including effects of these actions on the Muddy and Virgin rivers.

- Temporary water exchanges, forbearances, and associated changes in points of diversion for water banking activities or short-term leasing.

- Execution, administration, and operation of extended, renewed, new, or additional contracts for hydroelectric power from hydroelectric facilities at Hoover, Davis, Parker, and Headgate Rock dams by power users in Nevada.

Ongoing non-flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Operation, maintenance and replacement of existing water diversion and conveyance facilities and electrical generation and transmission facilities within the planning area.

Ongoing non-flow-related Nevada Department of Wildlife (NDOW) programs and activities for which incidental take authorization is being sought under the ESA include the following:

- Fish surveys using electrofishing, netting, and angling (these surveys are not for threatened or endangered species).
- Sport Fish Restoration Act-funded sport fish enhancement projects.
- Wildlife surveys (these surveys are not for threatened or endangered species).
- Aquatic, wetland, and riparian habitat maintenance and restoration activities, including installation of artificial fishery habitat enhancement at Lake Mead and Lake Mohave.
- Revegetation activities for aquatic, wetland, and riparian enhancement.
- Maintenance of aids to navigation and boating access along the LCR and in Lake Mead and Lake Mohave.
- Law enforcement patrol activities, including boating safety programs in both the mainstem of the LCR and mainstem reservoirs and lakes.

Future non-flow-related projects for which incidental take authorization is being sought under the ESA include the following:

- Operation, maintenance and replacement of existing water diversion and conveyance facilities and electrical generation and transmission facilities within the planning area.
- NDOW programs and activities described above.

1.2.3 Purpose of the EIS/EIR

The purpose of the EIS/EIR is to analyze the environmental effects of implementing the Conservation Plan by both the Federal and non-Federal participants for a 50-year period, as well as analyze the impacts of the incidental take from the covered activities that would be authorized by the section 10(a)(1)(B) permit. There is no parallel requirement to evaluate the environmental effects of authorizing incidental take through an incidental take statement under section 7, although the analysis of incidental take of covered species in this EIS/EIR includes the effects caused by both the Federal and non-Federal actions.

This EIS/EIR and the accompanying HCP and BA contain descriptions of the ongoing and future activities for which incidental take coverage is sought under the ESA by the Federal and non-Federal participants. Except for the effect of the authorized incidental take of covered species, which is part of the proposed action, this EIS/EIR does not evaluate the environmental effects of the covered activities and does not revisit NEPA or CEQA authorizations for ongoing activities or provide NEPA or CEQA authorization for future activities.

1.2.4 Scope of the EIS/EIR

This EIS/EIR evaluates only the impacts of implementing the Conservation Plan and issuance of a section 10(a)(1)(B) permit by the Service based on this plan because these are the two components of the proposed action. The ongoing covered activities have obtained NEPA and/or CEQA authorizations to the extent required by laws in effect at the time they were approved, and future covered activities will be required to obtain the appropriate authorizations. Although specific regions of influence have been developed for individual resources (e.g., socioeconomic and air quality impacts could affect a larger area than noise impacts or impacts to cultural resources, which are site-specific and highly localized), impacts generally would occur in the vicinity of the historic floodplain of the LCR or its tributaries, in proximity to the sites that would be used for habitat establishment. Implementation of the Conservation Plan and issuance of the section 10(a)(1)(B) permit would not change the amount of water available to the LCR MSCP participants, the amount of water used by these participants, or otherwise result in changes to environmental conditions beyond those analyzed in Chapter 3 of this EIS/EIR.

As described in section 2.1.1.3, the Conservation Plan includes measures that would contribute to maintaining existing desirable habitat areas within the planning area. The LCR MSCP participants would establish a fund early in the term of the program to be expended on assessing and implementing projects for maintaining existing native habitat that could occur anywhere within the planning area. The types of activities that could be conducted include construction of infrastructure for water delivery or movement; maintenance of marsh vegetation by burning, water delivery, dredging, and other means; maintenance of moist soil conditions in riparian land cover types[7] (e.g., cottonwood-willow); dredging activities to establish backwaters or backwater connection with the main river channel; removal or control of undesirable vegetation such as saltcedar and *Arundo*; and other appropriate means to maintain existing desirable habitat. Specific projects and locations have not been identified (some of the projects are ongoing while others are only proposed), but these maintenance activities would involve actions that are similar to the proposed action and it is reasonable to assume that they would result in impacts that are similar to those described in Chapter 3 of this EIS/EIR. Analyzing the environmental impacts of these measures is beyond the scope of this EIS/EIR, and their implementation would not be authorized by decisions based on this report.

7 The term "land cover type" is used to describe the dominant feature of the land surface discernible from aerial photographs, defined by vegetation, water, or human uses.

1.3 RELATIONSHIP TO OTHER LCR DOCUMENTS PREPARED PURSUANT TO THE ENDANGERED SPECIES ACT

Reclamation, pursuant to the ESA, issued a BA for LCR operations and maintenance from Lake Mead to the SIB in August 1996 (USBR 1996). That BA served two purposes: (1) as initial documentation for the ESA section 7 consultation between Reclamation and the Service for discretionary operations of the LCR, and (2) as an initial reference for development and implementation of the proposed Conservation Plan by LCR stakeholders pursuant to ESA section 7 (for Federal actions) and ESA section 10 (for non-Federal actions). On April 30, 1997, the Service issued its BO (U. S. Fish and Wildlife Service [USFWS] 1997). The 1997 BO identified Reclamation's participation in developing the proposed Conservation Plan as the long-term strategy to address the environmental impacts of Reclamation's continued operation and maintenance activities on the LCR. Consultation on the 1997 BO was reinitiated at Reclamation's request in March 2002, and another BO was issued by the Service in April 2002 (USBR 2002, USFWS 2002e). This BO identified minor modifications to the provisions of its 1997 BO and extended coverage for Reclamation's discretionary actions on the LCR for 3 years to April 30, 2005.

With the approval of the LCR MSCP and issuance of the section 10(a)(1)(B) permit and section 7 BO in response to the LCR MSCP HCP and LCR MSCP BA, these new authorizations would supersede the 1997 BO, as amended by the 2002 BO. When the new BO on the LCR MSCP took effect, the following obligations of Reclamation under the 1997 BO and 2002 BO would be replaced with its obligations under the new BO.

- If any of the 1,400 acres of southwestern willow flycatcher habitat acquired and protected under the provisions of the 1997 BO Reasonable and Prudent Alternative (RPA) 5 should lose its protected status in the future, the affected habitat acreage will be replaced by southwestern willow flycatcher habitat created under the LCR MSCP.
- Ongoing physical maintenance of native fish impoundments constructed by Reclamation as a condition of the 1997 BO RPA 3, as amended by the 2002 BO, will be included under the LCR MSCP.

Additionally, the Service issued a BO in January 2001 in response to Reclamation's August 2000 *Biological Assessment for Proposed Interim Surplus Criteria, Secretarial Implementation Agreements for California Water Plan Components and Conservation Measures on the Lower Colorado River (Lake Mead to the Southerly International Boundary*) (ISC/SIA BO). This BO analyzed the effects of the change in point of diversion of 400,000 af of Colorado River water on four ESA-listed species (Yuma clapper rail, southwestern willow flycatcher, bonytail, and razorback sucker). The LCR MSCP BA includes the same action for purposes of assessing and mitigating the impacts to the 23 covered and evaluation species not covered by the 2001 BO. The LCR MSCP HCP includes this action as part of the total 1.574 mafy in changes to point of diversion to obtain incidental take authorization for the non-Federal participants as to all 27 covered and evaluation species, including the four 2001 BO species. The Conservation Plan provides measures that overlap and duplicate the conservation measures provided to the four species that are benefited by the 2001 BO conservation measures. Despite the overlap in the impacts and mitigation measures, there are differences between the scopes of the 2001 BO and the Conservation Plan (e.g., the terms are different) that preclude the Conservation Plan from superseding that BO. Reclamation, with

support of funding from California agencies, would implement the conservation and mitigation measures identified in the 2001 BO in coordination with the implementation of the Conservation Plan. Where 2001 BO conservation measures are implemented in accordance with the Conservation Plan, these measures shall be considered as implementing those same conservation and mitigation measures in the Conservation Plan.

The following conservation measures identified in the 2001 BO, would be credited against the LCR MSCP conservation measure requirements:

- funding and support for razorback sucker studies at Lake Mead beyond 2005;
- rearing and stocking of 20,000 razorback suckers between Parker and Imperial Dams (Reaches 4 and 5);
- restoration or creation of 44 acres of backwaters as habitat for native fish;
- $50,000 in funding to provide for the capture of wild-born bonytail from Lake Mohave;
- monitoring of 372 acres of existing occupied southwestern willow flycatcher habitat; and
- restoration and maintenance of 372 acres of southwestern willow flycatcher habitat.

1.4 REQUIRED ACTIONS AND PERMITS

The following sections identify the Federal and non-Federal actions and permits supported by this EIS/EIR, as well as future actions and permits that may be required to implement individual LCR MSCP projects.

1.4.1 Actions Supported by this EIS/EIR

1.4.1.1 Federal Actions

U.S. Fish and Wildlife Service

The Service, under the provisions of ESA section 10 and its internal consultation under section 7, must evaluate the section 10(a)(1)(B) permit application to be able to authorize the incidental take of listed species and provide a means to authorize the incidental take of non-listed species should such species become listed in the future. Pursuant to sections 7 (b)(4) and (o)(2) of the ESA, the authorization by the Service is to be based on a determination whether the Federal action of issuing a section 10(a)(1)(B) permit is likely to jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify critical habitat. The Service may choose to (1) issue a permit conditioned on implementation of the LCR MSCP HCP as submitted, (2) issue a permit conditioned on implementation of the LCR MSCP HCP as supplemented with other measures specified by the Service, or (3) to deny the permit. The Service will sign the Record of Decision (ROD) regarding the adoption or rejection of the proposed action presented in this EIS/EIR.

U.S. Bureau of Reclamation

Reclamation would implement the Conservation Plan for the LCR MSCP Steering Committee if the section 10(a)(1)(B) permit were issued by the Service. In addition, Reclamation would

initiate a section 7 consultation on ongoing and future covered activities upon completion of the BA. Reclamation must formally accept or reject the terms and conditions of the Service's BO and will sign the ROD regarding the adoption or rejection of the proposed action presented in this EIS/EIR.

Other Federal Agencies

Other Federal participants in the LCR MSCP may contribute funding for implementing the Conservation Plan.

1.4.1.2 Non-Federal Actions

Each non-Federal participant must independently evaluate the LCR MSCP HCP and determine whether to execute the agreements required to participate in the implementation of the Conservation Plan. As the lead agency under CEQA, Metropolitan will independently evaluate and, if appropriate, certify this EIR and make CEQA findings. Non-Federal participants in Arizona, California, and Nevada would contribute funding for implementing the Conservation Plan.

1.4.1.3 Cooperating, Responsible, and Trustee Agency Actions

Under NEPA, cooperating agencies are agencies other than the lead agency that have discretionary authority over the proposed action, jurisdiction by law, or special expertise with respect to the environmental impacts expected to result from an action. The Hualapai Tribe has been identified as cooperating agency based on the technical expertise of its members and its jurisdiction over land that might be used for conservation. Other California agencies that are requesting incidental take authorizations for their covered actions are responsible agencies under CEQA. They will consider the EIR prepared by Metropolitan and reach their own conclusions regarding whether and how to approve the proposed action. CDFG, a trustee agency under CEQA for fish and wildlife resources, reviewed and provided comments on the Draft EIR.

1.4.2 Future Permits and Approvals Required to Implement Specific LCR MSCP Projects

Permits and approvals that may be required prior to the implementation of future, site-specific LCR MSCP conservation projects include the following:

- U.S. Army Corps of Engineers (Corps) permits for dredging and fill activities;
- Rivers and Harbors Act section 10 permit;
- BIA approval of leases for conservation actions on tribal lands;
- Approvals by tribal governments for conservation actions on tribal lands;
- Section 106 consultation with State Historic Preservation Office (SHPO) for Federal projects;
- Clean Air Act conformity determinations for Federal projects;

- Air quality permits from the relevant air quality management or air pollution control districts for construction activities and some maintenance activities, such as the use of prescribed burns for marsh restoration;
- AGFD permits to stock or take fish and wildlife;
- NDOW clearance for activities potentially affecting state-listed species;
- National Pollutant Discharge Elimination System (NPDES) permits from the California Regional Water Quality Control Boards (RWQCB) or Nevada Bureau of Water Pollution Control (NBWPC); Arizona Pollutant Discharge Elimination System permits from the Arizona Department of Environmental Quality (ADEQ);
- Section 401, Clean Water Act (CWA), Water Quality Certifications from ADEQ, RWQCBs, or NBWPC. Section 401 certification on tribal lands is handled by the U.S. Environmental Protection Agency (EPA) if the tribes do not have primacy or by the individual tribes if they do; and
- Collecting permits, section 10(a)(1)(A) permits, and migratory bird permits from the Service.

Additionally, the NPS, BLM, BIA, and the Service's NWRs may modify their land management plans to be consistent with the Conservation Plan and may make decisions regarding whether to integrate this plan with other conservation actions on the LCR.

1.5 SCOPING AND PUBLIC INVOLVEMENT

Public scoping was conducted to help identify areas of concern and specific issues that should be addressed in the EIS/EIR. Notices that a combined EIS/EIR was being prepared were published in 1999 and 2000. Subsequent notices were made in October 2003. The first Notice of Intent (NOI)/Notice of Preparation (NOP) was published in the *Federal Register* (Volume 64, Number 95, pages 27000-27002) on May 18, 1999. A supplemental NOI/NOP was published in the *Federal Register* (Volume 65, Number 134, pages 43031-43034) on July 12, 2000. These two NOI/NOPs are included in Appendix B. A Revised NOP of a Draft EIR was issued by Metropolitan on July 25, 2000 and also is included in Appendix B, as is the NOP issued on October 17, 2003. Three public scoping meetings held in 2000 were supplemental to the original scoping meetings in 1999 and involved a formal presentation on planning progress and conceptual preliminary alternatives. Four additional public information meetings were held in November 2003 in Arizona, California, and Nevada to present information regarding the alternatives being evaluated in this EIS/EIR and to obtain public comments regarding issues to be addressed in this document. Scoping summary reports documenting the issues raised at these meetings are included in Appendix C.

Approximately 360 copies of the Draft EIS/EIR were distributed to agencies, public libraries, Indian tribes, organizations, and individuals for review during a 60-day period ending on August 18, 2004. Additionally, three public hearings were held in Henderson, Nevada; Blythe, California; and Phoenix, Arizona on July 20-22, 2004 in order to receive public comments on the Draft EIS/EIR. Additional information regarding the public involvement program is included in section 7.2.1.

1.6 DOCUMENT ORGANIZATION

Volume I is the Final EIS/EIR, and it incorporates minor text changes made in response to comments on the Draft EIS/EIR and text clarifications. The LCR MSCP Final HCP is Volume II, and the accompanying Final BA is Volume III. Comment letters received during the 60-day public review period for the Draft EIS/EIR and verbal comments provided during three public hearings held during this period are included in LCR MSCP Volume V, along with responses to the comments. All appendices for these documents are included in Volume IV. Together, these documents comprise the NEPA, CEQA, and ESA documentation required to implement the proposed action. The EIS/EIR is organized as follows:

- The proposed action and alternatives are described in detail in Chapter 2 of this EIS/EIR;
- The affected environment, environmental consequences of these actions, and mitigation measures for significant impacts are described in Chapter 3 for each resource considered;
- Chapter 4 addresses cumulative impacts;
- Chapter 5 provides a comparison of the action and no action alternatives;
- Chapter 6 includes other NEPA and CEQA considerations, such as growth-inducing impacts, the relationship between short-term uses of the environment and long-term productivity, and irreversible and irretrievable commitments of resources; and
- Chapter 7 includes a discussion of regulatory compliance, consultation, and coordination.
- The remaining sections include a list of references and persons/agencies consulted; a glossary of technical terms; definitions of acronyms; and a list of preparers.

2.0 ALTERNATIVES

NEPA AND CEQA REQUIREMENTS REGARDING ALTERNATIVES

NEPA and CEQA require that an EIS or EIR, respectively, analyze the impacts of a proposed action and alternatives to the action. NEPA's requirements for an alternatives analysis are found in the CEQ NEPA Regulations (40 C.F.R. 1502.14) and CEQA's are found in section 15126.6 of the State CEQA Guidelines. NEPA requires an EIS to rigorously explore and objectively evaluate all reasonable alternatives that meet the proposed action's purpose and need, including those that are not within the jurisdiction of the lead agency. Reasonable alternatives are those that can be carried out based on technical, economic, and environmental factors, as well as common sense (40 C.F.R. 1502.14; Forty Most Asked Questions Concerning CEQ's NEPA Regulations No. 2a). The CEQ Regulations also indicate that a potential conflict with local or Federal law does not necessarily render an alternative unreasonable, although such conflicts must be considered (40 C.F.R. 1506.2[d]; Forty Questions No. 2b). The EIS must also briefly explain the reasons for eliminating alternatives from detailed study.

Reclamation's Draft NEPA Handbook (2000a) references the CEQ Regulations and indicates that alternatives should take distinctly different approaches and may emphasize the achievement of some objectives at the expense of others. Any reasonable alternative with anticipated environmental consequences that differ significantly from the preferred alternative should be considered a major alternative and analyzed fully.

CEQA requires that EIRs examine a reasonable range of alternatives to the project or to the location of the project that would feasibly obtain most of the basic project objectives, but would avoid or substantially lessen one or more of the significant environmental impacts of the project. Project alternatives must be feasible based on specific economic, social, legal, and technical considerations. The EIR must explain the rationale for selecting the alternatives to be discussed, identify those that were eliminated as infeasible, and briefly explain why they were eliminated. The range of alternatives required in an EIR is governed by a "rule of reason," which requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the project objectives (State CEQA Guidelines section 15126.6[f]). An EIR need not consider an alternative whose effects cannot be reasonably ascertained and whose implementation is remote and speculative (State CEQA Guidelines section 15126.6[f][3]).

Both NEPA (C.F.R. 1502.14[d]) and CEQA (State CEQA Guidelines section 15126.6[e]) require that the no action alternative be analyzed in order to provide a comparison of the conditions that would occur with and without the implementation of the proposed action or other alternatives. Reclamation's NEPA Handbook defines "no action" as the projection of current conditions to the most reasonable future responses or conditions that could occur during the life of the project without the proposed action or other proposed action alternatives being implemented. The State CEQA Guidelines (section 15126.6[e][1]) indicate that the no action alternative is not the baseline for determining whether the proposed action's environmental impacts may be significant unless it is identical to the existing environmental setting. The State CEQA Guidelines (section 15126.6[3][2]) further indicate that the no action analysis shall discuss the existing conditions at the time the NOP is published, as well as what would be reasonably

expected to occur in the foreseeable future if the action were not approved, based on current plans and consistent with available infrastructure and community services.

GOALS AND OBJECTIVES FOR THE CONSERVATION PLAN

In developing the Conservation Plan, the LCR MSCP participants identified a set of goals and objectives that they expect to achieve through its implementation. The goals and objectives are as follows:

1. Conserve habitat that may be impacted by the covered activities that the LCR MSCP participants would implement or perform on the LCR;
2. Reduce the likelihood of additional species listings on the LCR under the ESA;
3. Contribute to recovery of listed species on the LCR;
4. Accommodate current water diversions and power production on the LCR;
5. Optimize opportunities for future water and power development on the LCR;
6. Provide the basis for take authorizations for Federal and non-Federal covered activities on the LCR pursuant to the ESA;
7. Provide the basis for assurances for the non-Federal parties pursuant to the ESA against requirements for increased conservation and mitigation measures in the event of changed circumstances or unforeseen circumstances to the maximum extent permitted by law;
8. Comply with the Law of the River;
9. Identify and implement feasible conservation and mitigation measures for the program based on specific economic, social, legal, and technical considerations, including:
    a. Whether an alternative's costs would be prohibitively or substantially greater than other alternatives.
    b. Whether the alternative is technically feasible based on current science or technology, proximity to existing populations of the species, the presence or absence of infrastructure necessary to implement the measures, and the ability to integrate created habitat with existing habitat.

The Conservation Plan must also meet the criteria for issuance of a section 10(a)(1)(B) permit by the Service:

1. The taking will be incidental to an otherwise lawful activity;
2. The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
3. The applicant will develop an HCP and ensure that adequate funding for the HCP will be provided;
4. The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and

5. The applicant agrees to implement other measures the Service may require as being necessary or appropriate for the purpose of the HCP.

SCREENING CRITERIA

Criteria to screen project alternatives were established based on the State CEQA Guidelines and CEQ NEPA Regulations. To be considered in detail, alternatives should:

- Meet most project goals and objectives;
- Reduce or avoid the significant effects of the proposed action; and
- Minimize the creation of new, significant environmental effects.

The following sections describe both the alternatives that have been carried forward for detailed analysis, as well as those that were eliminated.

2.1 ALTERNATIVES CARRIED FORWARD FOR DETAILED ANALYSIS

2.1.1 Alternative 1: Implementation of Proposed Conservation Plan and Issuance of Section 10(a)(1)(B) Permit (Conservation Plan)

2.1.1.1 Overview

Proposed Action

Alternative 1 is the proposed action and includes two primary components:

1. Implementation of a regional Conservation Plan by Federal and non-Federal participants that would meet the LCR MSCP goals and objectives.
2. Issuance of an ESA section 10(a)(1)(B) permit by the Service based on the proposed HCP for non-Federal covered activities described in section 1.2.2.2.

Covered and Evaluation Species

Species proposed for coverage are those that meet one of the following selection criteria:

- Species that are listed or that are proposed or candidates for listing under the ESA or species that are protected under Arizona, California, or Nevada law that could be affected by covered activities and would require take authorization.
- Species that could become listed during the term of the LCR MSCP Conservation Plan under the ESA or species that could become protected under Arizona, California, or Nevada law that could be affected by covered activities and could require future take authorization.

The Conservation Plan includes a full range of conservation measures for all covered species. Based on application of the selection criteria, 27 of the species considered are proposed for coverage under the ESA section 10(a)(1)(B) permit (Table 2.1-1). The LCR MSCP HCP also includes four "evaluation species." Evaluation species are species that could become listed in

Table 2.1-1. Proposed Covered and Evaluation Species and Their Status Under the Conservation Plan (page 1 of 2)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Selection Criteria*[5]
THREATENED AND ENDANGERED SPECIES					
Yuma clapper rail *Rallus longirostris yumanensis*	FE	ASC	CT/FP	–	1
Southwestern willow flycatcher *Empidonax trailii extimus*	FE	ASC	CE	–	1
Desert tortoise (Mojave population) *Gopherus agassizii*	FT	ASC	CT	NT	1
Bonytail *Gila elegans*	FE	ASC	CE	NE	1
Humpback chub *Gila cypha*	FE	ASC	–	–	1
Razorback sucker *Xyrauchen texanus*	FE	ASC	CE/FP	NE	1
OTHER COVERED SPECIES					
Western red bat *Lasiurus blossevillii*	–	ASC	–	–	2
Western yellow bat *Lasiurus xanthinus*	–	ASC	–	–	2
Desert pocket mouse *Chaetodipus penicillatus sobrinus*	–	–	–	–	2
Colorado River cotton rat *Sigmodon arizonae plenus*	–	–	CSC	–	2
Yuma hispid cotton rat *Sigmodon hispidus eremicus*	–	–	CSC	–	2
Western least bittern *Ixobrychus exilis hesperis*	–	ASC	CSC	–	2
California black rail *Laterallus jamaicensis coturniculus*	–	ASC	CT/FP	–	1
Yellow-billed cuckoo *Coccyzus americanus occidentalis*	FC	ASC	CE	–	1
Elf owl *Micrathene whitneyi*	–	–	CE	NP	1
Gilded flicker *Colaptes chrysoides*	–	–	CE	–	1
Gila woodpecker *Melanerpes uropygialis*	–	–	CE	–	1
Vermilion flycatcher *Pyrocephalus rubinus*	–	–	CSC	–	2
Arizona Bell's vireo *Vireo bellii arizonae*	–	–	CE	–	1
Sonoran yellow warbler *Dendroica petechia sonorana*	–	–	CSC	–	2
Summer tanager *Piranga rubra*	–	–	CSC	–	2

Table 2.1-1. Proposed Covered and Evaluation Species and their Status Under the Conservation Plan (page 2 of 2)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Selection Criteria*[5]
Flat-tailed horned lizard *Phrynosoma mcalli*	–	ASC	CSC	–	2
Relict leopard frog *Rana onca*	FC	ASC	–	NP	1
Flannelmouth sucker *Catostomus latipinnis*	–	ASC	–	–	2
MacNeill's sootywing skipper *Pholisora gracielae*	–	–	–	–	2
Sticky buckwheat *Eriogonum viscidulum*	–	–	–	NEP	1
Threecorner milkvetch *Astragalus geyeri* var. *triquetrus*	–	–	–	NEP	1
EVALUATION SPECIES					
California leaf-nosed bat *Macrotus californicus*	–	ASC	CSC	–	N/A
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	–	–	CSC	–	N/A
Colorado River toad *Bufo alvarius*	–	–	CSC	–	N/A
Lowland leopard frog *Rana yavapaiensis*	–	ASC	CSC	–	N/A

1 Federal Status
- FE = Listed as endangered under the Federal ESA.
- FT = Listed as threatened under the ESA.
- FC = Candidate for listing under the ESA.

2 Arizona Status
- ASC = Arizona wildlife of special concern.

3 California Status
- CE = Listed as endangered under CESA
- CT = Listed as threatened under CESA.
- FP = Fully protected under the California Fish and Game Code.
- CSC = California species of special concern.

4 Nevada Status
- NE = Nevada endangered
- NT = Nevada threatened.
- NEP = Nevada critically endangered plant.
- NP = Nevada protected.

5 Selection Criteria
1. Species that are listed or that are proposed or candidates for listing under the ESA or species that are protected under Arizona, California, or Nevada law that could be affected by covered activities and would require take authorization;
2. Species that could become listed during the term of the LCR MSCP under the ESA or species that could become protected under Arizona, California, or Nevada law that could be affected by covered activities and could require future take authorization. Factors considered to determine potential for future listing during the term of the LCR MSCP are:
   - ongoing or likely future destruction, modification, or curtailment of a species' habitat or range of sufficient magnitude that could warrant future listing;
   - the inadequacy of existing regulatory mechanisms to protect a species from ongoing decline of sufficient magnitude that could warrant future listing; or
   - other natural or artificial factors that may affect a species' continued existence.

N/A = Not applicable.

future years and that could be added to the covered species list during the term of the LCR MSCP, but for which sufficient information is not available at this time to determine their status in the planning area, the potential effects of covered activities, or to develop specific conservation measures for the species. The Conservation Plan includes research studies and pilot management studies for the evaluation species to determine their status in the planning

area and to determine appropriate conservation measures. None of the four evaluation species are presently protected under the ESA.

Covered Activities

The covered activities for which the LCR MSCP participants are requesting incidental take authorizations and permits are briefly described in section 1.2.2, and are described more fully in Chapters 2 of the LCR MSCP BA and LCR MSCP HCP. The impacts to covered species' habitat that are likely to result from the covered activities and the implementation of the proposed Conservation Plan are shown in Table 2.1-2. Table 2.1-3 summarizes all impacts on covered and evaluation species and the expected level of take associated with implementing covered activities and the Conservation Plan.

Conservation Measures

The Conservation Plan includes the following types of conservation measures that, in combination, would achieve program objectives for regulatory compliance and contribute to species' recovery:

- Establishment of a $25 million fund to support projects implemented by land use managers in the planning area that maintain existing habitat for listed species that would be covered by the Conservation Plan under this alternative;
- Creation of native land cover types (5,940 acres of cottonwood-willow, 1,320 acres of honey mesquite type III, 512 acres of marsh, and 360 acres of backwaters) to provide covered species habitats;
- Avoidance and minimization of impacts on covered species and their habitat resulting from covered activities and Conservation Plan implementation;
- Population enhancement measures that directly or indirectly increase abundance of covered species;
- Monitoring and research necessary to assess and improve conservation measure effectiveness and adaptively manage implementation of the Conservation Plan over time; and
- Other conservation measures relating to the covered species and the strategies for implementing them.

The Conservation Plan is designed to fully mitigate adverse effects on all covered species resulting from covered activities described in section 1.2.2 and to meet the ESA section 10 standard to minimize and mitigate the impacts of the covered activities on covered species to the maximum extent practicable [50 C.F.R. 17.22(b)(2)(B)]. Specific conservation measures are listed in Table 2.1-3 and described more fully later in section 2.1.1.5.

Science Strategy

The LCR MSCP is a multi-faceted, long-range program to conserve covered species that are dependent on the aquatic, wetland, and riparian environments present within the LCR floodplain. In general, these species are rare, their habits and habitats are not well known, and experience in development and creation of their habitats and management of their populations

is limited. The LCR MSCP has used the best available scientific information to develop the Conservation Plan and would use sound scientific principles and standards to implement the conservation measures.

Table 2.1-2. Comparison of Species-Specific Habitat Impacts to Created LCR MSCP Habitat (in Acres) (Page 1 of 2)

Covered Species	*Impacts of Federal and Non-Federal Flow-Related Covered Activities*[a]	*Impacts of Federal and Non-Federal Non-Flow-Related Covered Activities*[a]	*Total Impacts*	*LCR MSCP Created Habitat*
THREATENED AND ENDANGERED SPECIES				
Yuma clapper rail	133	110	243	512
Southwestern willow flycatcher	1,784	69	1,853	4,050
Desert tortoise (Mojave population)	0	192	192	0[b]
Bonytail	399	0	399	360[c]
Humpback chub	ND[d]	0	ND[d]	ND[d]
Razorback sucker	399	0	399	360[c]
OTHER COVERED SPECIES				
Western red bat (roosting habitat)	161	604	765	765
Western yellow bat (roosting habitat)	161	604	765	765
Desert pocket mouse	0	0	0	0
Colorado River cotton rat	59	8	67	125
Yuma hispid cotton rat	0	71	71	76
Western least bittern	133	110	243	512
California black rail	37	66	103	130
Yellow-billed cuckoo	1,425	109	1,534	4,050
Elf owl	161	590	751	1,784
Gilded flicker	1,425	109	1,534	4,050
Gila woodpecker	819	36	855	1,702
Vermilion flycatcher	1,890	724	2,614	5,208
Arizona Bell's vireo	1,654	1,329[e]	2,983[e]	2,983
Sonoran yellow warbler	2,929	193	3,122	4,050
Summer tanager	161	14	175	602
Flat-tailed horned lizard	0	128	128	0[f]
Relict leopard frog	0[g]	0[g]	0[g]	0
Flannelmouth sucker	85	0	85	85
MacNeill's sootywing skipper	172	50	222	222
Sticky buckwheat	ND[h]	0	ND[h]	ND[h]
Threecorner milkvetch	ND[h]	0	ND[h]	ND[h]
EVALUATION SPECIES				
California leaf-nosed bat (roosting habitat)	0	0	0	0
Pale Townsend's big-eared bat (roosting habitat)	0	0	0	0
Colorado River toad	0	0	0	0
Lowland leopard frog	0	0	0	0

Table 2.1-2. Comparison of Species-Specific Habitat Impacts to Created LCR MSCP Habitat (in Acres) (Page 2 of 2)

Note: LCR MSCP conservation measures to create habitat for covered species would avoid removal of cottonwood-willow, honey mesquite, marsh, and backwater land cover types that provide habitat for covered species, and, therefore, impacts of implementing the LCR MSCP conservation measures are not shown in this table. The LCR MSCP currently estimates that about two-thirds of LCR MSCP created habitat would be created on agricultural lands (5,045 acres), including associated infrastructure (estimated to be 1percent of all habitat created, or 81 acres). Agricultural lands provide little or no habitat value for covered and evaluation species.

The LCR MSCP impact assessment also assumes that up to 512 acres of existing degraded or former marsh that may provide low-value habitat could be converted to create fully functioning marsh that provides high-value Yuma clapper rail, western least bittern, California black rail, and Colorado River cotton rat habitat. Up to 360 acres of existing degraded or former backwaters could also be converted to create fully functioning backwaters that provides high-value habitat for the bonytail, razorback sucker, and flannelmouth sucker. Conversion of existing degraded or former marsh and backwaters to create habitat for these species, however, would not result in a loss of existing habitat.

The remainder of LCR MSCP habitat (currently estimated to be 2,377 acres) would be created on lands that currently support low-value habitats (e.g., saltcedar and saltcedar-dominated land cover types) for one or more covered species. These low-value habitats would be lost and replaced with habitats designed to be of higher value for the covered species. With implementation of the avoidance and minimization measures described in section 2.1.1.5, "Avoidance and Minimization Measures," removal of these low-quality habitats, however, is not expected to result in harm (i.e., injury or mortality of individuals) and, therefore, is not expected to result in take of covered or evaluation species.

[a] The estimated effects on covered species habitats that will result from implementation of the Federal non-flow-related covered activities are addressed in the LCR MSCP BA. The amount of land cover types to be created or protected to provide covered species habitats described in Table 2.1-5 includes the creation or protection of sufficient land cover to provide covered species habitat to mitigate the impacts of implementing all of the LCR MSCP covered activities, including the Federal non-flow-related activities, on covered species habitats.

[b] Net loss in habitat is fully mitigated by protecting 230 acres of desert tortoise habitat in accordance with mitigation requirements in the document entitled "Compensation for Desert Tortoise" (Desert Tortoise Compensation Team 1991).

[c] The effects of the loss of 399 acres of backwater on this species would be fully mitigated by both creating 360 acres of backwater that would be managed to provide greater habitat values for this species and by stocking juvenile fish to substantially augment the existing population over the term of the LCR MSCP (see discussion of bonytail and razorback sucker in section 2.1.1.5, General Species Conservation Measures).

[d] ND = Not determined. Acres of potentially affected habitat are not calculated. Changes in reservoir elevations associated with implementation of flow-related covered activities, however, could result in the establishment of up to 62 miles of transitory Colorado River channel when the reservoir pool is maintained at lower elevations that could be occupied by humpback chub and subsequently lost when reservoir elevations rise.

[e] Includes 610 acres of honey mesquite IV that provides Arizona Bell's vireo habitat that could be converted to agricultural uses and that are covered under the LCR MSCP. Up to an additional 3,832 acres of honey mesquite IV that provides habitat could be removed by Federal non-flow-related activities; however, these activities and resultant impacts are not covered under the LCR MSCP.

[f] Net loss in habitat is fully mitigated by protecting 230 acres of flat-tailed horned lizard habitat in accordance with mitigation requirements in the Flat-Tailed Horned Lizard Rangewide Management Strategy (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003).

[g] Implementation of covered activities will not result in removal of this species' habitat but could result in temporary disturbance of habitat or affect movement of individuals.

[h] ND = Not determined. Acres of potentially affected habitat are not calculated. Changes in Lake Mead reservoir elevations associated with implementation of flow-related covered activities, however, would result in periodic loss of habitat that is exposed along the Lake Mead shoreline when reservoir elevations are low and then is subsequently inundated when reservoir elevations rise.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
THREATENED AND ENDANGERED SPECIES			
Yuma clapper rail	▪ Loss of up to 133 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 70 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 10 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential periodic removal of up to 30 acres of emergent vegetation that could provide habitat along 244 miles of drains ▪ Potential for disturbance of up to 512 acres of existing degraded or former marsh that may provide low habitat value associated with converting it to fully functioning marsh that provides high value habitat ▪ Potential for removal of some limited	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM5—Monitor selenium levels in created backwater and marsh land cover types, and study the effect of selenium released as a result of dredging activities CLRA1—Create 512 acres of Yuma clapper rail habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures achieves the LCR MSCP goals to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the Yuma clapper rail, and to contribute to its recovery. Implementation of these measures would contribute to recovery by increasing the amount of new nesting habitat by 269 acres over the number of impacted acres.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	and low value habitat (e.g., dry patches of herbaceous vegetation near marsh edges) as a result of creating covered species habitats with implementation of the LCR MSCP Conservation Plan[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	CLRA2—Maintain existing important Yuma clapper rail habitat areas	
South-western willow flycatcher	▪ Loss of up to 1,784 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 59 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 10 acres of degraded, low-value habitat associated with non-Federal, non-flow-related,	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the southwestern willow flycatcher, and contribute to its recovery. Implementation of these measures would

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	habitat restoration and habitat management activities ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan	MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM4—Conduct research to determine and address the effects of brown-headed cowbird nest parasitism on reproduction of covered species WIFL1—Create 4,050 acres of Southwestern willow flycatcher habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire WIFL2—Maintain existing important habitat areas	contribute to recovery by increasing the amount of new breeding habitat by 2,197 acres in addition to replacing the extent of impacted habitat. The conservation measures would also contribute to the objectives of the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002b).
Desert tortoise (Mojave population)	▪ Loss of up to 192 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for direct mortality of individuals associated with operation of vehicles and other equipment with implementation of non-flow-related covered activities and implementation of the LCR MSCP Conservation Plan over the term of the LCR MSCP	AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area DETO1—Acquire and protect 230 acres of existing unprotected occupied habitat DETO2—Avoid impacts on individuals and their burrows	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the Mohave population of desert tortoises.
Bonytail	▪ Loss of up to 399 acres of habitat associated with implementation of flow-related covered activities	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize,

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	▪ Potential temporary disturbance of habitat associated with the creation of habitat and habitat management activities. ▪ Potential for entrainment of individuals at diversions over the term of the LCR MSCP ▪ Potential for direct mortality of individuals as a result of stranding over the term of the LCR MSCP	AMM4—Minimize contaminant loads in runoff and return irrigation flows from LCR MSCP created habitats to the LCR AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM5—Monitor selenium levels in created backwater and marsh land cover types, and study the effect of selenium released as a result of dredging activities BONY1—Coordinate bonytail conservation efforts with the Service and recovery programs for endangered fish species in the Lower Basin BONY2—Create 360 acres of bonytail habitat BONY3—Augment bonytail populations BONY4—Evaluate and develop, if necessary, additional bonytail rearing capacity BONY5—Conduct monitoring and research, and adaptively manage bonytail augmentations and created habitat	and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the bonytail, and contribute to its recovery. Implementation of these measures would contribute to attainment of the recovery goals established for the species (USFWS 2002c).

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
Humpback chub	▪ Periodic loss of up to 62 miles of transitory Colorado River channel habitat that may be present in Lake Mead when the reservoir is below full pool elevation and lost when reservoir elevations are raised	HUCH1—Provide funding to support existing humpback chub conservation programs	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the humpback chub, and contribute to its recovery.
Razorback sucker	▪ Loss of up to 399 acres of habitat associated with implementation of flow-related covered activities ▪ Potential for periodic loss of razorback sucker spawning habitat in Lake Mead (Reach 1) with implementation of flow-related covered activities ▪ Potential temporary disturbance of habitat associated with the creation of habitat and habitat management activities. ▪ Potential for entrainment of individuals at diversions over the term of the LCR MSCP ▪ Potential for direct mortality of individuals as a result of stranding over the term of the LCR MSCP	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM4—Minimize contaminant loads in runoff and return irrigation flows from LCR MSCP created habitats to the LCR AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM5—Monitor selenium levels in created backwater and marsh land cover types, and study the effect of selenium released as a result of dredging activities RASU1—Coordinate razorback sucker conservation efforts with the Service and recovery programs for endangered fish species in the Lower Basin	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the razorback sucker, and contribute to its recovery. Implementation of these measures would contribute to attainment of the recovery goals established for the species (USFWS 2002e).

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
		RASU2—Create 360 acres of razorback sucker habitat RASU3—Augment razorback populations RASU4—Develop additional razorback sucker rearing capacity RASU5—Support ongoing razorback conservation efforts at Lake Mohave RASU6—Conduct monitoring and research, and adaptively manage razorback sucker augmentations and created habitat RASU7—Provide funding and support for continuation of the Reclamation/SNWA ongoing Lake Mead razorback sucker studies RASU8—Continue razorback conservation measures identified in the ISC/SIA BO	
OTHER COVERED SPECIES			
Western red bat (roosting habitat)	▪ Loss of up to 161 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 604 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for incidental take of	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the western red bat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for likely small, unmeasurable, effects on the production and abundance of insect prey associated with implementation of covered activities	MRM2—Monitor and adaptively manage created covered and evaluation species habitats WRBA1—Conduct surveys to determine species distribution of the western red bat WRBA2— Create 765 acres of western red bat roosting habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	
Western yellow bat (roosting habitat)	▪ Loss of up to 161 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 604 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for incidental take of individuals from activities that create	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the western yellow bat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for likely small, unmeasurable, effects on the production and abundance of insect prey associated with implementation of covered activities	WYBA1—Conduct surveys to determine species distribution of the western yellow bat WYBA2—Avoid removal of western yellow bat roosts trees WYBA3— Create 765 acres of western yellow bat roosting habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	
Desert pocket mouse	▪ Potential temporary or permanent disturbance or loss of habitat associated with the restoration of habitat and habitat management activities ▪ Potential temporary disturbance of habitat associated with the creation of LCR MSCP habitats and habitat management activities[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan	AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area DPMO1—Conduct surveys to locate desert pocket mouse habitat	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the desert pocket mouse.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	▪ Potential for direct mortality of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP		
Colorado River cotton rat	▪ Loss of up to 59 acres of habitat associated with implementation of flow-related covered activities ▪ Loss of up to 3 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 5 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, restoration of habitat and habitat management activities ▪ Potential for disturbance of up to 125 acres of existing degraded or former marsh that may provide low habitat value associated with converting it to fully functioning marsh that provides high value habitat ▪ Potential for removal of some limited and low value habitat (e.g., dry patches of herbaceous vegetation near marsh edges) as a result of creating covered species habitats with implementation of the LCR MSCP Conservation Plan[b]	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM5—Monitor selenium levels in created backwater and marsh land cover types, and study the effect of selenium released as a result of dredging activities CRCR1—Conduct research to better define Colorado River cotton rat habitat requirements CRCR2—Create 125 acres of Colorado River cotton rat habitat CMM1—Reduce risk of loss of created habitat to wildfire	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the Colorado River cotton rat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	CMM2—Replace created habitat affected by wildfire	
Yuma hispid cotton rat	▪ Loss of up to 71 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 5 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM2—Monitor and adaptively manage created covered and evaluation species habitats YHCR1—Conduct research to better define Yuma hispid cotton rat habitat requirements YHCR2—Create 76 acres of Yuma hispid cotton rat habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the Yuma hispid cotton rat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	▪ Potential for direct mortality of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP		
Western least bittern	▪ Loss of up to 133 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 70 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 10 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential periodic removal of up to 30 acres of emergent vegetation that could provide habitat along 244 miles of drains ▪ Potential for disturbance of up to 512 acres of existing degraded or former marsh that may provide low habitat	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM5—Monitor selenium levels in created backwater and marsh land cover types, and study the effect of selenium released as a result of dredging activities	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the western least bittern, and reduce the likelihood of future Federal listing of the species. Implementation of these measures would benefit the western least bittern by increasing the amount of new habitat in the LCR MSCP planning area by 269 acres in addition to replacing the extent of impacted habitat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	value associated with converting it to fully functioning marsh that provides high value habitat ▪ Potential for removal of some limited and low value habitat (e.g., dry patches of herbaceous vegetation near marsh edges) as a result of creating covered species habitats with implementation of the LCR MSCP Conservation Plan[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	LEBI1—Create 512 acres of western least bittern habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	
California black rail	▪ Loss of up to 37 acres of habitat associated with implementation of flow-related covered activities ▪ Loss of up to 31 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 5 acres of degraded, low-value habitat associated with non-Federal, non-flow-related,	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the California black rail, and reduce the likelihood of

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	habitat restoration and habitat management activities ▪ Potential periodic removal of up to 30 acres of emergent vegetation that could provide habitat along 244 miles of drains ▪ Potential for disturbance of up to 130 acres of existing degraded or former marsh that may provide low habitat value associated with converting it to fully functioning marsh that provides high value habitat ▪ Potential for removal of some limited and low value habitat (e.g., dry patches of herbaceous vegetation near marsh edges) as a result of creating covered species habitats with implementation of the LCR MSCP Conservation Plan[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM5—Monitor selenium levels in created backwater and marsh land cover types, and study the effect of selenium released as a result of dredging activities BLRA1—Create 130 acres of California black rail habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire BLRA2—Maintain existing important California black rail habitat areas	future Federal listing of the species. Implementation of these measures would benefit the California black rail by increasing the amount of new habitat in the LCR MSCP planning area by 27 acres in addition to replacing the extent of impacted habitat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
Yellow-billed cuckoo	▪ Loss of up to 1,425 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 99 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 10 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for mortality of a small number of individuals associated with non-flow-related covered activities over the term of the LCR MSCP	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats YBCU1—Create 4,050 acres of yellow-billed cuckoo habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire YBCU2—Maintain existing important yellow-billed cuckoo habitat areas	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the yellow-billed cuckoo, and reduce the likelihood of future Federal listing of the species. Implementation of these measures would benefit the yellow-billed cuckoo by increasing the amount of new habitat in the LCR MSCP planning area by 2,516 acres in addition to replacing the extent of impacted habitat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	▪ Loss of up to 161 acres of habitat associated with implementation of flow-related covered activities ▪ Loss of up to 590 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP		
Elf owl	▪ Loss of up to 1,425 acres of habitat associated with implementation of flow-related covered activities ▪ Loss of up to 99 acres of habitat	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM3—To the extent practicable, avoid and minimize	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 10 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM3—Conduct research to determine and address the effects of nest site competition with European starlings on reproduction of covered species ELOW1—Create 1,784 acres of elf owl habitat ELOW2—Install elf owl nest boxes CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	adverse effects of covered activities and LCR MSCP implementation on the elf owl, and reduce the likelihood of future Federal listing of the species. Implementation of these measures would benefit the elf owl by increasing the amount of new habitat in the LCR MSCP planning area by 1,033 acres in addition to replacing the extent of impacted habitat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
Gilded flicker	▪ Loss of up to 819 acres of habitat associated with implementation of flow-related covered activities ▪ Loss of up to 26 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 10 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM3—Conduct research to determine and address the effects of nest site competition with European starlings on reproduction of covered species GIFL1—Create 4,050 acres of gilded flicker habitat GIFL2—Install artificial snags to provide gilded flicker nest sites CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the gilded flicker, and reduce the likelihood of future Federal listing of the species. Implementation of these measures would benefit the gilded flicker by increasing the amount of new habitat in the LCR MSCP planning area by 2,516 acres in addition to replacing the extent of impacted habitat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
Gila woodpecker	▪ Loss of up to 1,890 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 714 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 10 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM3—Conduct research to determine and address the effects of nest site competition with European starlings on reproduction of covered species GIWO1—Create 1,702 acres of Gila woodpecker habitat GIWO2—Install artificial snags to provide Gila woodpecker nest sites CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the Gila woodpecker, and reduce the likelihood of future Federal listing of the species. Implementation of these measures would benefit the gilded flicker by increasing the amount of new habitat in the LCR MSCP planning area by 847 acres in addition to replacing the extent of impacted habitat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP		
Vermilion flycatcher	▪ Loss of up to 1,654 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 1,309 acres of habitat associated with implementation of Federal non-flow-related covered activities[a,c] ▪ Potential for loss of up to 20 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b]	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM4—Conduct research to determine and address the effects of brown-headed cowbird nest parasitism on reproduction of covered species VEFL1—Create 5,208 acres of vermilion flycatcher habitat	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the vermilion flycatcher, and reduce the likelihood of future Federal listing of the species. Implementation of these measures would benefit the vermilion flycatcher by increasing the amount of new habitat in the LCR MSCP planning area by 2,594 acres in addition to replacing the extent of impacted habitat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	
Arizona Bell's vireo	▪ Loss of up to 2,929 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 183 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for loss of up to 10 acres of degraded, low-value habitat associated with non-Federal, non-flow-related, habitat restoration and habitat management activities ▪ Potential for incidental take of individuals from activities that create	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the Arizona Bell's vireo.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM4—Conduct research to determine and address the effects of brown-headed cowbird nest parasitism on reproduction of covered species BEVI1—Create 2,983 acres of Arizona Bell's vireo habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
Sonoran yellow warbler	▪ Loss of up to 161 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic establishment and loss of habitat within the full pool elevation of Lake Mead as a result of fluctuations in reservoir elevation ▪ Loss of up to 14 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Potential for incidental take of individuals from activities that create covered species habitats in land cover types not considered to be habitat for the species, but where some transitory or minor use of the land cover type does occur[b] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of a small number of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM4—Conduct research to determine and address the effects of brown-headed cowbird nest parasitism on reproduction of covered species YWAR1—Create 4,050 acres of Sonoran yellow warbler habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the Sonoran yellow warbler, and reduce the likelihood of future Federal listing of the species. Implementation of these measures would benefit the Sonoran yellow warbler by increasing the amount of new habitat in the LCR MSCP planning area by 928 acres in addition to replacing the extent of impacted habitat.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
Summer tanager	▪ Loss of up to 128 acres of habitat associated with implementation of Federal non-flow-related covered activities[a] ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of individuals associated with implementation of non-flow-related covered activities and the LCR MSCP over the term of the LCR MSCP	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM4—Conduct research to determine and address the effects of brown-headed cowbird nest parasitism on reproduction of covered species SUTA1—Create 602 acres of summer tanager habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the summer tanager, and reduce the likelihood of future Federal listing of the species. Implementation of these measures would benefit the summer tanager by increasing the amount of new habitat in the LCR MSCP planning area by 427 acres in addition to replacing the extent of impacted habitat.
Flat-tailed horned lizard	▪ Potential temporary disturbance of habitat associated with the creation of habitat and habitat management activities.	AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area FTHL1—Acquire and protect 230 acres of existing	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize,

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	unprotected occupied flat-tailed horned lizard habitat FTHL2—Implement conservation measures to avoid or minimize take of flat-tailed horned lizard	and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the flat-tailed horned lizard.
Relict leopard frog	▪ Loss of up to 85 acres of habitat associated with implementation of flow-related covered activities ▪ Periodic loss of transitory Colorado River and Virgin River channel habitat that may be present in Lake Mead when the reservoir is below full pool elevation and lost when reservoir elevations are raised ▪ Potential temporary disturbance of habitat associated with the creation of habitat and habitat management activities ▪ Potential for entrainment of individuals at diversions over the term of the LCR MSCP ▪ Harassment of individuals associated with operation of equipment and other	RLFR1—Provide funding to support existing relict leopard frog conservation programs	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the relict leopard frog, and reduce the likelihood of future Federal listing of the species.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
	activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP		
Flannel-mouth sucker	▪ Loss of up to 172 acres of habitat associated with implementation of flow-related covered activities ▪ Loss of up to 50 acres of habitat associated with implementation of Federal non-flow-related covered activities ▪ Potential disturbance of or loss of a small, unquantifiable amount of habitat associated with the creation of habitat and habitat management activities ▪ Harassment of individuals associated with operation of equipment and other activities related to implementing non-flow-related covered activities and the LCR MSCP Conservation Plan ▪ Potential for direct mortality of individuals associated with implementation of non-flow-related covered activities over the term of the LCR MSCP	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM4—Minimize contaminant loads in runoff and return irrigation flows from LCR MSCP created habitats to the LCR AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities and other river management activities MRM2—Monitor and adaptively manage created covered and evaluation species habitats MRM5—Monitor selenium levels in created backwater and marsh land cover types, and study the effect of selenium released as a result of dredging activities FLSU1—Create 85 acres of flannelmouth sucker habitat FLSU2—Provide funding to support existing flannelmouth sucker conservation programs FLSU3—Assess flannelmouth sucker management needs and develop management strategies	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the flannelmouth sucker, and reduce the likelihood of future Federal listing of the species.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
MacNeill's sootywing skipper	▪ Potential for direct mortality of individuals associated with implementation of flow-related covered activities over the term of the LCR MSCP	AMM1—To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP on existing covered species habitats AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the LCR MSCP planning area MRM2—Monitor and adaptively manage created covered and evaluation species habitats MNSW1—Conduct surveys and research to locate MacNeill's sootywing skipper habitat and to better define its habitat requirements MNSW2—Create at least 222 acres of MacNeill's sootywing skipper habitat CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the MacNeill's sootywing skipper.
Sticky buckwheat	▪ Potential for direct mortality of individuals associated with implementation of flow-related covered activities over the term of the LCR MSCP	STBU1—Provide funding to support existing sticky buckwheat conservation programs	Implementation of conservation measures achieves the goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation and reduce likelihood of future Federal listing of the species.

▪

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
Threecorner milkvetch	▪ Potential for direct mortality of individuals associated with implementation of flow-related covered activities over the term of the LCR MSCP	THMI1—Provide funding to support existing threecorner milkvetch conservation programs	Implementation of the conservation measures achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the threecorner milkvetch, and reduce the likelihood of future Federal listing of the species.
		EVALUATION SPECIES	
California leaf-nosed bat (roosting habitat)	▪ Potential for likely small, unmeasurable, effects on the production and abundance of insect prey associated with implementation of flow-related activities	MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats CLNB1—Conduct surveys to locate California leaf-nosed bat roost sites CLNB2—Create covered species habitat near California leaf-nosed bat roost sites CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures would fully mitigate flow-related impacts, if any, on the diversity and production of insects. In addition, implementation of survey and research conservation measures would provide important information for use in developing future conservation efforts for this species.

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
Pale Townsend's big-eared bat (roosting habitat)	▪ No impacts expected	MRM1—Conduct surveys and research to better identify covered and evaluation species habitat requirements MRM2—Monitor and adaptively manage created covered and evaluation species habitats PTBB1—Conduct surveys to locate pale Townsend's big-eared bat roost sites PTBB2— Create covered species habitat near pale Townsend's big-eared bat roost sites CMM1—Reduce risk of loss of created habitat to wildfire CMM2—Replace created habitat affected by wildfire	Implementation of the conservation measures would fully mitigate flow-related impacts, if any, on the diversity and production of insects. In addition, implementation of survey and research conservation measures will provide important information for use in developing future conservation efforts for this species.
Colorado River toad	▪ No impacts expected	CRTO1—Conduct research to better define the distribution, habitat requirements, and factors that are limiting the distribution of the Colorado River toad CRTO2—Protect existing unprotected occupied Colorado River toad habitat CRTO3—Conduct research to determine feasibility of establishing the Colorado River toad in unoccupied habitat	Implementation of the conservation measures would provide information necessary for successful management to maintain and increase the abundance of the Colorado River toad throughout its range.
Lowland leopard frog	▪ No impacts expected	LLFR1— Conduct research to better define the distribution, habitat requirements, and factors that are limiting the distribution of the lowland leopard frog LLFR2—Protect existing unprotected occupied lowland leopard frog habitat	Implementation of the conservation measures would provide information necessary for successful

Table 2.1-3. Summary of Impacts on Covered and Evaluation Species and Estimated Level of Take Associated with Implementation of Flow- and Non-Flow-Related Covered Activities and the Conservation Plan

Species	*Impacts and Estimated Level of Take*	*Conservation Measures to Avoid, Minimize, and Mitigate Impacts*	*Summary of Expected Outcomes*
		LLFR3— Conduct research to determine feasibility of establishing the lowland leopard frog in unoccupied habitat	management to maintain and increase the abundance of lowland leopard frogs throughout its range.

a The estimated effects on covered species habitats that would result from implementation of the Federal non-flow-related covered activities addressed in the LCR MSCP BA. The amount of land cover types to be created to provide covered species habitats described in section 2.1.1 includes the creation of sufficient land cover to provide covered species habitat to mitigate both the impacts of implementing the LCR MSCP HCP and the Federal non-flow-related activities on covered species habitats.

b The LCR MSCP currently estimates that about two-thirds of LCR MSCP created habitat would be created on agricultural lands (5,045 acres), including associated infrastructure (estimated to be 1 percent of all habitat created, or 81 acres). Agricultural lands provide little or no habitat value for covered and evaluation species.

The LCR MSCP impact assessment also assumes that up to 512 acres of existing degraded or former marsh that may provide low-value habitat could be converted to create fully functioning marsh that provides high-value Yuma clapper rail, western least bittern, California black rail, and Colorado River cotton rat habitat. Up to 360 acres of existing degraded or former backwaters could also be converted to create fully functioning backwaters that provide high-value habitat for the bonytail, razorback sucker, and flannelmouth sucker. Conversion of existing degraded or former marsh and backwaters to create habitat for these species, however, would not result in a loss of existing habitat.

The remainder of LCR MSCP habitat (currently estimated to be 2,377 acres) would be created on additional lands that may support some transitory or minor level of use (e.g., saltcedar and saltcedar-dominated land cover types) by individuals of one or more covered species, but are not considered to be habitat. These land cover types would be lost and replaced with habitats designed to be of higher value for the covered species. Implementation of the avoidance and minimization measures described in section 2.1.1.5, however, would reduce the likelihood of incidental take of covered species that could be associated with removal of these land cover types.

c Includes 610 acres of honey mesquite IV that provides Arizona Bell's vireo habitat that could be converted to agricultural uses and that are covered under the LCR MSCP. Up to an additional 3,832 acres of honey mesquite IV that provides habitat could be removed by Federal non-flow-related activities, however, these activities and resultant impacts are not covered under the LCR MSCP.

The LCR MSCP has a commitment to use scientific information, scientific methods, principles, and standards to implement the Conservation Plan throughout the term of the LCR MSCP. This science-based strategy for implementing the LCR MSCP primarily applies to four major elements of the Conservation Plan: fish augmentation, habitat creation, monitoring and research, and adaptive management. The LCR MSCP planning processes for implementing conservation measures would incorporate both internal and external science review.

Internal reviews would focus on cost effectiveness of techniques for implementing conservation measures, chronology of implementation, and inter-relationships of Conservation Plan components. Internal reviews would consider the following:

- The current knowledge of the ecology and life requirements of covered species;
- Knowledge gained through applied research undertaken by the LCR MSCP and others; and
- The effectiveness of conservation measures and the status of the species and their habitats, including the results and progress of concurrent research, conservation, restoration, and recovery programs for LCR MSCP covered species undertaken elsewhere in the Colorado River Basin.

External reviews would be conducted by recognized experts in the field of study or program under review. The need for and timing of external review of specific elements of the LCR MSCP would be determined by the Program Manager and the number of reviewers required would be determined by the complexity of the LCR MSCP element under review.

Baseline conditions would be assessed before implementing conservation measures that create covered species habitats, augment populations, or other species-specific conservation measures (e.g., control brown-headed cowbirds to reduce the incidence of nest parasitism). This assessment of baseline conditions would provide the basis for assessing the success of conservation measures. Methods to implement conservation measures would be developed based on the best available scientific information, the efficacy of the methods would be monitored during implementation, and the effectiveness of the conservation measures would be monitored following implementation. Ineffective measures would be evaluated and, if feasible, modified to improve their effectiveness. Where conservation measures cannot be effectively modified, replacement conservation measures would be developed and implemented.

2.1.1.2 Geographic Scope of the Project

This alternative would be implemented in the planning area, which is the historic floodplain of the LCR, from Lake Mead to the SIB between the United States and Mexico and areas with elevations up to and including the full pool elevations of Lake Mead, Lake Mohave, and Lake Havasu (Figure 1.1-1). The historic floodplain includes all lands that are or have been affected by the meandering or regulated flows of the Colorado River, which historically have been confined by the change in elevation that forms the adjoining uplands. The full pool elevation of Lake Mead is defined by water surface elevation 1,229 feet National Geodetic Vertical Datum (NGVD). The full pool elevation of Lake Mohave is defined by surface water elevation 647 feet NGVD. The full pool elevation of Lake Havasu is defined by surface water elevation 450 feet

NGVD. These reservoir full pool surface elevations correspond to the top of the respective spillway gates (USBR 1981).

The planning area is located within seven counties in the states of Arizona, California, and Nevada: La Paz, Mohave, and Yuma counties in Arizona; Imperial, Riverside and San Bernardino counties in California; and Clark County in Nevada. It comprises approximately 720,000 acres, including open water, and consists of Federal, state, tribal, and privately owned lands, as shown in Table 2.1-4. This table does not include acreage for open water areas.

Table 2.1-4. Land Ownership in the Planning Area

Land Owner	*River Reach (acres)*							
	1	*2*	*3*	*4*	*5*	*6*	*7*	*TOTAL*
U.S. Bureau of Reclamation	0	0	18	0	0	0	0	18
U.S. Fish & Wildlife Service	0	0	20,615	16,672	10,791	497	0	48,575
National Park Service	57,068	12,189	115	0	0	0	0	69,372
Tribal Land	1,775	0	29,118	145,901	0	11,057	1,704	189,555
Bureau of Land Management	0	0	7,379	12,959	2,312	9,118	911	32,679
State	0	0	8,841	5,055	1,630	5,327	1,612	22,465
Private	148	2,892	24,242	109,342	2,091	36,756	57,576	233,047
Total	58,991	15,081	90,310	289,929	16,824	62,755	61,803	595,693
Note: Acreage does not include open water.								

For purposes of this analysis, the portion of the LCR in the planning area is divided into seven reaches. Water surface elevations and river miles (RM) used in defining these reaches are based on maps developed by Reclamation (USBR 1976)[1]. The reaches are shown on Figures 2.1-1 to 2.1-7 and described below:

- *Reach 1:* from Separation Canyon in the lower end of the Grand Canyon to Hoover Dam, including Lake Mead up to full-pool elevation.
- *Reach 2:* from Hoover Dam to Davis Dam (RM 276), including Lake Mohave up to full-pool elevation.
- *Reach 3:* from Davis Dam (RM 276) to Parker Dam (RM 192.3), including Lake Havasu up to full-pool elevation.
- *Reach 4:* from Parker Dam (RM 192.3) to Adobe Ruin and Reclamation's Cibola Gage (RM 87.3) at the lower end of Reclamation's maintenance Cibola Division.
- *Reach 5:* from Reclamation Cibola Gage (RM 87.3) to Imperial Dam (RM 49.2).

1 River miles are numbered along the thalweg of the LCR channel south to north starting with RM 0.0 at the SIB with Mexico. Backwaters are identified by river mile by using the first letter of the state the backwater is located in (Arizona, California, or Nevada) and the river mile distance from the SIB to the point of connection between the backwater and the river (e.g., C60.7). Dam locations are noted at their respective river miles.

- *Reach 6:* from Imperial Dam (RM 49.2) to the NIB (RM 23.1) between the United States and Mexico.
- *Reach 7:* portion of the LCR from the NIB (RM 23.1) to the SIB (RM 0.0) within the United States.

A certain amount of conservation would be implemented within specific river reaches, as follows:

- The created backwaters would be located in Reaches 3–6; at least 90 acres would be created in Reaches 3 and 4 with water depth, vegetation, and substrate characteristics that provide bonytail habitat. At least 85 acres would be created in Reach 3 with water depth, vegetation, and substrate characteristics that provide the elements of flannelmouth sucker habitat. Additional habitat could also be provided depending on the extent of connected backwaters that are established for the razorback sucker in Reach 3.
- Within the range of the MacNeill's sootywing skipper (Reaches 1–4), honey mesquite would be planted with quailbush to create the honey mesquite–quailbush interface that provides habitat for this species.
- The created cottonwood-willow land cover would include 76 acres in Reaches 6 and 7 to provide habitat for the Yuma hispid cotton rat; 600 acres would be created in Reaches 3-5 to provide habitat for the elf owl; 4,050 acres would be created in Reaches 3-6 to provide habitat for the gilded flicker; and 1,702 acres would be created in Reaches 3-6 to provide habitat for Gila woodpecker. Note that these acreages are not additive; created land cover types may provide habitat for more than one species.
- At least 125 acres of the created marsh would be located in Reaches 3 and 4 for the Colorado River cotton rat, and 130 acres would be created in Reaches 5 and 6 for the California black rail.

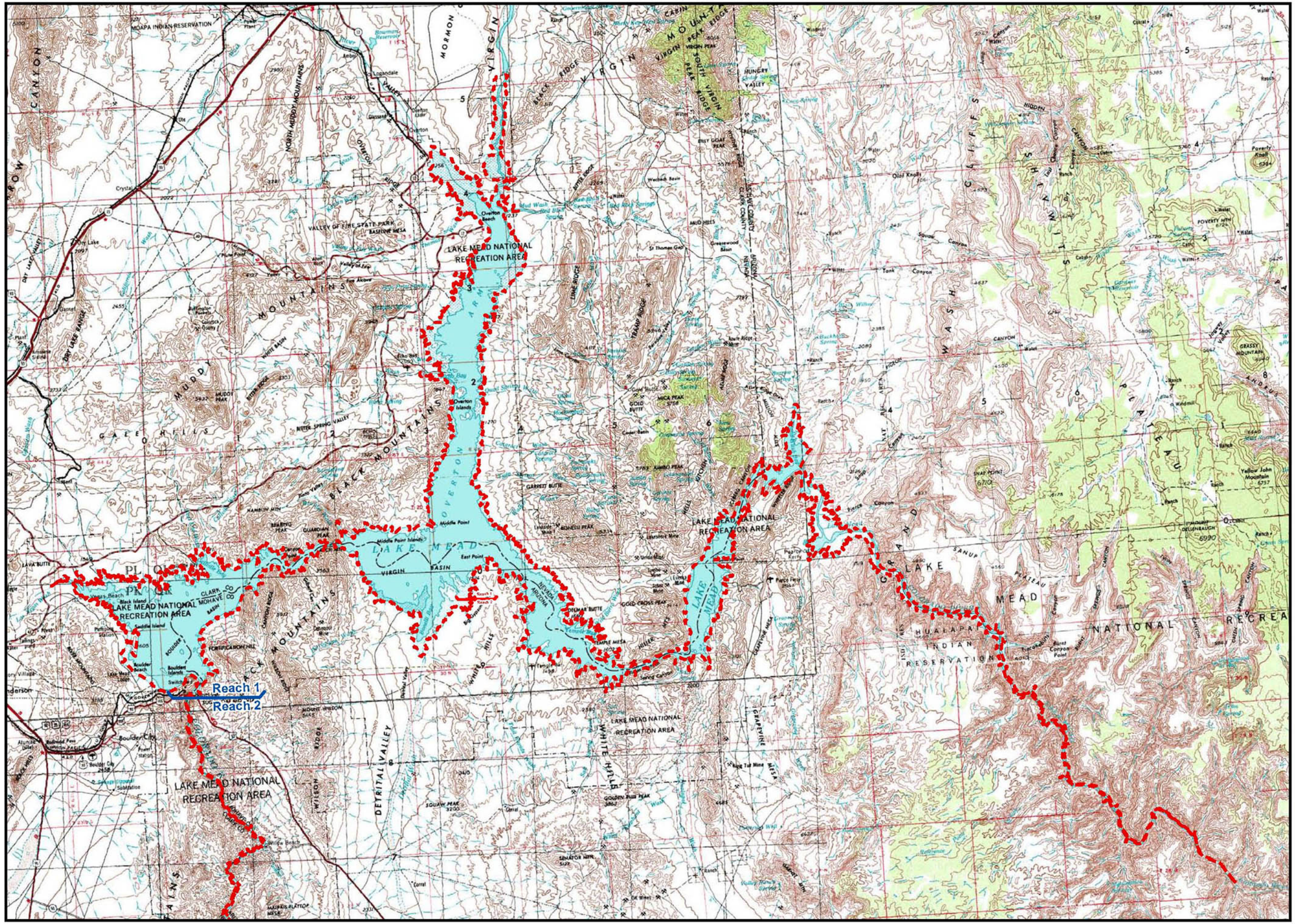
2.1.1.3 Conservation Concepts

The following types of conservation measures have been developed to offset take and provide benefits to covered species:

- Maintaining important existing habitat areas;
- Creating and maintaining new habitat for covered species;
- Augmenting populations of covered fish species;
- Supporting other programs to implement conservation measures to benefit covered species; and
- Timing of implementing conservation measures.

Maintenance of Existing Habitat

The LCR MSCP would contribute to maintaining the condition of a portion of existing habitat for southwestern willow flycatcher, yellow-billed cuckoo, Yuma clapper rail, and California



Planning Area Boundary

Reach Boundary

LCR Planning Area, Reach 1

0 10

Miles

FIGURE 2.1-1

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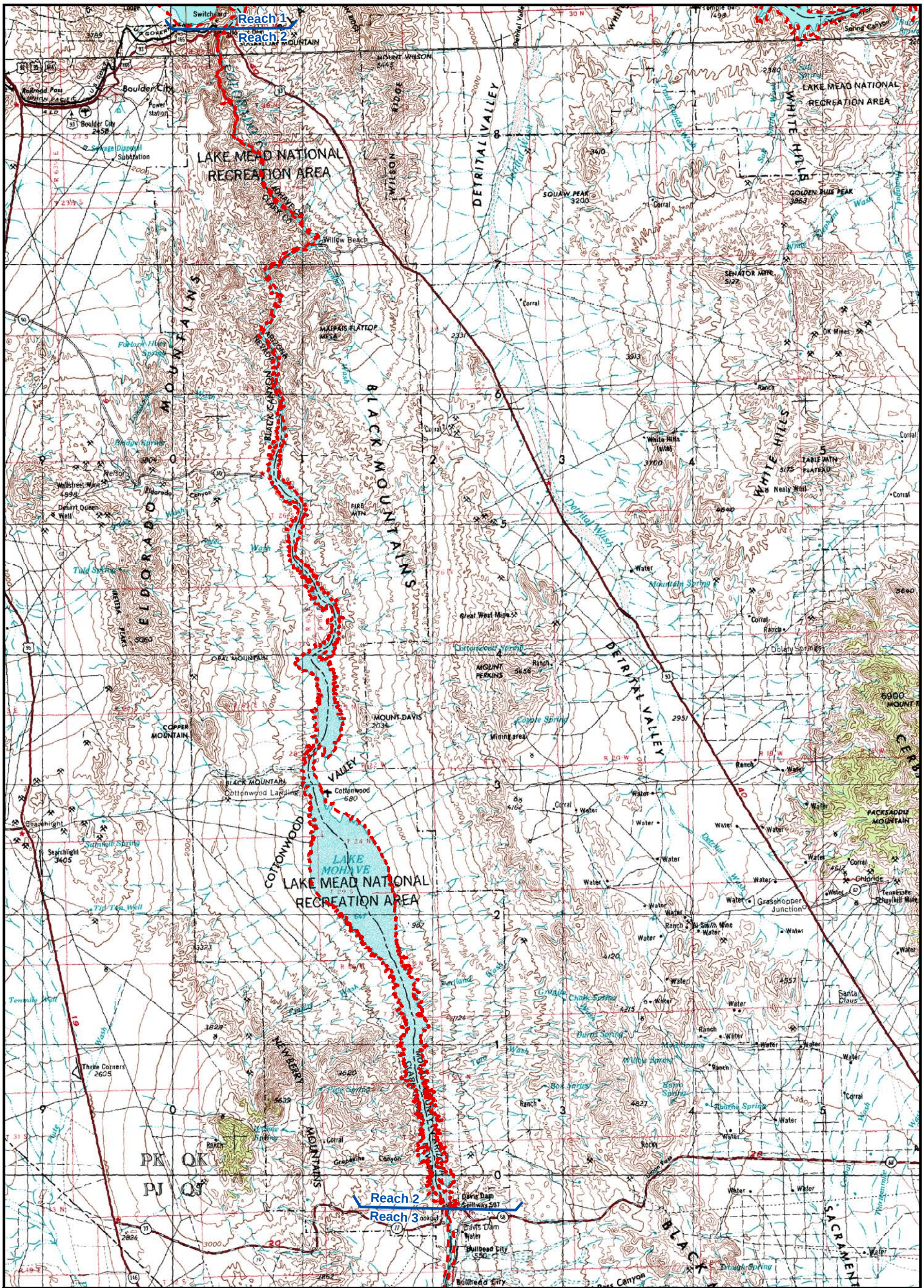

Lower Colorado River Multi-Species Conservation Program

LCR Planning Area, Reach 2

FIGURE
2.1-2

Planning Area Boundary

Reach Boundary

0 10 Miles

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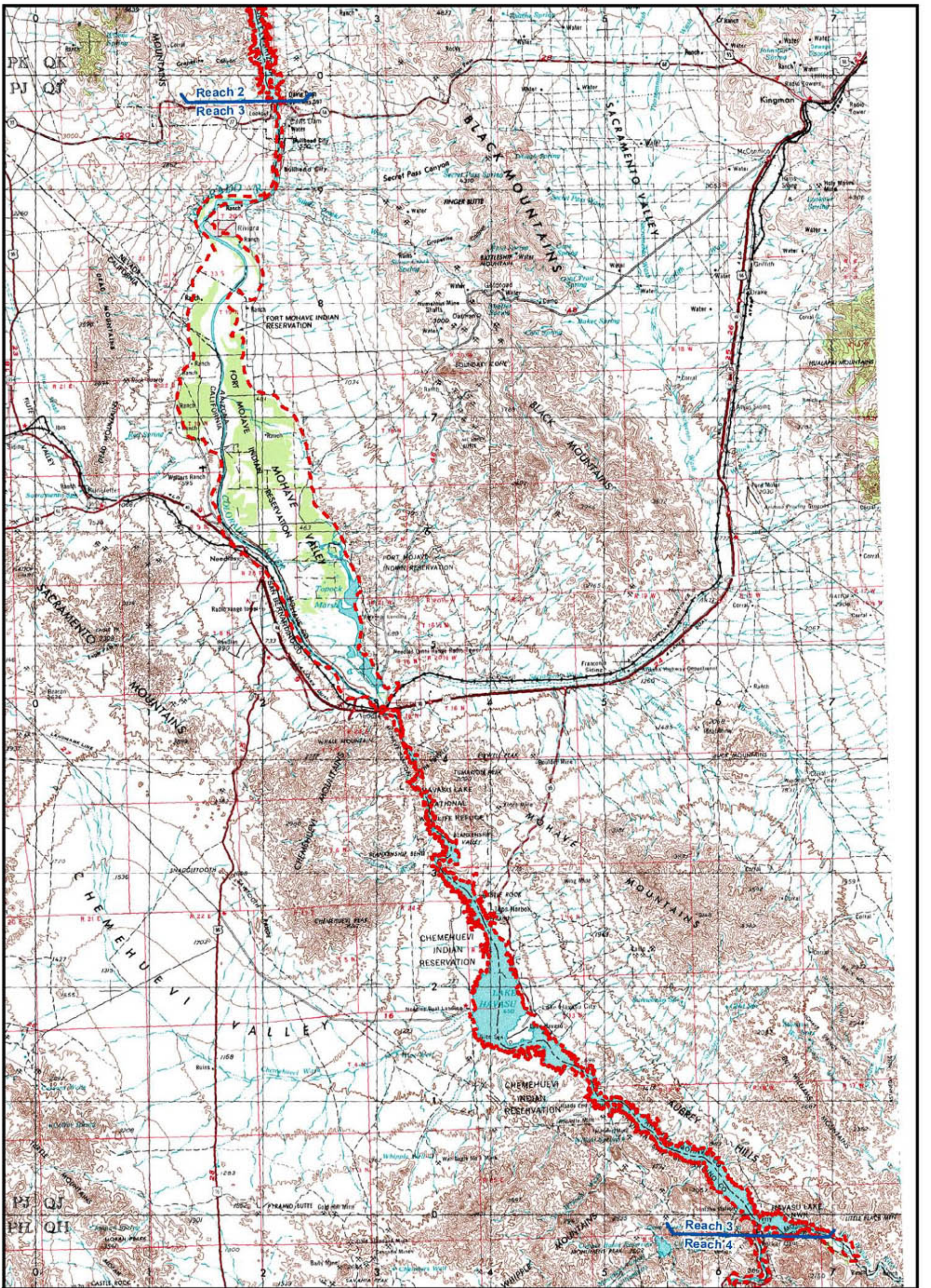

LCR Planning Area, Reach 3

FIGURE 2.1-3

Planning Area Boundary

Reach Boundary

0 12 Miles

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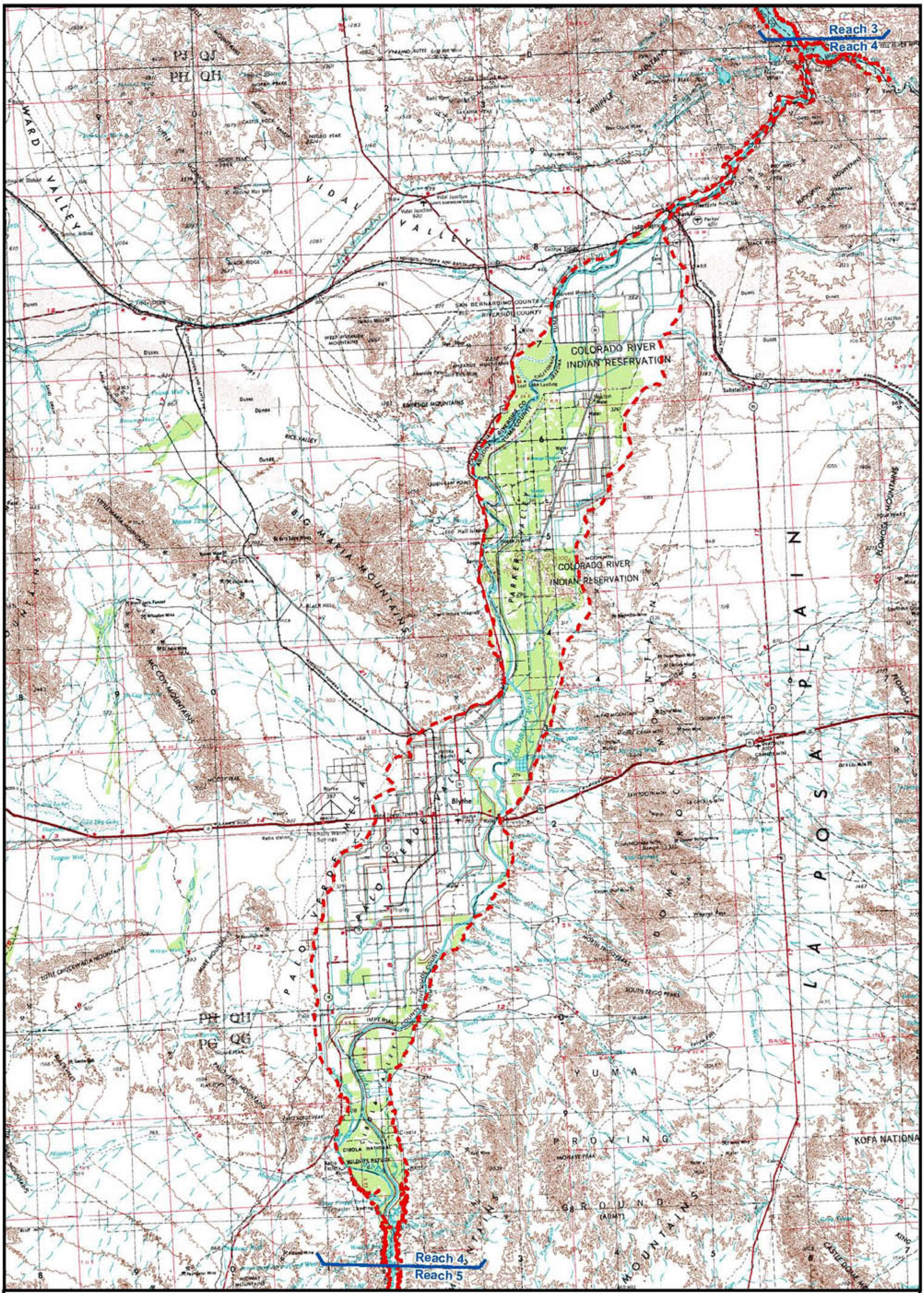

LCR Planning Area, Reach 4

FIGURE
2.1-4

Planning Area Boundary

Reach Boundary

0 12 Miles

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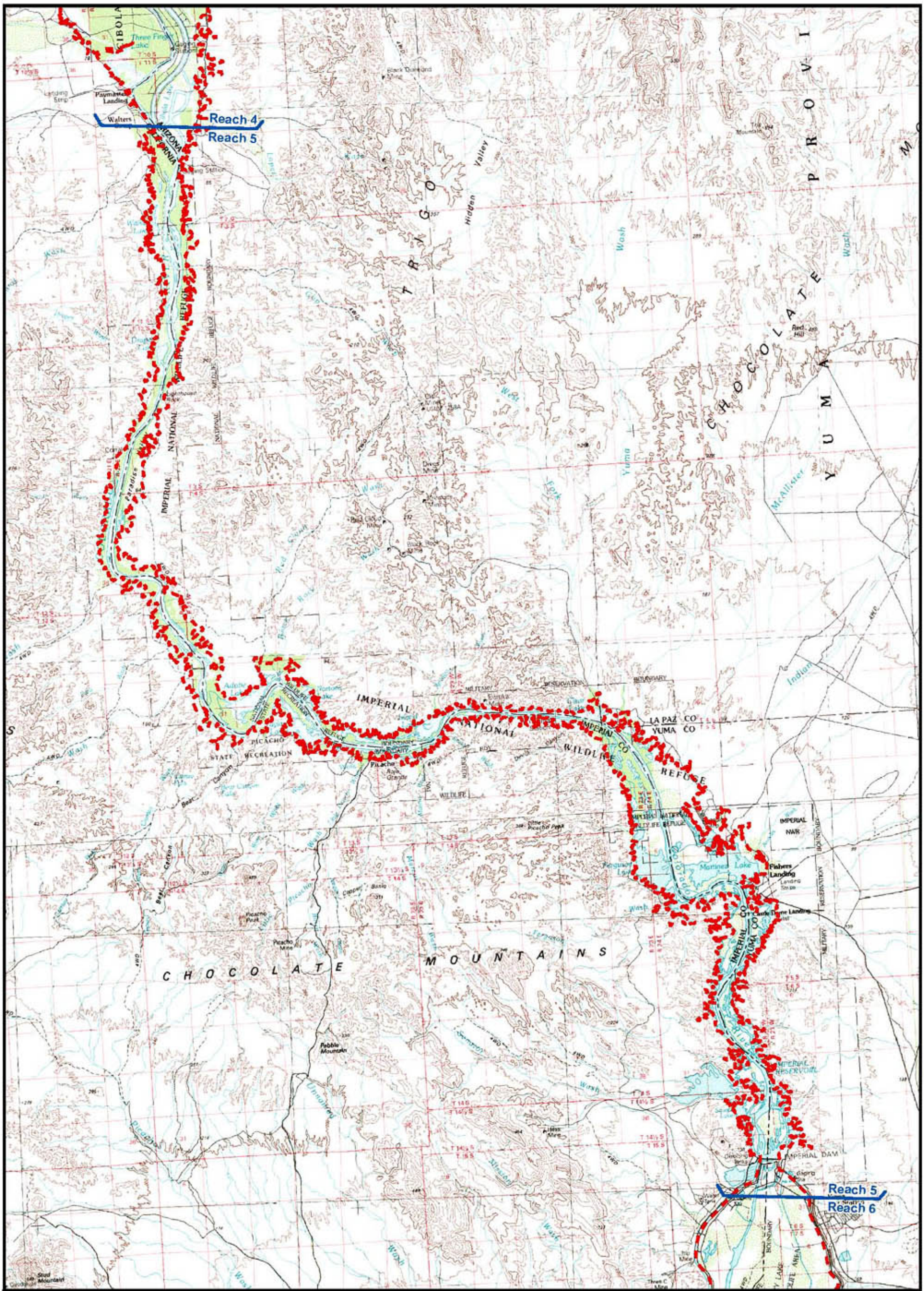

LCR Planning Area, Reach 5

FIGURE 2.1-5

Planning Area Boundary

Reach Boundary

0 4 Miles

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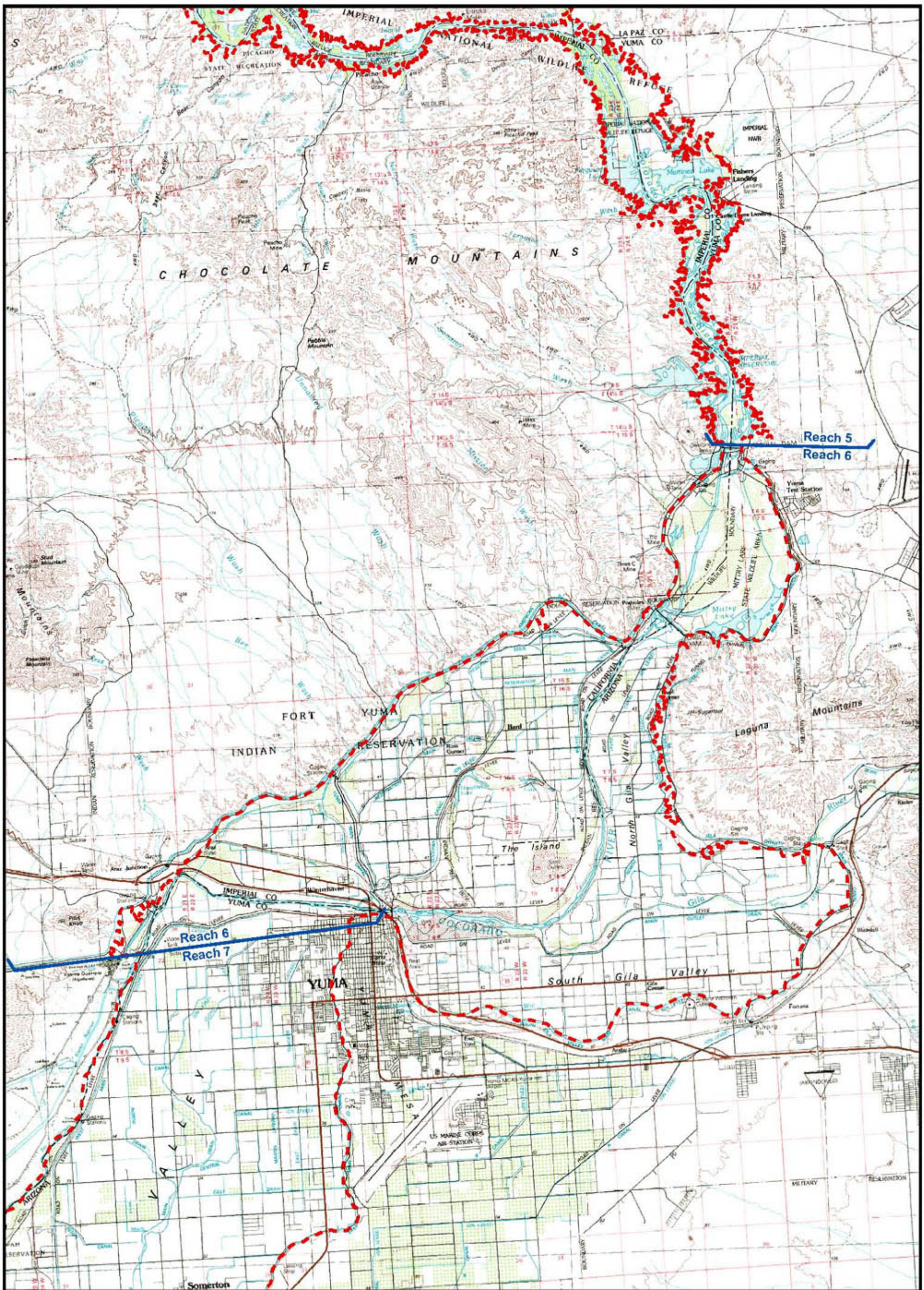

LCR Planning Area, Reach 6

FIGURE
2.1-6

Planning Area Boundary

Reach Boundary

0 4 Miles

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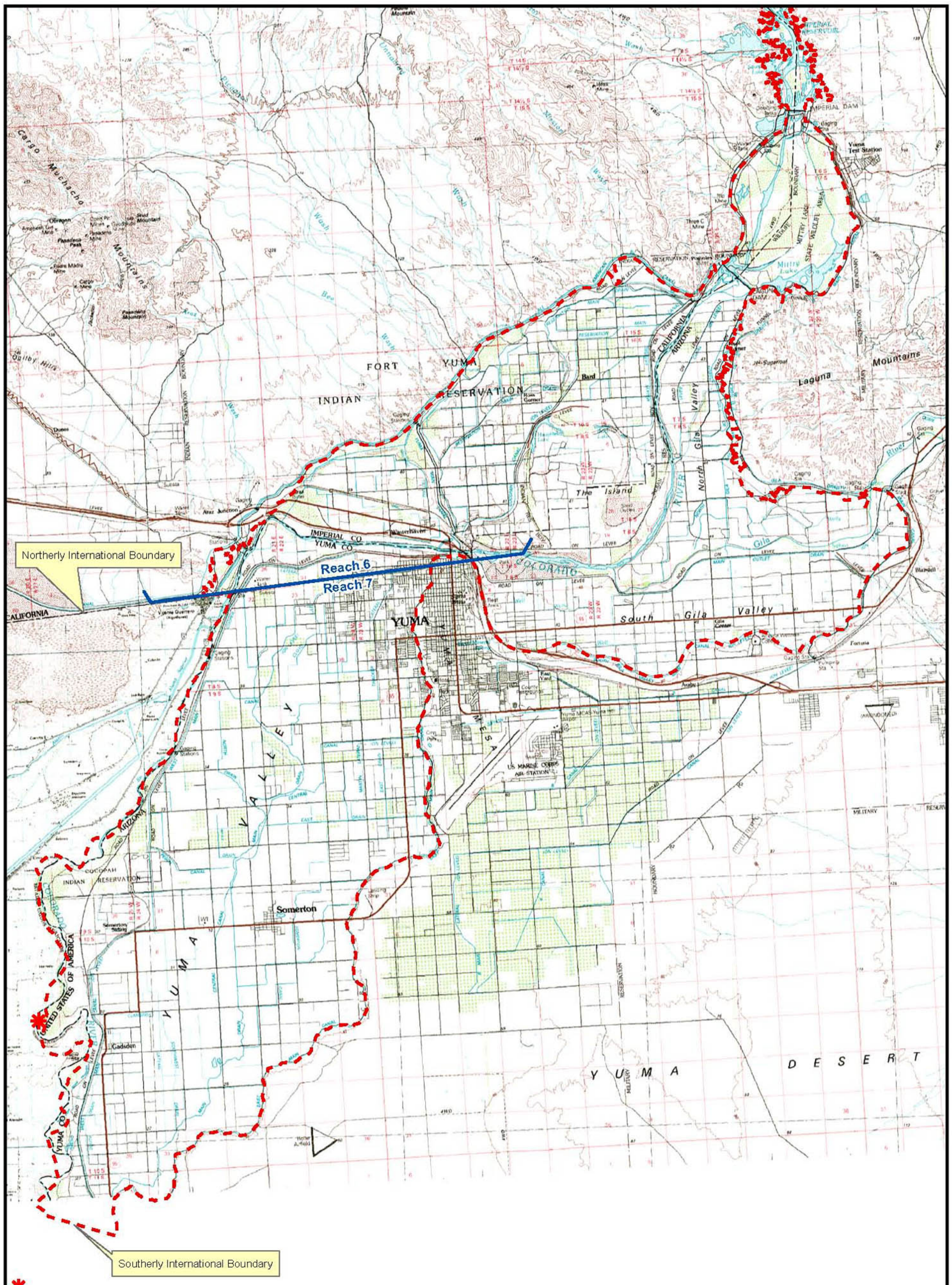

Note: The boundary between the United States and Mexico in Reach 7 is defined, by treaty, as the centerline of the LCR channel which varies over the planning area. The planning area boundary is based on the U.S. - Mexico boundary as it existed in 1992. The underlying topographic information depicts the boundary as it existed in 1977.

Lower Colorado River Multi-Species Conservation Program

LCR Planning Area, Reach 7

FIGURE 2.1-7

Planning Area Boundary

Reach Boundary

N

0 4 Miles

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black rail within the planning area. The key elements of the LCR MSCP approach to maintain existing important habitat areas are described below.

- The LCR MSCP would establish a $25 million fund contribution early in the term of the program in an interest-bearing account to be expended on assessing and implementing projects for maintaining existing habitat.
- Habitat maintenance activities could occur anywhere within the planning area and may be implemented through funding projects by any appropriate agency in the planning area.
- Habitat maintenance activities would be developed and implemented in cooperation with the managing agency for the property on which the activity would occur.
- Selection of habitat maintenance activities funded by the LCR MSCP would be determined based on a set of criteria to be developed by the LCR MSCP in conjunction with the Service. Criteria would be designed to ensure the activities are consistent with the goal of habitat maintenance, goals for covered species, and the overall goals of the Conservation Plan. General criteria that would be developed to select habitat maintenance projects to be funded under the LCR MSCP would include documented evidence that:
  - The habitat has degraded following approval of the LCR MSCP.
  - The habitat can be improved to meet the same standards as described for covered species habitats to be created under the Conservation Plan.
  - The extent of the habitat area encompassed by the project is sufficient to meet the needs of the covered species.
  - The project is economically justified.
  - Cost sharing from the applicant is sufficient.

  Special consideration may be given to award grants for equipment and other items to support continuous maintenance programs on a broad scale.
- The habitat maintenance fund would be administered by the Program Manager, primarily through award of grants to participating agencies.
- Types of activities that could be conducted include construction of infrastructure for water delivery or movement; maintenance of marsh vegetation by burning, water delivery, and other means; maintenance of moist soil conditions in riparian land cover types (e.g., cottonwood-willow); dredging activities to create backwaters or backwater connection with the main river channel; removal or control of undesirable vegetation such as saltcedar and *Arundo*; and other appropriate means to maintain existing desirable habitat.

Habitat Creation

This section describes conservation measures for creating cottonwood-willow, honey mesquite, marsh, and backwater land cover types to provide covered species habitat. Habitat creation involves the direct construction of habitat that results in new habitat at sites that do not

presently support habitat (e.g., establishment of cottonwood-willow stands or marsh that provides habitat for covered species on existing agricultural lands). To the extent practicable based on site conditions, cottonwood-willow, honey mesquite, marsh, and backwaters would be created in proximity to each other to recreate integrated mosaics of habitat that approximate the relationship among aquatic and terrestrial communities historically present along the LCR floodplain.

The LCR MSCP would design and create the following amounts of each land cover type in a manner that would provide habitat for covered species that could be affected by covered activities and Conservation Plan implementation:

- 5,940 acres of cottonwood-willow;
- 1,320 acres of honey mesquite type III;
- 512 acres of marsh; and
- 360 acres of backwaters.

The extent of each created land cover type and the extent of created habitat the land cover types would provide for each covered species are summarized in Table 2.1-5. Patches of created land cover, in most instances, would be designed and managed to provide habitat for more than one covered species. Patches of land cover can support habitat for one or more covered species, although how each species may use the same patch of land cover may differ. For example, habitat for one species may be supported by the upper layers of canopy in a stand of riparian land cover, while habitat for another may be supported by the understory vegetation. Therefore, affected vegetation that provides habitat for more than one covered species can be replaced within the same footprint of created land cover, where the established land cover supports the habitat elements of each covered species. Species for which habitat can be created within the same area of land (if elements of each species' habitat are present and accessible to the species) are illustrated in Figure 2.1-8 (cottonwood-willow) and Figure 2.1-9 (cottonwood-willow and marsh land cover). Lands on which land cover types are created to provide habitat for covered species would be located within designated conservation areas under the management of the LCR MSCP Program Manager.

The length of time that created habitats would be maintained under the LCR MSCP is dependent on the duration of the effects of the covered activities on covered species (the covered activities include both those that would result in permanent loss of habitat and those that would not). The LCR MSCP commits to maintaining in perpetuity the habitat created to address permanent impacts of implementing the covered activities. This commitment would be accomplished through a variety of management options, including transfer of purchased mitigation land to a Federal, state, or appropriate private entity for permanent management for wildlife values, or creating habitat on existing protected lands. Agreement by the managing entity to maintain the habitat would be acquired or, if necessary, endowments for the maintenance of the properties would be provided within the LCR MSCP budget.

Table 2.1-5. Extent of Covered Species Habitat That Would Be Provided with the Establishment of Land Cover Types (Page 1 of 3)

Created Land Cover Type	*Species Habitat Provided by the Created Land Cover Type*
Create a total of 5,940 acres of cottonwood-willow	Southwestern willow flycatcher: • 2,700 acres would be created as cottonwood-willow types I–III with moist surface soil conditions during the breeding season • 1,350 acres would be created as cottonwood-willow types I–IV with moist surface soil conditions during the breeding season
	Western red bat: • 175 acres would be created as cottonwood-willow types I and II to provide roosting habitat[a]
	Western yellow bat: • 175 acres would be created as cottonwood-willow types I and II to provide roosting habitat[a]
	Yuma hispid cotton rat: • 76 acres would be created in Reaches 6 and 7 that support a moist herbaceous understory, including openings in the canopy to allow for the establishment and growth of herbaceous vegetation
	Yellow-billed cuckoo: • 2,700 acres would be created as cottonwood-willow types I–III with moist surface soil conditions during the breeding season • 1,350 acres would be created as cottonwood-willow types I–III
	Elf owl: • 600 acres would be created as cottonwood-willow types I and II in Reaches 3–5[b]
	Gilded flicker: • 4,050 acres would be created as cottonwood-willow types I–III in Reaches 3–7
	Gila woodpecker: • 1,702 acres would be created as cottonwood-willow types I–IV in Reaches 3–6
	Vermilion flycatcher: • 4,008 acres would be created as cottonwood-willow types I–IV
	Arizona Bell's vireo: • 1,763 acres would be created as cottonwood-willow types III and IV
	Sonoran yellow warbler: • 4,050 acres would be created as cottonwood-willow types I–IV

Table 2.1-5. Extent of Covered Species Habitat That Would Be Provided with the Establishment of Land Cover Types
(Page 2 of 3)

Created Land Cover Type	*Species Habitat Provided by the Created Land Cover Type*
	Summer tanager: • 602 acres would be created as cottonwood-willow types I and II
Create a total of 1,320 acres of honey mesquite III	Western red bat: • 590 acres would be created to provide roosting habitat[a]
	Western yellow bat: • 590 acres would be created to provide roosting habitat[a]
	Elf owl: • 1,184 acres would be created in Reaches 3–5[b]
	Vermilion flycatcher: • 1,200 acres would be created
	Arizona Bell's vireo: • 1,200 acres would be created
	MacNeill's sootywing skipper: • 222 acres would be created with quail bush to create the honey mesquite–quail bush edge required by this species near existing occupied habitat in Reaches 1–4
Create a total of 512 acres of marsh	Yuma clapper rail: • 512 acres would be created with water depths no greater than 12 inches
	Colorado River cotton rat: • 120 acres would be created in Reaches 3 and 4
	Western least bittern: • 512 acres would be created with water depths no greater than 12 inches
	California black rail: • 130 acres would be created with water depths no greater than 1 inch in Reaches 5 and 6
Create a total of 360 acres of backwater	Bonytail: • 360 acres would be created in Reaches 3–6 that contain the physical, chemical, and biological conditions required to support native LCR fishes in a healthy condition

Table 2.1-5. Extent of Covered Species Habitat That Would Be Provided with the Establishment of Land Cover Types
(Page 3 of 3)

Created Land Cover Type	*Species Habitat Provided by the Created Land Cover Type*
	Razorback sucker: • 360 acres would be created in Reaches 3–6 that contain the physical, chemical, and biological conditions required to support native LCR fishes in a healthy condition
	Flannelmouth sucker: • Up to 85 acres would be created in Reach 3 that contain the physical, chemical, and biological conditions required to support native LCR fishes in a healthy condition

Notes:

a Cottonwood-willow types I and II and honey-mesquite type III provide roosting habitat for this species. The LCR MSCP Conservation Plan would provide a total of 765 acres of habitat for this species by creating a combination of 765 acres of cottonwood-willow types I and II and honey mesquite type III land cover type. The quantity of each created land cover type presented in this table is for illustrative purposes only—the actual amount of each land cover type that would be created to provide habitat for this species would depend on a number of factors, including site availability and conditions for creating each of the land cover types. For example, the habitat creation objective of 765 acres for this species could also be achieved by creating 100 acres of cottonwood-willow types I and II and 665 acres of honey mesquite type III.

b Cottonwood-willow types I and II and honey-mesquite type III provide elf owl habitat. The LCR MSCP Conservation Plan would provide a total of 1,784 acres of habitat for this species by creating a combination of 1,784 acres cottonwood-willow types I and II and honey mesquite type III. The quantity of each created land cover type presented in this table is for illustrative purposes only—the actual amount of each land cover type that would be created to provide elf owl habitat would depend on a number of factors, including site availability and conditions for creating each of the land cover types. For example, the habitat creation objective of 1,784 acres for this species could also be achieved by creating 1000 acres of cottonwood-willow types I and II and 784 acres of honey mesquite type III.

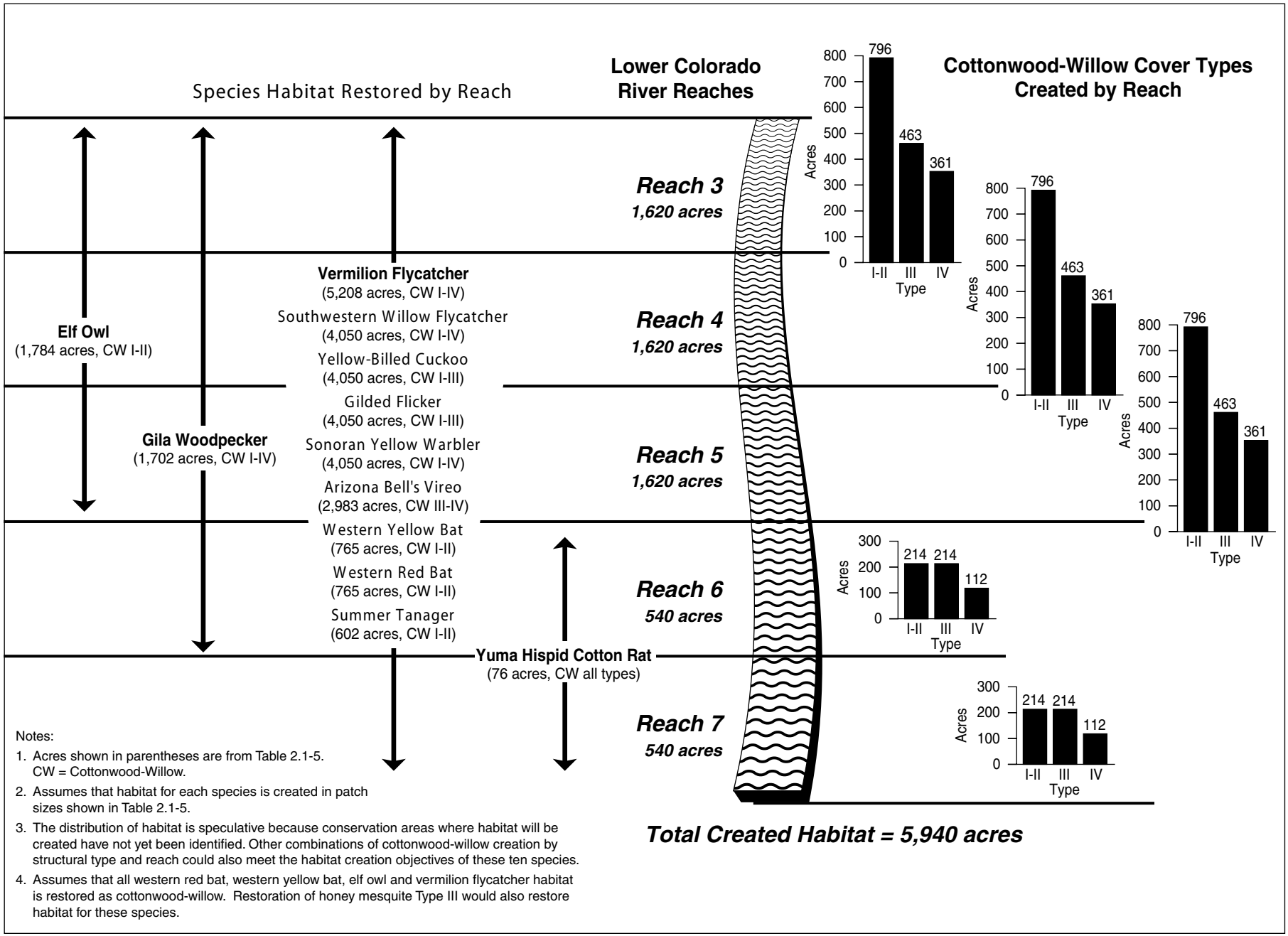
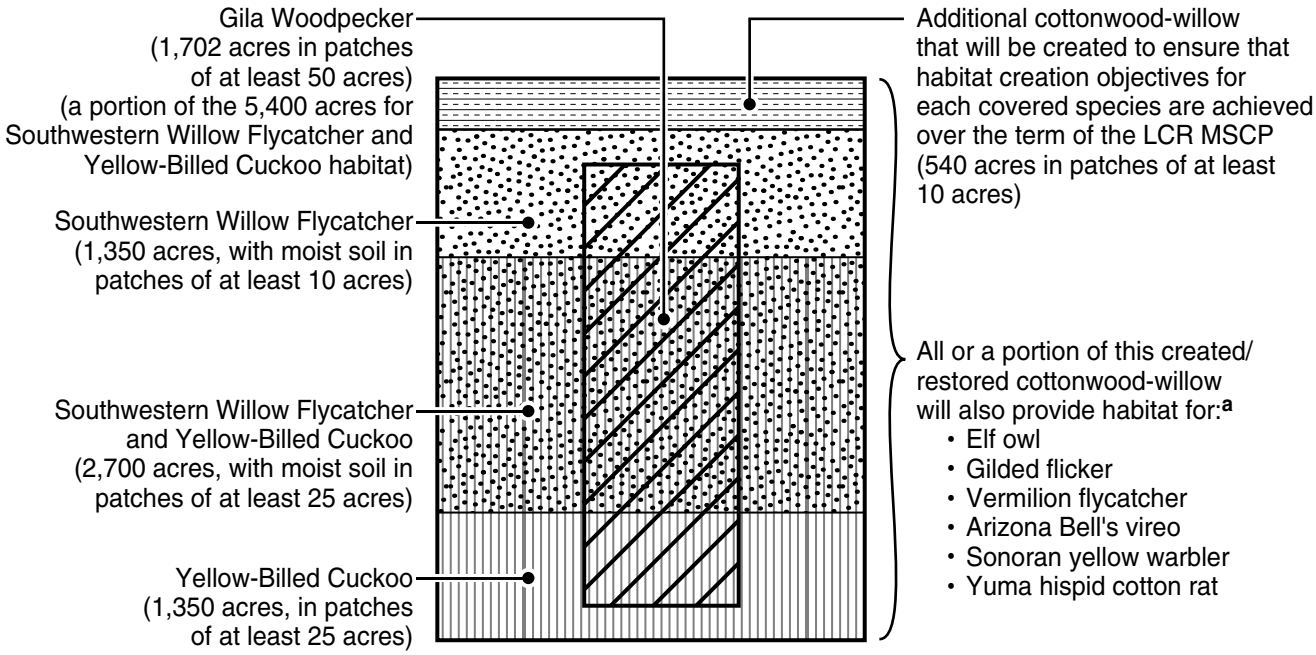
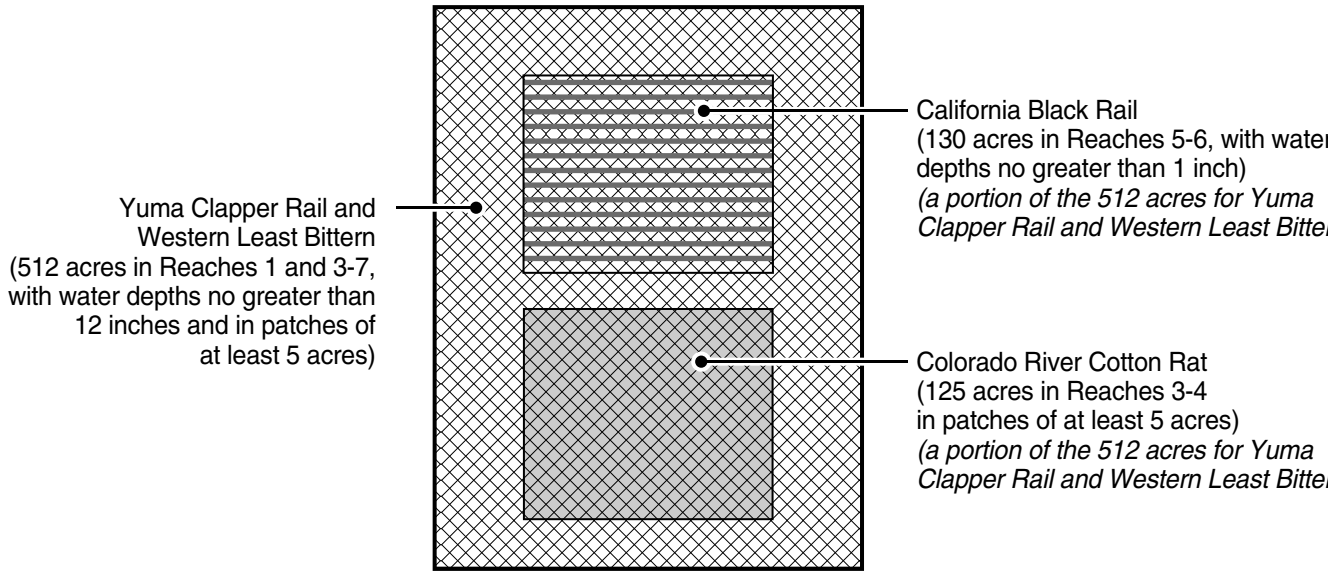


Figure 2.1-8. Hypothetical Distribution of Cottonwood-Willow Creation that Would Meet Habitat Requirements for all Covered Species Associated with Cottonwood-Willow



Cottonwood-Willow Creation (5,940 acres)

[a]The portion of created cottonwood-willow that will provide habitat for these species is dependent on the structure type of cottonwood-willow required by each species and the reaches in which the species occurs or is assumed to occur (Table 2.1-5).



Marsh Creation (512 acres)

Figure 2.1-9. Proportion of Created Cottonwood-Willow and Marsh that would Provide Habitat for Selected Covered Species

COTTONWOOD-WILLOW

Cottonwood-willow land cover would be created to provide the habitat elements for the covered species that use this land cover type, as shown on Table 2.1-5. The Conservation Plan would replace 2,132 acres of cottonwood-willow that would be removed or could be degraded by non-flow and flow-related covered activities with 5,940 acres of created and actively managed cottonwood-willow of higher quality than the affected land cover.

Cottonwood-willow would be created in specific patches of land cover types, such as saltcedar and agricultural lands, that are not considered to support habitat for cottonwood-willow associated covered species. To the extent practicable, cottonwood-willow would be created in conjunction with honey mesquite, *Atriplex* spp., other native riparian species, and marsh and backwater vegetation to meet the habitat requirements of the covered species and to create an integrated mosaic of functional habitats. In addition, creation of large patches of habitat would reduce the likelihood for cowbird nest parasitism on several covered bird species whose populations have declined and are now being affected by nest parasitism. Creation of cottonwood-willow in patches suitable for these species would also meet the habitat patch requirements for other riparian-associated covered species.

Depending on site-specific conditions, creation of cottonwood-willow stands may require creating canals and seasonally wet swales, creating some topographic diversity, and planting or seeding the site with cottonwoods, willows, honey mesquite, and other native riparian species, such as quail bush and saltbush. It is anticipated that most created cottonwood-willow land cover would be flood irrigated. After planting or seeding, removal of saltcedar and management of other invasive exotic species may be required. Created cottonwood-willow designed to provide southwestern willow flycatcher habitat would be specifically managed to ensure that moist surface soil, slow-moving water, or ponded water conditions are present during the breeding season to ensure the production of the flycatcher's flying insect prey base. Once established, patches of created cottonwood-willow would be actively managed to maintain the seral stages and other patch attributes that are required habitat elements for the covered species for which each patch of created cottonwood-willow is intended to provide habitat.

Major design elements for creating cottonwood-willow as habitat for covered species include the following:

- creating large blocks of cottonwood-willow forest necessary to provide yellow-billed cuckoo habitat interspersed with bands of honey mesquite established at higher site elevations;
- excavating and supplying water to canals and shallow swales that dissect blocks of created forest to provide water and forest-edge conditions necessary to support southwestern willow flycatcher habitat, create the microrelief and soil moisture conditions necessary to support a diversity of understory plant species, and distribute irrigation water;
- actively managing created forest to maintain the seral stages required by covered species;

- irrigating to water and establish planted cottonwood-willow and mesquite seedlings (once stands have become established, ongoing maintenance of the native vegetation would include limiting establishment of saltcedar and other nonnative species to maintain habitat quality for associated covered species); and
- periodically irrigating, when necessary, to prevent the buildup of salts in the soil.

Successful creation of cottonwood-willow riparian forest requires that the physical processes that determine habitat structure and dynamics in riparian systems be mimicked as much as possible. In suitable locations, this component of the Conservation Plan would include mimicking overbank flooding by flood irrigation, in particular in the spring and early summer, but also later in the season to maintain a shallow groundwater table. Maintaining a shallow groundwater table would help maintain herbaceous understory vegetation as well as woody riparian vegetation. Creation would also include seeding of cottonwoods and willows during the natural dispersal period or allowing for self-seeding. Following the establishment of vegetation, irrigation would continue as needed to maintain moist soil conditions during the breeding season for covered bird species and to prevent the buildup of salts in the soil. In addition, stands would be managed to maintain the seral stages required by the covered species and the essential habitat parameters and minimum habitat area requirements for the southwestern willow flycatcher, western yellow-billed cuckoo, and other riparian-associated covered species. Monitoring and research through the adaptive management process would guide cottonwood-willow habitat management. (Active management may include apical pruning, bole reduction, vegetative propagation via willow limb and bole prostration in moist soil.)

HONEY MESQUITE

The Conservation Plan would replace 590 acres of honey mesquite land cover type III that provide habitat for the elf owl, vermilion flycatcher, and Arizona Bell's vireo and that would be removed by non-flow-related activities with 1,320 acres of established and actively managed honey mesquite type III. The composition and structure of the established honey mesquite land cover would be consistent with Anderson and Ohmart's (1976, 1984a) vegetation classification type III. Honey mesquite would be created in conjunction with created cottonwood-willow and backwaters to create an integrated mosaic of habitats. Depending on site-specific conditions, honey mesquite may be created in small patches or as bands within created cottonwood-willow and adjacent to backwaters at suitable site elevations or as larger patches (e.g., greater than 50 acres) adjoining created or existing habitats. It is anticipated that creation of large blocks of honey mesquite generally would require removing existing saltcedar-dominated stands of riparian vegetation or clearing agricultural land, planting and irrigating honey mesquite seedlings, and seeding or planting native understory vegetation. Quail bush, saltbush, and other native riparian vegetation may also be planted along the perimeter of created honey mesquite where topography and soil conditions are suitable.

MARSH

The Conservation Plan would replace 243 acres of marsh that provide habitat for covered species and could be removed or degraded by covered activities with 512 acres of marsh that provide habitat for affected covered species. Replacement marsh would be designed and

managed to provide habitat for the Yuma clapper rail, California black rail, western least bittern, and Colorado River cotton rat. Replacement marsh would be provided by creating new marsh in locations with suitable soils and water availability. Patches of new marsh would be created, designed, and managed to provide an integrated mosaic of habitat for the Yuma clapper rail and California black rail. Creation of habitat for these species would also provide habitat for the western least bittern and Colorado River cotton rat. Habitat creation activities could include, but not be limited to the following:

- Creating moist soil units vegetated with bulrush, with infrastructure that would allow water levels to be managed to depths required by the California black rail,
- Dredging and planting emergent vegetation in newly established backwaters and marsh components of conservation areas, and
- Restoring hydrologic conditions in existing degraded, nonfunctional marsh to create marsh that functions as habitat for covered species.

Long-term management activities to maintain the established habitat could include burning, or applying other appropriate management measures, to remove dead mats of emergent vegetation to encourage growth of cattails and bulrush as the established marshes mature.

BACKWATER

The Conservation Plan would replace 399 acres of backwaters and river channels that provide habitat for the bonytail, razorback sucker, and flannelmouth sucker that would be affected by flow-related activities, with 360 acres of created and actively managed connected and disconnected backwaters. Backwater creation would provide habitat for the razorback sucker and bonytail and provide surface and groundwater hydrology in support of existing or created habitat for southwestern willow flycatcher, western yellow-billed cuckoo, clapper rail, elf owl, and other covered species. Disconnected backwaters isolated from non-native fish communities in the river or reservoirs could provide habitat for a recruiting population of native fish, production facilities (grow-out or harvestable surplus of natural recruitment), and research facilities on habitat use and species interactions and would ultimately serve as refuges for these species. Backwaters that are disconnected from the LCR channel are of considerably higher value to bonytail and razorback sucker in the LCR and are the preferred type to achieve LCR MSCP conservation goals for these species. (Fish reared under the Conservation Plan and stocked into these backwaters would count toward total augmentation numbers for razorback sucker and bonytail, described below.) Connected backwaters would be designed to provide the environmental conditions necessary to support adult or subadult razorback sucker, bonytail, and flannelmouth sucker. Vegetation, substrate, depth, water quality, and continuity with the adjacent river or reservoir are important habitat elements for these species.

Where possible, backwater creation would be combined with the creation of riparian and marsh land cover types to provide a mosaic of land cover types. Backwaters would be designed to provide for the establishment of bulrush and cattail along the edges. Depending on the extent of marsh vegetation established at each site, breeding and/or dispersal habitat may be created for the Yuma clapper rail. Backwater creation within or adjacent to existing or created patches of riparian vegetation provides the two major components of southwestern willow flycatcher breeding habitat—structure for nest site placement and standing water and saturated soils for

production of insect prey. Backwaters, integral to flycatcher breeding habitat, would be designed and managed to maintain standing water and moist soils during the southwestern willow flycatcher breeding season. Where backwaters are created in or adjacent to extensive stands of riparian forest, they would also contribute to maintaining the humid microclimate conditions required by nesting yellow-billed cuckoos.

Fish Augmentation Strategies

In addition to replacing covered fish species habitat affected by covered activities, the LCR MSCP would rear and stock fish to augment the existing population of razorback sucker and bonytail in the LCR. To offset any potential take of razorback sucker and bonytail, the LCR MSCP commits to providing the level of funding necessary to produce:

- up to 660,000 subadult razorback sucker (at least 300 mm [~12 inches] in length); and
- up to 620,000 bonytail (at least 300 mm [~12 inches] in length).

These augmentations would be structured as described below under "Species-Specific Conservation Measures for Covered Species" in section 2.1.1.5. Funds not used for production of fish would be used for other management actions that would benefit the populations of both species.

Existing fish rearing capacity and aquacultural techniques may initially be insufficient to meet the augmentation objectives described above. Accordingly, in the initial years of Conservation Plan implementation, the LCR MSCP would:

- Monitor the response of razorback suckers to previous augmentations and stock the numbers of razorback sucker that can be produced up to the amounts described above;
- Assess the efficacy of existing or proposed bonytail production programs and facilities and develop the methods required to produce and rear the fish;
- Increase rearing capacity, if necessary, in cooperation among AGFD, CDFG, NDOW, the Service, and other LCR MSCP participants, or fish may be acquired from other sources;
- Construct, in the context of the integrated landscape mosaic, a "pilot project" for isolated backwaters that can be used for recruiting populations, grow-out facilities, or research within the planning area.

The LCR MSCP would also monitor fish response to augmentations and conduct adaptive management experiments to collect information necessary to evaluate and adaptively manage implementation to better ensure program objectives are achieved.

Other Conservation Strategies

CONTRIBUTE TO ONGOING CONSERVATION PROGRAMS

The LCR MSCP would contribute up to $1.25 million to entities charged with ongoing programs to conserve covered species within and outside of the planning area. Funding would be provided only to implement species conservation actions that have been identified to contribute

to the conservation of the species and for which other funding is not available. Covered species for which the LCR MSCP would fund conservation measures through other ongoing programs include the relict leopard frog, humpback chub, flannelmouth sucker, sticky buckwheat, and threecorner milkvetch.

COVERED SPECIES POPULATION ENHANCEMENT STRATEGIES

Species-specific population enhancement conservation measures are designed to address species conservation needs that cannot be addressed through maintenance of existing habitat or creation of habitat. Examples of population enhancement measures include collecting wild fish spawn, raising brood and young fish at hatcheries and rearing ponds, and releasing them into the river and backwaters; controlling piscivorous fish and nonnative amphibians in advance of releases into created backwaters; placing nest boxes in created cottonwood-willow land cover to increase nesting success for cavity-nesting species; and controlling brown-headed cowbirds to reduce adverse effects of nest parasitism on covered species. Specific descriptions of population enhancement conservation measures are presented below under "Monitoring and Research Measures" and "Species-Specific Conservation Measures for Covered Species" in section 2.1.1.5.

PROTECTION OF EXISTING HABITAT

The Conservation Plan is directed toward creating new covered species habitats to replace affected habitats and contribute to the recovery of covered species. Under specific circumstances, however, existing unprotected covered species habitats may be acquired, protected, and managed under the LCR MSCP to prevent their future loss or degradation. If existing habitat is protected under the LCR MSCP, the extent of the protected covered species habitat would be credited in lieu of an equal amount of the applicable covered species habitat to be created under the Conservation Plan (e.g., if 100 acres of existing southwestern willow flycatcher habitat are acquired and protected, 100 fewer acres would be created than is identified in the Conservation Plan). For existing unprotected habitat to be protected and managed under the LCR MSCP, the Program Manager would evaluate each identified property on a case-by-case basis.

AVOIDANCE AND MINIMIZATION OF IMPACTS

The Conservation Plan includes measures to avoid and minimize impacts of implementing covered activities and the Conservation Plan on covered and evaluation species. Examples of such measures include avoiding declines in groundwater and surface water elevations by installing infrastructure to maintain water elevations and designing LCR MSCP–created habitats to avoid removal of cottonwood-willow land cover and southwestern willow flycatcher habitat. Specific descriptions of avoidance and minimization conservation measures are presented below under "Avoidance and Minimization Measures" and "Species-Specific Conservation Measures for Covered Species" in section 2.1.1.5.

2.1.1.4 Conservation Area Site Selection, Design, and Management

Conservation areas are lands on which land cover types would be created to mitigate impacts of covered activities and LCR MSCP implementation on existing covered species habitat. Once

established, conservation areas would be maintained and managed to ensure continued habitat persistence and function.

Conservation Area Site Selection

The LCR MSCP would create 8,132 acres of habitat for covered species and would select conservation areas in which to create habitat from the following:

- among 30 potentially suitable habitat establishment sites that have been initially identified, surveyed, and evaluated by the LCR MSCP participants (Ogden Environmental and Energy Services 1999; CH2MHill 1999; SWCA Environmental Consultants 2000; Inter-Agency Team 1999, 2000a, 2000b, 2000c; SAIC/Jones & Stokes 2001
- available agricultural lands; and
- other undeveloped lands.

Approximately 37,500 acres are present in the 30 initially identified conservation area sites (Table 2.1-6, Figure 2.1-10), and approximately 270,500 acres of agricultural lands are present in the planning area (Table 2.1-7). Consequently, sufficient suitable sites are available to the LCR MSCP to successfully create the required 8,132 acres of covered species habitat (representing approximately 3 percent of the lands identified in Tables 2.1-6 and 2.1-7).

The process for selecting conservation areas would involve application of site-selection criteria and require collection of sufficient information to properly evaluate the potential for the successful creation of habitat before conservation areas are acquired. It is the intent of the LCR MSCP participants to create habitats in locations and patch sizes that would best meet the conservation needs of the covered species and to manage those habitats in a manner that would meet species' seasonal habitat requirements, within the constraints associated with land availability. Conservation site-selection criteria include the following:

- presence of and proximity to existing occupied covered species habitats;
- suitability of site conditions for restoring habitat for specific species (e.g., appropriate soils, availability of water for irrigation);
- available requisite infrastructure (e.g., access roads, irrigation-related infrastructure);
- relative suitability for achieving multiple creation objectives through an integrated mosaic of habitat types;
- likelihood for mosquitoes produced on a site to become a vector control or nuisance problem based on proximity to urban areas and mosquito production potential;

Table 2.1-6. Summary of Initially Identified Conservation Areas

Potential Conservation Area	*River Mile*	*Ownership Status*[a]	*Total Area*[b] *(acres)*	*Cottonwood -Willow*	*Honey Mesquite III*	*Riparian*[c]	*Marsh*
Hualapai Wilderness Riparian Restoration	GC 243–260	T	60	0	0	60	0
Hualapai Lost Creek Riparian Improvement	GC 247	T	2	1	0	0	0
Lake Mead Riparian Restoration[d]	418-343	F	500	0	0	500	0
Lake Mohave Riparian Restoration[e]	326-278	F	200	ND	ND	ND	ND
Backwaters and Sloughs I	266-264	S	450	100	250	0	50
Cimarron Agricultural Conversion	254-253.3	T	97	97	0	0	0
Long Lake	254-252	T	570	0	0	562	0
Pauite Wash Restoration	251.5	T	630	20	200	0	0
Twin Lakes	251-249	T	165	150	0	0	0
Section 33 Agricultural Conversion	250.5	T	150	150	0	0	0
Section 20 Riparian and Native Fish Rest.	243-244	T	1,326	0	0	1,226	0
Chemehuevi Rearing Pond Cove Enhance.	216-208.5	T	54	ND	ND	ND	ND
Chemehuevi Wilderness Riparian Restoration	212.5-208.5	T	124	124	0	0	0
Chemehuevi Agricultural Conversion	Chem Res	T	40	40	0	0	0
Chemehuevi Desert Wash Revegetation	Chem Res	T	100	ND	ND	ND	ND
'Ahakhav Tribal Preserve	175-169	T	1,010	280	530	0	0
Mohave and Deer Tail Backwaters	169-166	T	800	170	540	0	0
A7 Backwater	121-117	S	1,560	670	590	0	0
A10 Backwater	115-114	F	220	110	80	0	0
Swendt Slough	111-110	S	235	50	160	0	0
Cibola Valley Irrigation and Drainage District	110-107	P	1,030	515	515	0	0
BLM Agricultural Leases within PVID	107-102	F	2,200	2,110	60	0	0
Cibola Meander, Arizona Side	104.5-101.5	P	1,040	700	300	0	0
Palo Verde Oxbow Enhancement	102-100	P,F	1,560	620	20	0	0
Sempre Property Land Acquisition	113-96.5	P	17,000	ND	ND	ND	0
Cibola Restoration Concepts	96-88	R,F	230	70	110	0	0
Laguna Old Channel Restoration	49-43	S	1,425	770	420	0	0
Yuma East Wetlands Pilot Project	34.2-30.8	S,T,F,P	1,305	580	0	0	0
Cocopah Tribal Enhancement Proposal	27-9	T	1,223	0	0	1,223	0
Limitrophe BLM Habitat Restoration	8-0	F	770	740	20	0	0
Acreage Totals			**37,526**	**7,917**	**3,795**	**3,571**	**50**

Notes:

ND= no data available
GC= Grand Canyon
Chem Res = Chemehuevi Indian Reservation
BLM = Bureau of Land Management

a Ownership Status Symbols:
F = Federal (non refuge)
R = National Wildlife Refuge
S = State
T = Tribal
P = Private

b The total extent of potential conservation areas may include land cover types (e.g., developed lands and desert scrub) that are not suitable for establishment of covered species habitat. Consequently, the total extent of established habitat may be less than the total extent of the conservation area.

c The design for the specific composition of this created riparian land cover has not yet been developed. Land cover types could include cottonwood-willow, honey mesquite, arrowweed, atriplex, and other riparian land cover types.

d Habitat created in this potential conservation area would be in addition to the Federal covered activities described in the LCR MSCP BA that will also restore habitat at Lake Mead.

e Habitat created in this potential conservation area would be in addition to the Federal covered activities described in the LCR MSCP BA that will also restore habitat at Lake Mohave.

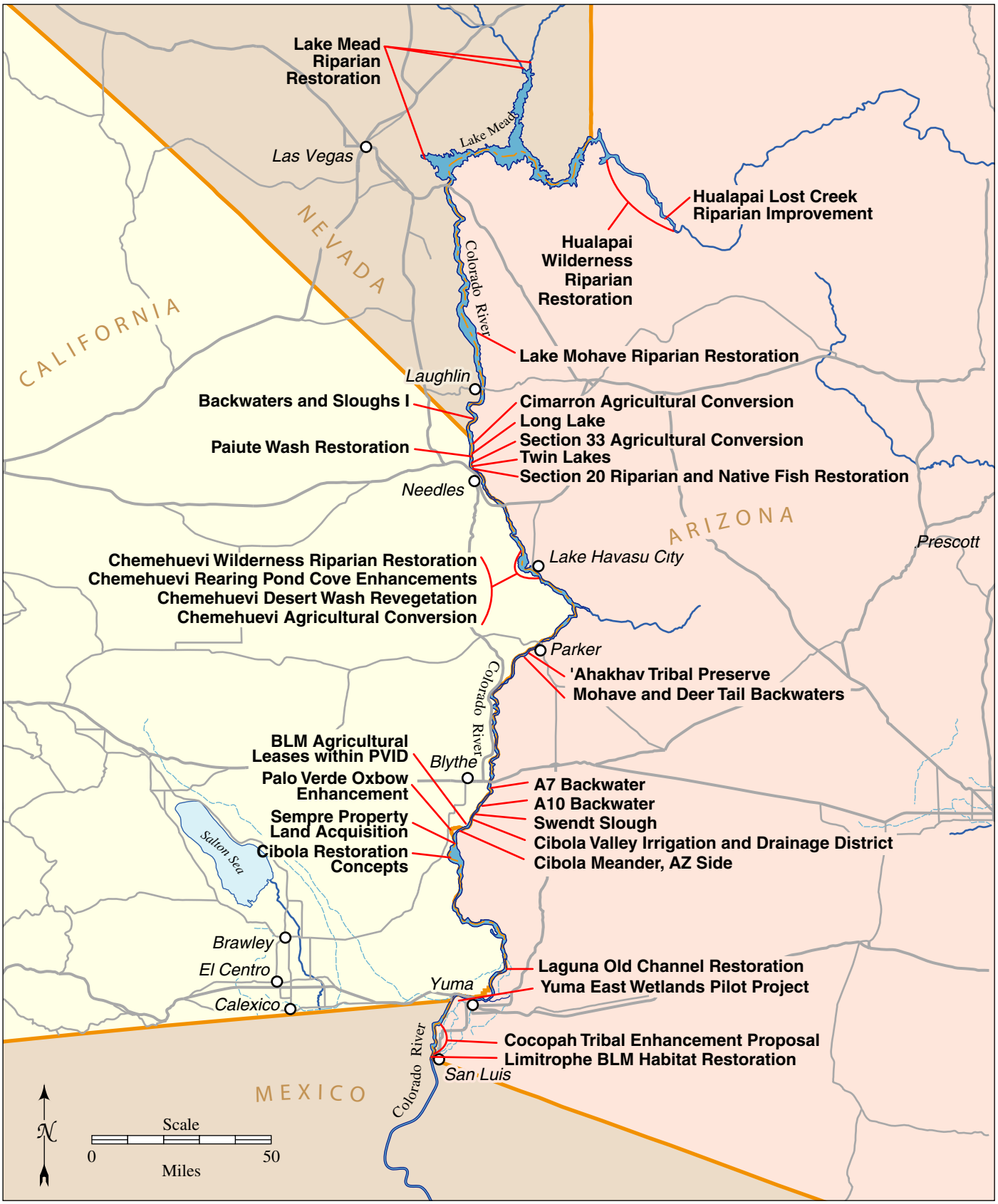


Figure 2.1-10. LCR MSCP Potential Conservation Areas

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Table 2.1-7. Agricultural Land by River Reach and Landowner Category

River Reach[1]	*Owner Category*	*Agricultural Land (acres)*
Reach 3	Federal/state refuge	222
	Tribal land	11,510
	Private	5,789
	Not identified[2]	0
	Total	19,159
Reach 4	Federal/state refuge	1,551
	Other Federal/state	8,874
	Tribal land	78,061
	Private	81,118
	Not identified[2]	0
	Total	169,604
Reach 5	Federal/state refuge	256
	Other Federal/state	4
	Total	260
Reach 6	Federal/state refuge	65
	Other Federal/state	3,314
	Tribal land	7,292
	Private	25,207
	Not identified[2]	908
	Total	36,786
Reach 7	Other Federal/state	1,847
	Tribal land	883
	Private	41,943
	Not identified[2]	32
	Total	44,705
All Reaches	Federal/state refuge	2,096
	Other Federal/state	15,677
	Tribal land	97,745
	Private	154,057
	Not identified[2]	940
	Grand total	270,514

1 No Lower Colorado River Accounting System agricultural landowner data are available for Reaches 1 and 2. Reaches 1 and 2 do not contain agricultural land because the river in this area is generally bordered by cliffs rather than the broad plains that are conducive to such uses.

2 No landowner data is available; however, landowners could include any of the other landowner categories.

Sources: USBR 2003a, 2002

- cost of land acquisition (e.g., fee title, conservation easement, lease);
- timing of availability relative to the need for implementing conservation measures;
- consideration of zoning and general plan designations;
- relative cost of implementing and maintaining established habitat; and
- availability and cost of water to meet establishment and maintenance requirements.

Conservation Area Design Concepts

Once the location of conservation areas is determined based on the site selection criteria, a conservation area design plan would be developed specific to the conservation area to meet covered species habitat needs. The conservation area design plans would incorporate created habitat, existing habitat if present, and, if necessary, buffer areas to protect conservation area habitats from activities on adjacent lands that could degrade Conservation Plan habitats. Important conservation area design concepts that would guide implementation of the habitat creation element of the Conservation Plan are described below:

1. Habitat would be created in patches equal to or greater than the patch sizes required to support sustainable occupancy of the target-covered species.
2. Conservation areas would be designed to create an integrated mosaic of vegetation to approximate the historical juxtaposition of communities along the LCR. Examples of how this may be accomplished include the following:
    a. approximating the historical floodplain community by establishing an integrated mosaic of patches of cottonwood-willow, honey mesquite, *Atriplex* spp., other native riparian species, and backwater and emergent vegetation; and
    b. creating habitat in locations where, in combination with existing adjacent habitat, habitat mosaics are created or enhanced.
3. Created habitat for species with limited distribution along the LCR and with limited ability to move among habitat patches along the LCR would be located near known populations to facilitate future occupancy of created habitats.
4. To create large patches of habitat that would be more likely to support high numbers of associated covered species, priority would be given to creating habitat near existing habitats.
5. To the extent consistent with the conservation area site-selection criteria, preference would be accorded to locating created habitat on Federal, state, and tribal lands. If suitable public lands were not available, private land would be considered on the principle of willing seller or lessor. Preference also would be given to acquisition and design of large patches.
6. Management of conservation areas includes a commitment to:
    a. reduce the risk of the loss of created habitat to wildfire by providing resources to suppress wildfires (e.g., contributing to and integrating with local, state, and Federal agency fire management plans),

b. design conservation areas to contain wildfire and facilitate rapid response to suppress fires (e.g., fire management plans would be an element of each conservation area management plan), and

c. implement land management and habitat creation measures in conservation areas to support the re-establishment of native vegetation that is lost to wildfire or other destructive events.

7. Conservation areas would, as needed, incorporate buffer areas to minimize the potential effects of wildfire, existing land uses, and other activities that may be associated with adjacent lands that could adversely affect the ecological functions associated with established habitats. Conservation areas would be designed to minimize the need for buffers by locating, juxtaposing, and managing established habitats in a manner that would minimize the effect of activities/events that may occur on adjacent lands. The need for buffer lands would be determined based on the site-specific needs identified for each conservation area. Lands acquired and designated as buffers for conservation areas would not be lands that are established as covered species habitat. In order to avoid potential impacts to aircraft from increases in bird populations, the conservation measures would be implemented in compliance with Federal Aviation Administration (FAA) Guidelines.

8. Conservation areas would be located and designed to incorporate, to the greatest extent practicable, existing infrastructure and to minimize the need for construction of new infrastructure required for establishment and management of habitats. The extent of land required for new infrastructure to manage conservation areas would be based on site-specific needs identified for each conservation area, and lands required for new infrastructure would be in addition to lands enhanced and established as covered species habitat.

9. Design and management of conservation areas would be coordinated with appropriate local health officials to incorporate, to the extent practicable, design and management concepts to help reduce the likelihood that conservation areas do not produce mosquitoes in numbers that could cause public health or nuisance concerns. Access to conservation areas would be provided to appropriate health officials to monitor mosquito populations.

Conservation Area Management

A management plan would be developed and implemented for each conservation area. Major elements addressed by the management plans would include:

- Habitat objectives of the conservation area;
- Monitoring requirements;
- Fire management;
- Predator/competitor management;
- Vegetation management;
- Infrastructure maintenance;

- Permitted uses; and
- Water management.

It is anticipated that conservation area management plans would need to be periodically revised to reflect new information that is collected through monitoring and research (section 2.1.1.7).

Conservation Area Mainstream Water Use and Management

WATER SUPPLY

The diversion and consumptive use of Colorado River water is governed by the Law of the River. Key concepts are described below, and additional detail is included in Appendix A. The concepts of "apportionment" and "entitlement" are key to understanding the allocation of Colorado River water. "Apportionment" refers to the distribution of Colorado River water between the Upper and Lower Basin States as identified in the Colorado River Compact of 1922 (Compact), and within the Lower Basin States as identified in the Boulder Canyon Project Act (BCPA) and the *Arizona v. California 1964 Supreme Court Decree* (Decree). The Compact apportioned Colorado River water between the Upper and Lower basins, giving in perpetuity to each basin the exclusive beneficial consumptive use of 7.5 million af per year (mafy). Under the BCPA and the Decree, Colorado River water within the Lower Division States was apportioned among the states; 2.8 mafy to Arizona, 4.4 mafy to California, and 300 thousand af per year (kafy) to Nevada. The Decree further defined each state's apportionment in "normal," "surplus," and "shortage" years[2]. After the water was apportioned to the Lower Division States, the states, the Decree, and the supplemental Decrees allocated the amounts among the Federal government, Indian tribes, the states themselves, and public and private entities. The right or authorization to beneficially use Colorado River water is defined as an entitlement. Entitlements are created by 1) decree of the United States Supreme Court, 2) through a contract with the Secretary under section 5 of the BCPA, and 3) Federal reservations, including those reserved by the Secretary. It is the entitlement, not the apportionment, that establishes a right to consumptively use Colorado River water.

Those who hold entitlements to Colorado River water are referred to as Contractors. As noted above, Contractors consist of the Federal government, states, Indian tribes, and various public and private entities that are recognized under the Decree, hold a section 5 Contract with the Secretary, or have a Secretarial reservation of water. Contractors can take delivery of Colorado River water by diversion from the river at the various dams and diversion facilities or by pumping water that is drawn from within the accounting surface of the mainstream Colorado River. Contractors have permanent water service (i.e., the Contract, Decreed right or Secretarial reservation of water remains in place indefinitely and is not lost due to non-use). The

2 The Secretary is required to determine when "normal," "surplus," and "shortage" conditions occur on the LCR. These conditions are determined in the Annual Operating Plan and are referred to as "normal," "surplus," and "shortage" years. As generally set forth in the Decree, a "normal year" occurs if there is sufficient mainstream Colorado River water available to satisfy 7.5 maf of annual consumptive use in the Lower Division States; a "surplus year" occurs if there is sufficient mainstream water available for release to satisfy in excess of 7.5 maf of annual consumptive use in the Lower Division States; a "shortage year" occurs if there is insufficient mainstream water available for release to satisfy 7.5 maf of annual consumptive use in the Lower Division States. The Secretary makes an annual determination of the water supply conditions, in consultation with the Basin States, Indian tribes with Federal reserved rights, and other parties.

consumptive use of water by each Contractor is accounted for in the apportionment of the state where the water is used, so that the consumptive use of water by each Contractor within each state does not exceed the state's apportionment. This concept applies regardless of year type (i.e., normal, surplus, or shortage). There are 79 named Contractors in Arizona, 24 in California, and 15 in Nevada.

Colorado River water from the mainstem is anticipated to provide the necessary water supplies for establishing and maintaining the habitat created by the LCR MSCP. Implementation of the LCR MSCP would require the use of water as described below. LCR MSCP parties would obtain Colorado River water to meet these requirements from various sources in accordance with the Law of the River and in coordination with the Lower Basin State(s) whose apportionment may be affected by the use. The legal structure governing the Colorado River would ensure that these uses would not increase the amount of water used in the LCR Basin beyond existing entitlements. The geographic scope of the proposed action (section 2.1.1.2) would ensure that Colorado River water that would be used by the LCR MSCP is used within the historic floodplain and tributaries of the LCR. Sources of water supply other than the Colorado River may become available during the 50-year implementation period of the LCR MSCP. Any water source that would be required to implement the conservation measures would be analyzed during the LCR MSCP site selection process.

MAINSTREAM WATER USE ATTRIBUTES ASSOCIATED WITH COTTONWOOD-WILLOW AND HONEY MESQUITE LAND COVER

The potential water use attributes associated with the creation of cottonwood-willow and honey mesquite land cover may include site preparation, establishment irrigation, maintenance irrigation, and managed flooding. Each of these attributes is described below.

Site Preparation. After clearing and root-ripping to remove the exotic vegetation, soil conditioning or leaching of salts may be necessary. This work may require several applications of mainstream water to create appropriate soil conditions prior to revegetation with the desired native riparian plant species. Site preparation water use needs are probably not necessary, or very limited, on sites involving the conversion of lands in agricultural crop production to support stands of cottonwood-willow and honey mesquite. Depending upon the existing conditions of the soil column at the proposed habitat creation site, site preparation water use may be necessary for only one growing season.

Establishment Irrigation. Water use for establishment irrigation would be necessary to ensure that the recently planted native plant species were maintained and to promote vigorous growth. Typically, on sites with undulating or uneven topography, this could involve the application of mainstream water via sprinkler or drip irrigation systems (recognizing that most of the selected sites should be favorable for flood irrigation practices or would be graded and leveled during site preparation, but that sprinklers could be used under special or local conditions). On lands converted from agricultural crop production, the land may be level enough to facilitate flood irrigation using the existing water conveyance infrastructure. Generally, it is expected that establishment irrigation would be required at specific sites for 1 to 3 years following revegetation until the young tree root systems are able to reach the water table.

Maintenance Irrigation. Water use for maintenance irrigation may be necessary to maintain overall plant health and vigor in sites where depth to water is beyond the ability of the plant's root systems to access. The ability to access water may be more of an issue for cottonwood-willow and associated shrub and forb understory communities than for mesquite species (i.e., mesquite has been shown to exhibit rooting depths in excess of 50 feet [Stromberg, et al. 1992]). At some sites, it may be desirable or feasible to lower the grade in order to ensure adequate depths to water for mature riparian plant species, thus limiting maintenance irrigation requirements. Depending upon specific site characteristics, maintenance irrigation may be required one or more times annually during the 50-year term of the LCR MSCP, particularly for the created patches of cottonwood-willow land cover.

Managed Flooding. Water use for managed flooding is intended to simulate pre-development hydrologic conditions along the LCR. The concept involves flooding or irrigating the established patch of riparian vegetation from late February through late March or early April, during the seed germination period for cottonwood-willow. This technique requires the presence of a number of mature cottonwood and willow seed source trees in close proximity to the habitat creation site. This managed flooding promotes recruitment of juvenile cohorts of cottonwood and willow species and maintains adequate soil conditions. Managed flooding may be desirable at some sites on an annual basis, while at other sites it may only be necessary every 2-3 years. Because of the current paucity of seed trees within the planning area, this technique may be somewhat limited during the first decade of Conservation Plan implementation until more mature trees are present in areas suitable for habitat creation.

Managed flooding may also be required to maintain adequate, or suitable, soil-moisture content at specific habitat creation sites. Adequate soil moisture promotes healthy macro- and micro-biotic conditions and the production of flying insects important to many of the covered species (e.g., southwestern willow flycatcher and bats). This aspect of managed flooding could be accomplished, in some cases, with the February-April flooding requirements for seed germination, but may also be required one or more times per month during the heat of the summer if the soil moisture conditions warrant.

A third type of managed flooding involves maintaining saturated soils or standing water in and adjacent to created stands of cottonwood-willow associated with occupied southwestern willow flycatcher habitat from May 1 through August 30. This habitat characteristic is highly desirable to promote successful breeding and recruitment of neotropical migrant bird species. Consequently, at sites currently occupied by southwestern willow flycatcher, or sites that over time become territories and nesting sites of this species, it may be necessary to include this water use, as well. It may be possible to use adjacent marsh or backwater land cover types to meet this requirement.

Water Use. Based upon the proposed creation of 5,940 acres of cottonwood-willow and 1,320 acres of honey mesquite land cover types, a preliminary analysis indicates that approximately 34,480 afy of mainstream water would be required to meet the consumptive use by the created habitat. This amount is based upon an average evapotranspiration (ET) rate of 4.74 afy per acre

for cottonwood-willow land cover and 4.79 afy per acre for the mesquite land cover.[3] Additionally, it has been estimated that an additional 8,600 afy may be required associated with periodic managed flooding events. This is particularly important for the created and maintained stands of cottonwood-willow because these stands must maintain certain specific macrosite and microsite characteristics in order to function as habitat for covered species.

MARSH LAND COVER CREATION MAINSTREAM WATER USE ATTRIBUTES

The proposed action includes the creation and maintenance of 512 acres of marsh land cover. The potential water use attributes associated with creation of native marsh may include existing backwater enhancement and/or enlargement and new backwater and marsh creation. Each of these attributes is described below.

Existing Backwater Enhancement/Enlargement. To create functional marshes, it may be feasible and desirable to restructure existing backwater features within the planning area. This restructuring may involve the use of amphibious excavators to enlarge and reshape the interface between the backwater and the floodplain. Benches and shelves could be sculpted to create the shallow water conditions necessary to promote establishment and maintenance of marsh vegetation for both the Yuma clapper rail and California black rail. The potential mainstream water use is associated with increased open water surface area and evaporation, as well as additional consumptive use related to the ET by the marsh vegetation.

New Backwater and Marsh Creation. In conjunction with the creation of large patches of native riparian vegetation or isolated native fish refugia in the floodplain, it may be feasible and desirable to create functioning patches of marsh at the interface between the backwater and riparian vegetation. The potential mainstream water use is related to open water evaporation and the ET of the marsh vegetation.

Water Use. The proposed creation and maintenance of 512 acres of marsh land cover would require an estimated 3,000 afy of mainstream water. This amount is based on an average ET rate of 5.77 af per acre per year. Again, this average ET rate was calculated from data reported in Reclamation's calendar year (CY)–1999 LCRAS annual report for the three mainstream reaches of the Colorado River below Davis Dam.

BACKWATER CREATION MAINSTREAM WATER USE ATTRIBUTES

The potential water use attributes associated with creation of the actively managed connected or disconnected backwaters may include enhancement and/or enlargement of existing connected or disconnected backwaters and new backwater and marsh creation. Each of these attributes is described below.

Enhancement and/or Enlargement of Existing Connected or Disconnected Backwaters. This habitat creation concept, like marsh habitat creation, involves enhancement or enlargement of existing backwaters and the creation of new backwaters adjacent to the mainstream or in the floodplain.

3 The average ET rate was calculated utilizing data reported in Reclamation's CY-1990 LCRAS Annual Report; and was based upon ET rates reported for three reaches of the mainstream (i.e., Davis Dam to Parker Dam, Parker Dam to Imperial Dam, and Imperial Dam to the Southerly International Boundary).

Existing backwaters could be modified to provide improved water flow and water quality through the backwater (e.g., culverts, gate structures, percolation dike structures, openings directly to the mainstream). Backwaters could be divided into zones to better facilitate management of native fish and desired aquatic characteristics. The potential mainstream water use associated with enhanced or modified backwater creation activities is related to evaporation and bank storage.

New Backwater and Marsh Creation. In conjunction with the creation of large patches of cottonwood-willow, honey mesquite, and marsh land cover types, it may be desirable to construct isolated native fish refugia in the floodplain. These refugia could involve reestablishment of a hydrologic connection in a relict channel feature, remnant backwater, swale, or slough. Typically, this reestablishment involves lowering the grade of the land surface in the relict channel feature or diversion (e.g., via direct diversion from the mainstream and conveyance or supplied by groundwater pumping from wells in the floodplain) and conveyance of a water supply to the feature.

In the integrated mosaic concept, it is likely that functioning patches of marsh would be established around the fringe of the new backwater. The potential mainstream water use is related to open water evaporation, bank storage, and the ET of the associated marsh vegetation.

Water Use. The proposed creation and maintenance of 360 acres of backwaters would require an estimated 1,900 afy of mainstream water. This amount is based upon an average ET and evaporation rate of 5.17 af per acre per year. This average evaporation and ET rate was calculated from data reported in Reclamation's CY-1999 LCRAS annual report for the three mainstream reaches of the Colorado River below Davis Dam.

ESTABLISHMENT AND OPERATION OF NATIVE FISH HATCHERY AND REARING FACILITIES

To produce sufficient numbers of native endangered fishes for reintroduction into suitable LCR mainstream habitats, it is likely that additional native fish production facilities would be required. Some of these hatchery facilities may be constructed off-stream, which is outside of the planning area. No mainstream water use would be associated with these off-stream facilities. At suitable sites within the planning area, it may make economic sense to construct the facility in the adjacent floodplain, thus reducing transport costs and the transit time associated with moving the fish from the facility to the reintroduction site.

Hatchery facilities would involve the construction and maintenance of raceways and grow-out ponds. Mainstream water, either directly pumped from the river or from wells in the floodplain, would provide the water supply for these activities. The potential mainstream water use attributes are generally associated with open water evaporation and bank storage in unlined earthen ponds and/or evaporation from lined ponds or raceways. The amount of water that could be required for hatchery and rearing facilities would be based on the consumptive use through evaporation.

SUMMARY OF CONSERVATION AREA MAINSTREAM WATER USE AND MANAGEMENT NEEDS

As described above, the potential requirements for the use of mainstream Colorado River water include the following types of activities:

- Conservation area site preparation;
- Establishment and maintenance of riparian, marsh/wetland, and aquatic and backwater land cover to provide habitat for covered species, as well as native fish rearing facilities; and
- Periodic managed flooding to maintain overall plant growth and vigor and promote the development of moist soil conditions and flying insect production.

These potential uses of mainstream water are anticipated to occur over the life of the 50-year LCR MSCP. Generally, the expected mainstream water uses associated with establishment and maintenance of conservation areas could include the use of the annual amounts shown below:

Cottonwood-willow	28,156 af
Honey mesquite	6,323 af
Marsh	2,954 af
Aquatic	1,861 af
Total	39,294 af

To meet the estimated consumptive use (CU) requirement associated with all of the conservation areas, it is assumed that 6.0 afy per acre would be necessary. Consequently, to satisfy the CU requirement of 39,294 afy, approximately 48,800 afy would need to be applied to the conservation areas.

As described above, the periodic managed flooding requirement to maintain overall plant growth and vigor and promote the development of moist soil conditions and flying insect production is estimated to be approximately 8,600 afy of additional mainstream water. This water is assumed to be an additional 25 percent of the annual CU of that required to meet the conservation area site total CU needs for cottonwood-willow and mesquite land cover types.

In summary, the total estimated conservation area CU needs, including the managed flooding requirements, is approximately 39,300 afy. This total results in an estimated requirement of approximately 57,400 afy to establish and maintain the 8,132 acres of LCR MSCP conservation areas.

2.1.1.5 General Species Conservation Measures

Avoidance and Minimization Measures

This section describes the conservation measures that would be implemented to avoid and minimize the effects of implementing the proposed action. In addition to these conservation measures, the best management practices (BMPs) of the state in which a covered activity is implemented would be used to control sedimentation in the vicinity of water bodies during ground-disturbing activities.

Avoidance and minimization measure (AMM)1—To the extent practicable, avoid and minimize impacts of implementing the Conservation Plan on existing covered species habitats. To the extent practicable, establishment and management of created habitats would avoid removal of existing cottonwood-willow stands, honey mesquite bosques, marsh, and backwaters to avoid and minimize impacts on habitat they provide for covered species.

Temporary disturbance of covered species habitats, however, may be associated with habitat establishment and subsequent maintenance activities (e.g., controlled burning in marshes and removal of trees to maintain succession objectives). Conservation Plan measures that could result in such temporary disturbances would, to the extent practicable, be designed and implemented to avoid or minimize the potential for disturbance. In addition to implementing AMM3 and AMM4 below, these measures could include conducting pre-construction surveys to determine if covered species are present and, if present, implementing habitat establishment and management activities during periods the species would be least sensitive to the activities, or redesigning the activities to avoid the need to disturb sensitive habitat use areas; staging construction actions away from sensitive habitat use areas; and implementing BMPs to control erosion when implementing ground-disturbing activities.

AMM2—Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh. Impacts on groundwater levels that support covered species habitat at Topock Marsh would be avoided by maintaining water deliveries for maintenance of water levels and existing conditions. At times, flow-related activities could lower river elevations to levels that could disrupt diversion of water from the river to the marsh. Improvements to intake structures that allow water to continue to be diverted or other measures to maintain the water surface elevation would avoid effects on groundwater elevation. Avoidance of effects could be accomplished with the purchase, installation, and operation of two electric pumps sized to the current inflow at the Topock Marsh diversion inlet. The pumps would most likely need to be operated during summer to make up for the lower flow periods.

Implementation of this conservation measure would maintain existing habitat at Topock Marsh for the Yuma clapper rail, southwestern willow flycatcher, Colorado River cotton rat, western least bittern, California black rail, yellow-billed cuckoo, gilded flicker, vermilion flycatcher, Arizona Bell's vireo, and Sonoran yellow warbler. Maintaining water deliveries to Topock Marsh would also maintain razorback sucker and bonytail habitat associated with disconnected backwaters managed for these species.

AMM3—Avoid disturbance of covered bird species during the breeding season. To the extent practicable, to avoid and minimize potential impacts on covered bird species, vegetation management activities (e.g., periodic removal of emergent vegetation to maintain canals and drains) associated with implementation of covered activities and the Conservation Plan that could result in disturbance to covered bird species would not be implemented during the breeding season to prevent injury or mortality of eggs and young birds unable to avoid these activities.

AMM4—Minimize contaminant loads in runoff and return irrigation flows from LCR MSCP–created habitats to the LCR. LCR MSCP–created habitats that require irrigation to establish and maintain vegetation to provide habitat would be designed and managed to minimize contaminant loads that could return to the LCR as runoff or return-flow. Measures would include vegetation establishment methods that minimize the need for application of herbicides, pesticides, and fertilizers and designing irrigation methods and new irrigation infrastructure to reduce runoff and return-flows to the extent practicable. Use of pesticides is not a covered activity. Pesticides used to establish and maintain Conservation Plan habitats

would be applied in accordance with EPA restrictions and, as needed, authorization for their use would be sought under separate permits.

AMM5—Avoid impacts of operation, maintenance, and replacement of hydroelectric generation and transmission facilities on covered species in the planning area. To the extent practicable, before implementing activities associated with operation, maintenance, and replacement of hydroelectric generation and transmission facilities, measures would be identified and implemented that are necessary to avoid take of covered species where such activities could otherwise result in take. These measures could include conducting surveys to determine if covered species are present and, if so, deferring the implementation of activities to avoid disturbance during the breeding season; redesigning the activities to avoid the need to disturb covered species habitat use areas; staging equipment outside of covered species habitats; delineating the limits of vegetation control activities to ensure that only the vegetation that needs to be removed to maintain infrastructure is removed; stockpiling and disposing of removed vegetation in a manner that minimizes the risk of fire; and implementing BMPs to control erosion when implementing ground-disturbing activities.

AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities, and other river management actions. To the extent practicable, before initiating activities involved with river maintenance projects, measures would be identified and implemented that avoid or minimize take of covered species where such activities could otherwise result in take. Such measures could include alternative methods to achieve project goals, timing of activities, pre-activity surveys, and minimizing the area of effect, including offsite direct and indirect effects (e.g., avoiding or minimizing the need to place dredge spoil and discharge lines in covered species habitats; placing dredge spoils in a manner that would not affect covered species habitats).

Monitoring and Research Measures

This section describes the monitoring and research measures that would be implemented to help guide the design and management of established habitats over the term of the Conservation Plan.

Monitoring and research measure (MRM)1—Conduct surveys and research to better identify covered and evaluation species habitat requirements. Conduct surveys and research, as appropriate, to collect information necessary to better define the species habitat requirements and to design and manage fully functioning established covered and evaluation species habitats. This conservation measure applies to the following species[4]:

4 MRM1 and MRM2 apply to those species for which comparable measures are not subsumed under species-specific conservation measures. They are not applicable to species for which habitat would not be established under the Conservation Plan, such as the desert tortoise, relict leopard frog, humpback chub, and threecorner milkvetch.

Yuma clapper rail	California black rail	Arizona Bell's vireo
Southwestern willow flycatcher	Yellow-billed cuckoo	Sonoran yellow warbler
Western red bat	Elf owl	Summer tanager
Western yellow bat	Gilded flicker	California leaf-nosed bat
Desert pocket mouse	Gila woodpecker	Pale Townsend's big-eared bat
Western least bittern	Vermilion flycatcher	

MRM2—Monitor and adaptively manage created habitats for covered species and evaluation species. Created species habitats would be managed to maintain their functions as species habitat over the term of the LCR MSCP. Created habitat would be monitored and adaptively managed over time to determine the types and frequency of management actions that may be required to maintain created cottonwood-willow, honey mesquite, marsh, and backwater land cover as habitat for covered species. This conservation measure applies to the following species:

Yuma clapper rail	Western least bittern	Arizona Bell's vireo
Southwestern willow flycatcher	California black rail	Sonoran yellow warbler
Western red bat	Yellow-billed cuckoo	Summer tanager
Western yellow bat	Elf owl	Flannelmouth sucker
Desert pocket mouse	Gilded flicker	MacNeill's sootywing skipper
Colorado River cotton rat	Gila woodpecker	California leaf-nosed bat
Yuma hispid cotton rat	Vermilion flycatcher	Pale Townsend's big-eared bat

MRM3—Conduct research to determine and address the effects of nest site competition with European starlings on reproduction of covered species. Research would be undertaken to determine whether nest site competition with European starlings is a substantial factor limiting the reproductive success of the elf owl, gilded flicker, and Gila woodpecker. If so, experimental programs may be implemented to determine the effectiveness and practicality of controlling starlings.

MRM4—Conduct research to determine and address the effects of brown-headed cowbird nest parasitism on reproduction of covered species. Research would be undertaken to determine whether brown-headed cowbird nest parasitism is a substantial factor limiting the reproductive success of the southwestern willow flycatcher, vermilion flycatcher, Arizona Bell's vireo, Sonoran yellow warbler, and summer tanager in the planning area. If so, studies would be implemented to identify effective and practical methods for controlling brown-headed cowbirds. If cowbirds are adversely affecting breeding success and effective control measures are developed, a program would be implemented to monitor the effects of cowbirds on nesting success in created habitats to determine the need for cowbird control and to implement cowbird control measures in locations where cowbird control is needed to improve reproductive success.

MRM5—Monitor selenium levels in created backwater and marsh land cover types, and study the effect of selenium released as a result of dredging activities. Conduct monitoring of selenium levels in sediment, water, and/or biota present in LCR MSCP created backwater and marsh land cover types. If monitoring results indicate that management of the LCR MSCP conservation areas increases levels of selenium in created backwaters and marshes or in covered species that use them, the LCR MSCP would undertake research to develop feasible methods to

manage the conservation areas in a manner that would eliminate or compensate for the effects of increased selenium levels. If feasible management methods were identified, they would be implemented. This conservation measure would include monitoring the effects of dredging and dredge spoil disposal associated with creating and maintaining backwaters and marshes. If monitoring results indicate that current or future dredging and dredge spoil disposal methods increase selenium levels, the LCR MSCP would only implement methods that will have the least effect on selenium levels. A study would also be conducted to look at the effects of potential releases of selenium from dredging in general.

Conservation Area Management Measures

This section describes the conservation area management measures that would be implemented to maintain the intended functions and values of created covered species habitats over the term of the Conservation Plan.

Conservation area management measure (CMM)1—Reduce risk of loss of established habitat to wildfire. Management of conservation areas would include contributing to and integrating with local, state, and Federal agency fire management plans. Conservation areas would be designed to contain wildfire and facilitate rapid response to suppress fires (e.g., fire management plans would be an element of each conservation area management plan).

CMM2—Replace created habitat affected by wildfire. In the event of established habitat degradation or loss as a result of wildfire, land management and habitat establishment measures to support the reestablishment of native vegetation would be identified and implemented.

Species-Specific Conservation Measures for Covered Species

This section describes the species-specific conservation measures, in addition to the general conservation measures described above under "Avoidance and Minimization Conservation Measures" that would be implemented to avoid, minimize, and fully mitigate the effects of implementing covered activities and contribute to the recovery of listed covered species/reduce the likelihood of future listing of unlisted covered species.

YUMA CLAPPER RAIL

CLRA1—Create 512 acres of Yuma clapper rail habitat. Create and manage 512 acres of marsh to provide Yuma clapper rail habitat. This created habitat would also provide habitat for the western least bittern and the California black rail (see conservation measures LEBI1 and BLRA1). Habitat would be created in patches as large as possible but would not be created in patches smaller than 5 acres.

CLRA2—Maintain existing important Yuma clapper rail habitat areas. The LCR MSCP participants, under agreements with cooperating land management agencies, would provide funding to those agencies to maintain a portion of existing Yuma clapper rail habitat within the planning area.

SOUTHWESTERN WILLOW FLYCATCHER

WIFL1—Create 4,050 acres of southwestern willow flycatcher habitat. Of the 5,940 acres of created cottonwood-willow, at least 4,050 acres would be designed and created to provide habitat for this species. Created cottonwood-willow would be designed and managed to support cottonwood-willow types I–IV that provide breeding habitat for this species.

WIFL2—Maintain existing important habitat areas. The LCR MSCP participants, under agreements with cooperating land management agencies, would provide funding to those agencies to maintain a portion of existing southwestern willow flycatcher habitat within the planning area.

DESERT TORTOISE

DETO1—Acquire and protect 230 acres of existing unprotected occupied habitat. The acquired habitat would be transferred to an appropriate management agency for permanent protection of species' habitat.

DETO2—Avoid impacts on individuals and their burrows. The following measures would be implemented to avoid and minimize impacts on desert tortoise:

- Before implementing non-flow-related covered activities and LCR MSCP conservation measures in desert tortoise habitat, presence or absence surveys would be conducted using approved Service survey protocols to locate desert tortoises and their burrows (USFWS 1992). The number and location of all tortoises or tortoise signs (e.g., shells, bones, scutes, limbs, scats, burrows, pellets, tracks, egg shell fragments, courtship rings, drinking sites, and mineral licks) that occur within the project area and its zone of influence and whether any tortoises occur outside of the project area whose home ranges may overlap the project area or its zone of influence should be identified. The project area is defined as any area that would be cleared or partially cleared; have vehicles on or adjacent to it; be temporarily or permanently used for equipment or materials storage, loading, or unloading; or would have its soil or vegetation damaged, fragmented, or disturbed. Desert tortoise presence or absence surveys should be conducted during the typical period of activity for the tortoise (i.e., March 25 to May 31). Surveys should be conducted during daylight hours. The Service considers the results of a presence or absence survey, including the zone of influence, to be valid for no more than 1 year, although the time period may be significantly reduced, depending on project size, location, or proximity to other land disturbance.

- If desert tortoises are present, the covered activity or LCR MSCP activity would be modified to avoid take of individuals and their burrows. However, if impacts cannot be avoided, clearance surveys would be conducted to locate desert tortoises that would be removed and relocated to other habitat areas. Clearance surveys should be conducted to locate all desert tortoises above and below ground within the project area that would be temporarily relocated or salvaged using the Service clearance survey protocol (USFWS 1992). Clearance surveys should be conducted immediately prior to surface disturbance at each site within the project area. Surveys should be conducted during daylight hours.

- If impacts cannot be avoided, desert tortoises should be removed and relocated to other habitat areas, if appropriate. The Desert Tortoise Council guidelines for determining whether tortoises should be moved, mapping tortoise burrows, determining whether burrows should be excavated, finding tortoises in burrows, excavating burrows, constructing artificial burrows, handling tortoise eggs, handling tortoises, processing tortoises, translocating tortoises, and releasing tortoises should be followed (Desert Tortoise Council 1994).

BONYTAIL

BONY1—Coordinate bonytail conservation efforts with the Service and recovery programs for endangered fish species in the Lower Basin.. The LCR MSCP would interact with the Service or any formal recovery program developed in the future for the Lower Basin to ensure that conservation measures included in the Conservation Plan would be implemented in support of recovery efforts to meet recovery goals for the bonytail in the Lower Basin. The LCR MSCP may also use funding programmed for bonytail augmentation (BONY3) and other bonytail conservation measures to implement other recovery activities identified by the Service or a future formal recovery program if it is determined through the adaptive management process and with concurrence of the Service that providing such funding would more effectively contribute to recovery of the bonytail.

BONY2—Create 360 acres of bonytail habitat. Create 360 acres of backwater with depth, vegetation, and substrate characteristics that provide the elements of bonytail habitat. This created backwater would also provide habitat for the razorback sucker. Created backwaters would be designed and managed as described in section 2.1.1.3, Conservation Concepts. At a minimum, created backwaters would contain the physical, chemical, and biological conditions suitable for the establishment and maintenance of healthy fish populations in the LCR.

BONY3—Bonytail augmentation program. The LCR MSCP would provide a level of funding to support implementation of a stocking/augmentation program for the bonytail providing for the stocking of up to 620,000 subadult bonytail (at least 300 mm [~ 12 inches] in length) into the designated critical habitat for the species in Reaches 2-3, and in Reaches 4 and 5 of the LCR. The figure of 620,000 fish is not a target number for the LCR but represents an assumption (see BONY1) used to define the extent of funding that would be available, with the understanding that the adaptive management process would guide the actual stocking program.

BONY4—Evaluate and develop, if necessary, additional bonytail rearing capacity. Additional rearing capacity, if needed, would be developed through cooperation between AGFD, CDFG, NDOW, the Service, and other LCR MSCP participants, or fish may be acquired from other sources.

BONY5—Conduct monitoring and research, and adaptively manage bonytail augmentations and created habitat. Monitoring and research would be conducted to gather information necessary to adaptively manage bonytail conservation, including aggressive monitoring of fish response following augmentations to gather information regarding habitat use and fish movement, to increase the success of subsequent management of the species.

HUMPBACK CHUB

HUCH1—Provide funding to support existing humpback chub conservation programs. The LCR MSCP would provide $10,000 per year for 50 years ($500,000 total) to the Glen Canyon Dam Adaptive Management Program or other entity approved by the Service to support implementation of planned, but unfunded, species conservation measures and, as appropriate, to fund species conservation measures in the lower Grand Canyon of the Colorado River upstream of Lake Mead NRA.

RAZORBACK SUCKER

RASU1—Coordinate razorback sucker conservation efforts with the Service and recovery programs for endangered fish species in the Lower Basin. The LCR MSCP would interact with the Service or any formal recovery program developed in the future for the Lower Basin to ensure that conservation measures included in the Conservation Plan would be implemented in support of recovery efforts to meet recovery goals for the razorback sucker in the Lower Basin. The LCR MSCP may also use funding programmed for razorback sucker augmentation (RASU3) and other razorback sucker conservation measures to implement other recovery activities identified by the Service or a future formal recovery program if it is determined through the adaptive management process and with concurrence of the Service that providing such funding would more effectively contribute to recovery of the razorback sucker.

RASU2—Create 360 acres of razorback sucker habitat. Create 360 acres of backwater with water depth, vegetation, and substrate characteristics that provide the elements of razorback sucker habitat. This created backwater would also provide habitat for the bonytail. Created backwaters would be designed and managed as described in section 2.1.1.3, Conservation Concepts. At a minimum, created backwaters would contain the physical, chemical, and biological conditions suitable for the establishment and maintenance of healthy fish populations in the LCR.

RASU3—Razorback sucker augmentation program. The LCR MSCP would provide a level of funding to support implementation of a stocking/augmentation program for the razorback sucker, providing for the stocking of up to 660,000 subadult razorback suckers (at least 300 mm [~12 inches] in length) into the designated critical habitat for the species in Reach 3, and in Reaches 4 and 5 of the LCR.

RASU4—Develop additional razorback sucker rearing capacity. The LCR MSCP participants, in cooperation with AGFD, CDFG, NDOW, and the Service, would develop additional razorback sucker rearing capacity or would acquire the necessary numbers of fish from other sources.

RASU5—Support ongoing razorback conservation efforts at Lake Mohave. Provide support to maintain the current Lake Mohave Program (Native Fish Work Group) goal of maintaining a population of 50,000 adult razorback sucker in Lake Mohave as a genetic refuge.

RASU6—Conduct monitoring and research, and adaptively manage razorback sucker augmentations and created habitat. Monitoring and research would be conducted to gather information necessary to adaptively manage razorback sucker conservation, including

continued monitoring of fish response to previous augmentations, aggressive monitoring of fish response following LCR MSCP augmentations to gather information regarding habitat use, and fish movement, to increase the success of subsequent management of the species.

RASU7—Provide funding and support for continuation of the Reclamation/Southern Nevada Water Authority (SNWA) ongoing Lake Mead razorback sucker studies. The LCR MSCP would continue to fund and support the ongoing studies of razorback suckers in Lake Mead that were implemented under the ISC/SIA BO.

RASU8—Continue razorback conservation measures identified in the ISC/SIA BO. Reclamation would continue to implement, as part of the LCR MSCP, certain conservation measures specific to razorback identified in the ISC/SIA BO.

WESTERN RED BAT

WRBA1—Conduct surveys to determine the distribution of the western red bat. Conduct investigations to identify the distribution of the western red bat in Reaches 3–5.

WRBA2— Create 765 acres of western red bat roosting habitat. Of the 7,260 acres of cottonwood-willow and honey mesquite to be created as covered species habitat, at least 765 acres would be designed and created to provide western red bat roosting habitat.

WESTERN YELLOW BAT

WYBA1—Conduct surveys to determine the distribution of the western yellow bat. Conduct investigations to identify the distribution of the western yellow bat in Reaches 3–5.

WYBA2—Avoid removal of western yellow bat roost trees. To the extent practicable, avoid removal of palm trees that could serve as roosts for the western yellow bat when establishing covered species habitats.

WYBA3—Create 765 acres of western yellow bat roosting habitat. Of the 7,260 acres of cottonwood-willow and honey mesquite to be created as covered species habitat, at least 765 acres would be designed and created to provide western yellow bat roosting habitat.

DESERT POCKET MOUSE

DPMO1—Conduct surveys to locate desert pocket mouse habitat. Conduct surveys to locate desert pocket mouse habitat that could be affected by habitat creation–related activities to determine whether the habitat is occupied. If the habitat is occupied, design habitat creation–related activities to avoid the habitat. If the habitat cannot be avoided, to the extent practicable, restore the disturbed habitat area onsite following completion of the activities and protect and incorporate the habitat into the conservation area. If the habitat cannot be restored onsite, establish amount of habitat at least equal to the extent of disturbed habitat elsewhere in the conservation area.

COLORADO RIVER COTTON RAT

CRCR1—Conduct research to better define Colorado River cotton rat habitat requirements. Conduct research, if needed, to better define the elements of Colorado River cotton rat habitat and provide information necessary to design and manage established habitat.

CRCR2—Create 125 acres of Colorado River cotton rat habitat. Of the 512 acres of marsh to be created to create Yuma clapper rail habitat, at least 125 acres would be designed to also provide Colorado River cotton rat habitat in Reaches 3 and 4 near occupied habitat.

YUMA HISPID COTTON RAT

YHCR1—Conduct research to better define Yuma hispid cotton rat habitat requirements. Conduct research, if needed, to better define the elements of Yuma hispid cotton rat habitat and provide information necessary to design and manage established habitat.

YHCR2—Create 76 acres of Yuma hispid cotton rat habitat. Of the 5,940 acres of cottonwood-willow to be created as habitat for covered species, at least 76 acres would be designed to provide habitat for the Yuma hispid cotton rat in Reaches 6 and 7 near occupied habitat.

WESTERN LEAST BITTERN

LEBI1—Create 512 acres of western least bittern habitat. Create and manage 512 acres of marsh to provide western least bittern habitat. This created habitat would also be habitat for the Yuma clapper rail (conservation measure CLRA1).

CALIFORNIA BLACK RAIL

BLRA1—Create 130 acres of California black rail habitat. Of the 512 acres of LCR MSCP–created marsh, 130 acres would be created and managed to provide California black rail habitat near occupied habitat in Reaches 5 and 6.

BLRA2—Maintain existing important California black rail habitat areas. The LCR MSCP participants, under agreements with cooperating land management agencies, would provide funding to those agencies to maintain a portion of existing California black rail habitat in the planning area.

YELLOW-BILLED CUCKOO

YBCU1—Create 4,050 acres of yellow-billed cuckoo habitat. Of the 5,940 acres of created cottonwood-willow, at least 4,050 acres would be designed and created to provide habitat for this species.

YBCU2—Maintain existing important yellow-billed cuckoo habitat areas. The LCR MSCP participants, under agreements with cooperating land management agencies, would provide funding to those agencies to maintain a portion of existing yellow-billed cuckoo habitat within the planning area.

ELF OWL

ELOW1—Create 1,784 acres of elf owl habitat. Of the 7,260 acres of created cottonwood-willow and honey mesquite land cover, at least 1,784 acres would be designed and created to provide elf owl habitat.

ELOW2—Install elf owl nest boxes. Until vegetation has matured sufficiently to attract woodpeckers that are needed to create nesting cavities for the elf owl, structural characteristics of nesting habitat (i.e., snags) would be artificially established.

GILDED FLICKER

GIFL1—Create 4,050 acres of gilded flicker habitat. Of the 5,940 acres of created cottonwood-willow, at least 4,050 acres would be designed and created to provide habitat for this species.

GIFL2—Install artificial snags to provide gilded flicker nest sites. Until vegetation in established patches of gilded flicker habitat has matured sufficiently to support structural characteristics of nesting habitat (i.e., snags), install artificial snags that can be used by gilded flickers to excavate nesting cavities.

GILA WOODPECKER

GIWO1—Create 1,702 acres of Gila woodpecker habitat. Of the 5,940 acres of created cottonwood-willow, at least 1,702 acres would be designed and created to provide habitat for this species in Reaches 3-6.

GIWO2—Install artificial snags to provide Gila woodpecker nest sites. Until vegetation in established patches of Gila woodpecker habitat has matured sufficiently to support structural characteristics of nesting habitat (i.e., snags), install artificial snags that can be used by Gila woodpeckers to excavate nesting cavities.

VERMILION FLYCATCHER

VEFL1—Create 5,208 acres of vermilion flycatcher habitat. Of the 7,260 acres of created cottonwood-willow and honey mesquite, at least 5,208 acres would be designed and created to provide habitat for this species.

ARIZONA BELL'S VIREO

BEVI1—Create 2,983 acres of Arizona Bell's vireo habitat. Of the 7,260 acres of created cottonwood-willow and honey mesquite, at least 2,983 acres would be designed and created to provide habitat for this species.

SONORAN YELLOW WARBLER

YWAR1—Create 4,050 acres of Sonoran yellow warbler habitat. Of the 5,940 acres of created cottonwood-willow, at least 4,050 acres would be designed and created to provide habitat for this species.

SUMMER TANAGER

SUTA1—Create 602 acres of summer tanager habitat. Of the 5,940 acres of created cottonwood-willow, at least 602 acres would be designed and created to provide habitat for the species.

FLAT-TAILED HORNED LIZARD

FTHL1—Acquire and protect 230 acres of existing unprotected occupied flat-tailed horned lizard habitat. The acquired habitat would be transferred to an appropriate management agency for permanent protection of habitat for the species.

FTHL2—Implement conservation measures to avoid or minimize take of flat-tailed horned lizard. Reclamation would continue to implement measures to avoid or minimize take of flat-tailed horned lizard. These measures would include worker education programs and other procedures as described in the 1997 BO (USFWS 1997) and are in accordance with the 2003 Flat-tailed Horned Lizard Interagency Coordinating Committee recommendations for the species.

RELICT LEOPARD FROG

RLFR1—Provide funding to support existing relict leopard frog conservation programs. LCR MSCP program activities would assist and contribute to existing relict leopard frog research and conservation programs where appropriate. To the extent consistent with the LCR MSCP Conservation Plan goals and objectives, implementation of this conservation measure would be coordinated with the Relict Leopard Frog Conservation Team.

FLANNELMOUTH SUCKER

FLSU1—Create 85 acres of flannelmouth sucker habitat. Of the 360 acres of LCR MSCP–created backwaters, at least 85 acres would be created in Reach 3 with water depth, vegetation, and substrate characteristics that provide the elements of flannelmouth sucker habitat.

FLSU2—Provide funding to support existing flannelmouth sucker conservation programs. The LCR MSCP would provide $80,000 per year for 5 years ($400,000 total) to support flannelmouth sucker research efforts in Reach 3 below Davis Dam to determine habitat use, habitat preferences, and recruitment and to support decisions on habitat management activities for river channel and backwater habitats in Reach 3.

FLSU3—Assess flannelmouth sucker management needs and develop management strategies. The LCR MSCP would use results of research conducted by the LCR MSCP (see conservation measure FLSU2) and others, through the adaptive management process, to assess main channel and backwater management needs and develop management strategies to benefit the flannelmouth sucker.

MACNEILL'S SOOTYWING SKIPPER

MNSW1—Conduct surveys and research to locate MacNeill's sootywing skipper habitat and to better define its habitat requirements. Conduct research to locate MacNeill's sootywing skipper populations that could be affected by covered activities and determine the macrohabitat

and microhabitat requirements and ecology of the species. Based on research results, implement adaptive management experiments to develop habitat establishment and management methods.

MNSW2—Create at least 222 acres of MacNeill's sootywing skipper habitat. Based on results of research conducted under conservation measure MNSW1, at least 222 acres of MacNeill's sootywing skipper habitat would be created in Reaches 1–4 near occupied habitat.

STICKY BUCKWHEAT

STBU1—Provide funding to support existing sticky buckwheat conservation programs. The LCR MSCP would provide $10,000 per year until 2030 to the Clark County Multi-Species Habitat Conservation Plan (MSHCP) Rare Plant Workgroup to support implementation of conservation measures for the sticky buckwheat and threecorner milkvetch that are beyond the permit requirements of the Clark County MSCHP.

THREECORNER MILKVETCH

THMI1—Provide funding to support existing threecorner milkvetch conservation programs. The LCR MSCP would provide $10,000 per year until 2030 to the Clark County MSHCP Rare Plant Workgroup to support implementation of conservation measures for the threecorner milkvetch and sticky buckwheat that are beyond the permit requirements of the Clark County MSCHP.

Species-Specific Conservation Measures for Evaluation Species

Species-specific conservation measures for evaluation species are as follows:

CALIFORNIA LEAF-NOSED BAT

CLNB1—Conduct surveys to locate California leaf-nosed bat roost sites. Conduct investigations to identify locations of California leaf-nosed bat roost sites within 5 miles of the planning area in Reaches 3–5.

CLNB2—Create covered species habitat near California leaf-nosed bat roost sites. The LCR MSCP process for selecting sites to establish cottonwood-willow and honey mesquite as habitat for other covered species would, based on the information collected under conservation measure CLNB1, give priority, when consistent with achieving LCR MSCP goals for other covered species, to selecting sites that are within 5 miles of California leaf-nosed bat roosts in Reaches 3–5.

PALE TOWNSEND'S BIG-EARED BAT

PTBB1—Conduct surveys to locate pale Townsend's big-eared bat roost sites. Conduct investigations to identify locations of pale Townsend's big-eared bat roost sites within 10 miles of the planning area in Reaches 3–5.

PTBB2—Create covered species habitat near pale Townsend's big-eared bat roost sites. The LCR MSCP process for selecting sites to establish cottonwood-willow and honey mesquite as

habitat for other covered species would, based on the information collected under conservation measure PTBB1, give priority, when consistent with achieving LCR MSCP goals for other covered species, to selecting sites that are within 10 miles of pale Townsend's big-eared bat roosts in Reaches 3–5.

COLORADO RIVER TOAD

CRTO1—Conduct research to better define the distribution, habitat requirements, and factors that are limiting the distribution of the Colorado River toad. Develop and implement a multiyear integrated research program to determine the range, status, habitat requirements, population biology, factors that currently limit Colorado River toad abundance and distribution, and factors that have contributed to the decline of the species in the planning area.

CRTO2—Protect existing unprotected occupied Colorado River toad habitat. Based on results of research conducted under conservation measures CRTO1 and within funding constraints of the LCR MSCP, protect existing unprotected occupied Colorado River toad habitat that is located through the research program.

CRTO3—Conduct research to determine feasibility of establishing the Colorado River toad in unoccupied habitat. Conduct research necessary to determine the feasibility for successfully establishing the Colorado River toad in unoccupied habitat. If feasible, implement a pilot introduction into unoccupied habitat, and monitor the success of methods and establishment of the Colorado River toad in unoccupied habitat.

LOWLAND LEOPARD FROG

LLFR1—Conduct research to better define the distribution, habitat requirements, and factors that are limiting the distribution of the lowland leopard frog. Develop and implement a multiyear integrated research program to determine the range, status, habitat requirements, population biology, factors that currently limit lowland leopard frog abundance and distribution, and factors that have contributed to the decline of the species in the planning area.

LLFR2—Protect existing unprotected occupied lowland leopard frog habitat. Based on results of research conducted under conservation measures LLFRO1 and within funding constraints of the LCR MSCP, protect existing unprotected occupied lowland leopard frog habitat that is located through the research program.

LLFR3—Conduct research to determine feasibility of establishing the lowland leopard frog in unoccupied habitat. Conduct research necessary to determine the feasibility for successfully establishing the lowland leopard frog in unoccupied habitat. If feasible, implement a pilot introduction into unoccupied habitat, and monitor the success of methods and establishment of the lowland leopard frog in unoccupied habitat.

2.1.1.6 Timing of the Implementation of Conservation Measures

The conservation measures would be implemented as quickly as efficient staffing, funding, and the time required to conduct necessary research relative to creating covered species habitats and required to evaluate and acquire lands that are suitable for creating covered species habitat

would permit. It is not certain when future flow-related activities (i.e., changes in points of diversion) will be implemented or whether all of these activities will be implemented. It is anticipated, however, that changes in points of diversion will not be implemented for several years following approval of the Conservation Plan. Because of the uncertainties surrounding species requirements, habitat creation techniques, and the capabilities of potential habitat creation sites to provide habitat, the LCR MSCP anticipates that the first few years of Conservation Plan implementation would focus on conducting research and adaptive management experiments (e.g., pilot habitat creation projects to test habitat creation techniques) to collect information necessary to successfully implement the LCR MSCP. Following collection of this information, implementation of the LCR MSCP is expected to rapidly accelerate, with most or all of the habitat creation conservation component of the LCR MSCP completed within 20–30 years of LCR MSCP HCP approval.

The anticipated implementation strategy for establishing cottonwood-willow, honey mesquite, and marsh land cover types to create habitats for cottonwood-willow–associated covered species builds on information that would be gathered in the first few years of Conservation Plan implementation. It is presumed that during implementation Years 0–5, most habitat creation projects would be small in scale and designed to identify and verify the most cost effective means of creating high quality habitat. Larger scale projects would be implemented in Years 6–10 that are designed based on information gathered from previous plantings and partnerships with willing landowners. Implementation Years 11–30 would focus on large-scale habitat creation projects until the habitat creation objective acreage is achieved. The strategy for creation of both connected and disconnected backwaters assumes 60 acres of backwater would be created during each 5-year implementation period, with a goal of creating several small or one or two larger backwaters during any single year. Performance criteria for covered species habitats would be used to determine the extent of established cottonwood-willow, honey mesquite, and marsh that develops as habitat for covered species.

Tables 2.1-8a-d describe the proposed implementation rate and interim acreage goals for establishment of created habitats.

Table 2.1-8a. Anticipated Schedule for Establishment of Cottonwood/Willow

Years	*Acres/Year*	*5-Year Total*	*Cumulative Total*
1–5	50	250	250
6–10	150	750	1,000
11–15	300	1,500	2,500
16–20	300	1,500	4,000
21–25	300	1,500	5,500
26–30	–	440	5,940

Table 2.1-8b. Anticipated Schedule for Establishment of Honey Mesquite

Years	*Acres/Year*	*5-Year Total*	*Cumulative Total*
1–5	20	100	100
6–10	40	200	300
11–15	80	400	700
16–20	80	400	1,100
21–25	–	220	1,320
26–30	–	–	1,320

Table 2.1-8c. Anticipated Schedule for Establishment of Marsh

Years	*Acres/Year*	*5-Year Total*	*Cumulative Total*
1–5	10	50	50
6–10	20	100	150
11–15	40	200	350
16–20	40	162	512
21–25	–	–	–
26–30	–	–	–

Table 2.1-8d. Anticipated Schedule for Establishment of Backwaters

Years	*Acres/Year*	*4-Year Total*	*Cumulative Total*
1-5	15	60	60
6-10	15	60	120
11-15	15	60	180
16-20	15	60	240
21-25	15	60	300
26-30	15	60	360

2.1.1.7 Monitoring and Research

The elements of the monitoring and research program include system monitoring, species monitoring and research, habitat creation technology research, and post-development or post-habitat creation monitoring.

The LCR MSCP Program Manager, in cooperation with the Service, would direct development and implementation of the monitoring and research program. The LCR MSCP would maintain databases for storage and retrieval of monitoring and research data collected under the LCR MSCP and by others that are relevant to covered species and their habitats, as well as for tracking implementation and success of Conservation Plan measures. Monitoring and research would primarily be directed to fill known data and information gaps and/or those data needs identified through database review. Every attempt would be made to use and glean data from existing, ongoing programs and to direct the collection of data that would augment, not replace,

these programs. Monitoring protocols and research studies would be designed to avoid excessive disturbance to covered species and to ensure that monitoring and research are conducted in compliance with all permit stipulations.

The LCR MSCP Program Manager would maintain close coordination with other recovery implementation programs and habitat conservation programs in the Colorado River watershed, including the Upper Colorado River Endangered Fish Recovery Program, the Glen Canyon Dam Adaptive Management Program, the Clark County MSHCP and others that may develop through the life of the LCR MSCP. Additionally, communication and coordination would be maintained with other species conservation planning and habitat restoration efforts that are in place within the range of the species covered under the Conservation Plan (e.g., southwestern willow flycatcher research and habitat restoration activities along the middle Rio Grande in central New Mexico).

The purpose behind this close communication and coordination is to ensure and facilitate the transfer and management of data and information related to key species and the employment of state-of-the-art restoration technologies. LCR MSCP monitoring protocols would be developed in coordination with the National Fish and Wildlife Foundation's Partner's in Flight programs in Arizona, California, and Nevada to ensure that results of LCR MSCP monitoring are compatible with and can be integrated with data collected on covered species and habitat restoration efforts under these programs. This coordination would allow for comparable data to be collected that can be used to better evaluate the regional status and trends of species and to identify and direct future management efforts to benefit these species. Identification of such regional management needs based on coordinated regional monitoring efforts would not only help guide adaptive implementation of the Conservation Plan but would also provide such guidance for other species conservation programs. Additionally, monitoring protocols would be designed and developed that permit coordinated database management, as well as database compatibility with other conservation planning efforts (e.g., databases developed, maintained, and managed in the Glen Canyon Dam Adaptive Management Program, Upper Colorado River Basin Recovery Implementation Program, and Roosevelt Lake HCP).

System Monitoring

System monitoring would be conducted to collect data on existing populations and habitats of covered species to determine their status, distribution, density, migration, productivity, and other ecologically important parameters. System monitoring would be implemented annually, with decreasing intensity over the term of the LCR MSCP. Collected data would be maintained in a GIS database (e.g., distribution of habitats, species observations) and other database formats as appropriate.

In the early years of Conservation Plan implementation, extensive data gathering would be conducted to acquire and sort data on covered species to identify data gaps and research questions that would be addressed through the adaptive management process. At the same time, ongoing monitoring of endangered species currently performed by Reclamation would continue. Additionally, productivity and survival for other avian species would be gathered through continued monitoring at two data Monitor Avian Productivity and Survival (MAPS) stations located in patches of riparian land cover along the LCR (one on created habitat and one on existing habitat that would not be affected by covered activities). If the appropriate sites are

identified and become available for use, it may be feasible to establish one or more additional MAPS stations within the planning area.

As data gaps are identified, monitoring actions, primarily directed toward covered species for which little is known from the LCR (i.e., mammals, amphibians, insects) would be designed, scheduled, and implemented. Monitoring data would itself be reviewed to determine species-specific and habitat creation–specific research needs. For example, the status and distribution of the Colorado River cotton rat is unknown. (None have been seen or collected for a few years.) Small mammal trapping would need to be implemented in areas previously known to be occupied by this species. If the species is located, species-specific research studies would need to be undertaken to determine the relationship between the organism and its environment. Data collected through such species-specific research efforts would then be used to refine or modify Conservation Plan conservation measures to ensure the species' LCR MSCP conservation goals are achieved.

An important aspect of system monitoring includes the development and use of consistent monitoring and research protocols. Monitoring and research plan designs and database management techniques and methodologies should, to the maximum extent practicable, conform to protocols identified or developed in existing species recovery plans, Partner's in Flight bird conservation plans, and other species-related conservation planning efforts.

It is anticipated that system monitoring could decrease during the later years of LCR MSCP implementation because post-development monitoring on established sites would provide the data necessary to evaluate the overall health and well-being of these species.

Species Research

The LCR MSCP participants recognize that there are considerable data gaps for many of the covered species and that these data are needed to guide, through the adaptive management process, the design and implementation of effective conservation measures. Through the adaptive management process, LCR MSCP implementation would be informed and enhanced by the collection of basic life history data, such as food habits, migration timing, and the physical-, chemical-, and biological-limiting factors necessary to design, construct, and manage the requisite habitats necessary to ensure the continued survival of the species.

The LCR MSCP Program Manager would determine, in cooperation with the Service, the appropriate scope of these species-specific research programs and activities. As described for system monitoring, the LCR MSCP participants would coordinate with, participate in, and build on extant research for these species. Some of the species research items currently identified include brown-headed cowbird and starling control, bat roost and forage site identification, MacNeill's sootywing skipper habitat requirements, and flannelmouth sucker investigations below Davis Dam.

Restoration Research

Restoration technology and methodology research is a key element for successful implementation of habitat establishment through the adaptive management process. Most of the habitats to be created under the LCR MSCP involve a continuation, completion, or

expansion of actions currently being tested and implemented by Reclamation as part of previous BOs (e.g., some Reclamation projects, such as backwater development, have been implemented as mitigation as long as 30 years ago). Many of Reclamation's ongoing restoration projects are demonstration projects that were designed and implemented to answer some of the multitude of questions surrounding restoration of native aquatic, marsh, and riparian communities in the Colorado River floodplain. Much of this work would still be under investigation as the Conservation Plan moves into the implementation phase. In many ways, these actions are still conceptual in nature.

Initially, a major focus of restoration research would be to conduct site evaluations to collect the information necessary to select conservation areas based on the conservation area site-selection criteria. Substantial pre-restoration evaluation and inventory would be required to ensure that the best sites are selected.

Post-development Monitoring

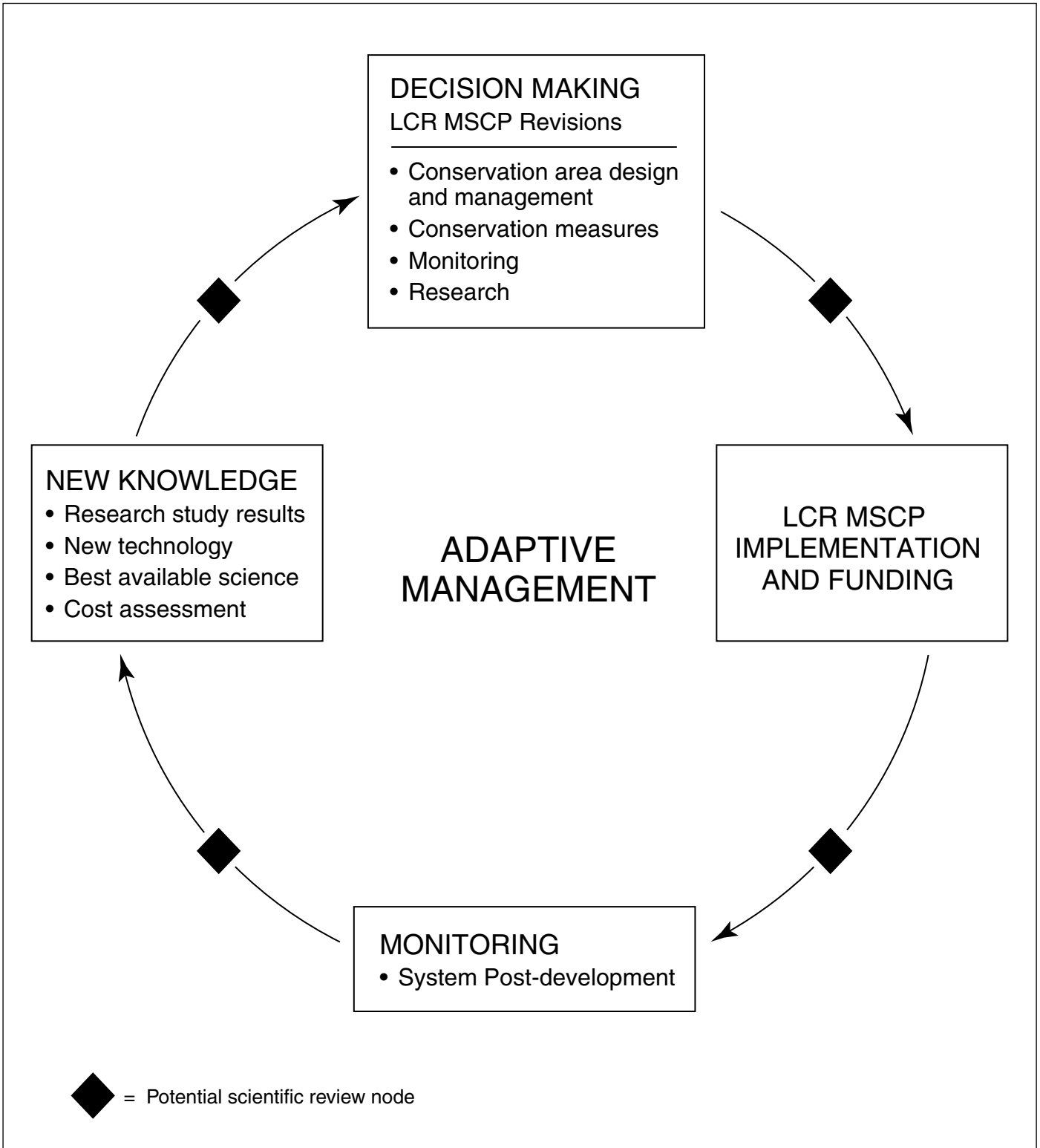
Following completion of habitat creation activities (e.g., site grading, plant installation) at each conservation area, post-development monitoring would be conducted to evaluate development of the site as covered species habitat (e.g., growth of vegetation, development of elements of species habitat) and use of the habitat by covered species. Data collected about how created habitat develops relative to the habitat creation techniques used to establish and maintain the habitat would be used to refine management techniques to ensure the most cost-effective approaches are used (e.g., water management). An element of post-development monitoring also includes monitoring of the parameters established for established covered species habitats to determine whether the minimum habitat requirements established for each species' habitat are being achieved.

2.1.1.8 Adaptive Management

Uncertainty is an unavoidable component of creating and managing species habitats since conditions within the planning area and the status of covered species may change during the term of the LCR MSCP. To address such uncertainties, the LCR MSCP Program Manager would implement the LCR MSCP based on the principles of adaptive management, which would allow LCR MSCP conservation measures to be adjusted over time based on results of monitoring and research.

The adaptive management process would be administered by the LCR MSCP Program Manager, with input from the LCR MSCP Steering Committee, and would provide the Program Manager with objective scientific data and analyses on which to base management decisions. Figure 2.1-11 conceptually illustrates the adaptive management process.

The LCR MSCP adaptive management process is intended to be a flexible, iterative approach to long-term habitat creation and management of biological resources and would be influenced over time by the results of ongoing monitoring, research, and other sources of information. Conservation measures, habitat creation actions, and resource management techniques would be regularly evaluated in light of monitoring and research results regarding species needs, habitat creation successes and failures, and other factors. The intent of this evaluation process is



Source: Adapted from *Statewide Strategy to Recover Salmon* (Washington State Joint Resources Cabinet 1999).

Figure 2.1-11. Adaptive Management Process

to better achieve overall conservation and management goals as defined by measurable biological objectives.

The cornerstone of the adaptive management process is the LCR MSCP monitoring and research program. Information collected through monitoring and research would be used to design and manage created habitat and provide information to direct the fish augmentation element of the LCR MSCP. During the early phases of LCR MSCP implementation, monitoring and research would provide data to improve the efficacy of techniques to successfully establish habitat. As habitats are established, the adaptive management process would allow for the experience gained through early projects to shape and refine future habitat creation projects.

The data collected, evaluated, and managed through the monitoring and research program would provide a scientific basis for modification of existing projects or development of alternative measures that would provide greater benefits or more efficient use of LCR MSCP resources. Such modified/alternative measures would be developed as written proposals and would be presented to the LCR MSCP Steering Committee by the LCR MSCP Program Manager, together with an estimate of the costs. These proposals would be evaluated to ensure that they are consistent with the LCR MSCP goals and can be accomplished within the limits of the budget and financing assurances of the LCR MSCP participants.

Action plans and budgets, reflecting the implementation of conservation projects, will be presented to the Service for its review and written concurrence that they conform to the terms and conditions necessary or appropriate for purposes of the incidental take authorization. Modified/alternative conservation measures and methods that have been generated through the adaptive management process, proposed by the LCR MSCP Program Manager, reviewed by the LCR MSCP Steering Committee, and with concurrence of the Service would not require an amendment to the section 10(a)(1)(B) permit or re-initiation of the section 7 consultation.

Recovery plans could be developed for Federally listed species or LCR MSCP species that become listed over the 50-year life of the LCR MSCP. The LCR MSCP adaptive management process allows for revisions of objectives and conservation measures to incorporate recovery strategies identified in new or revised recovery plans.

2.1.1.9 Conceptual Habitat Conservation Actions

Table 2.1-9 summarizes the key elements that would be involved in implementing the five habitat creation and maintenance concepts that would be incorporated into an integrated mosaic of habitats. The five concepts are:

1. Converting agricultural land to cottonwood-willow and/or mesquite habitat.
2. Converting undeveloped lands to cottonwood-willow and/or mesquite habitat.
3. Creating marsh.
4. Creating backwaters.
5. Maintaining existing habitat (this refers to the LCR MSCP's contribution to maintaining the condition of a portion of existing habitat for covered species within the planning area).

1

Table 2.1-9. Key Elements of Habitat Establishment and Maintenance Concepts

Key Elements of Concepts	CONCEPT[1]				
	1	*2*	*3*	*4*	*5*
Clearing existing vegetation.	X	X	X	X	
Using existing water delivery infrastructure where possible.	X				
Upgrading, augmenting, or enhancing the pumping system, canals, and drains where needed.	X				X
Grading and contouring to provide distribution canals, side channels, swales, and berms to support cottonwood-willow and mesquite land cover types.	X	X			
Designing/constructing water infrastructure to allow for flood irrigation of cottonwood-willow and seasonal creation and maintenance of moist soils.	X	X			X
Revegetating using methods that include but are not limited to pole planting (vertical or horizontal), planting container-grown trees and shrubs, natural seeding from early plantings, and hydroseeding	X	X	X		
Identifying potential maintenance and management measures to ensure long-term viability of the conservation site.	X	X	X	X	
Installing drip irrigation where needed to irrigate mesquite plantings	X	X			
Creating low-lying areas for water retention through dredging, surface excavation, or other means.	X	X	X		
Establishing a water inflow and outflow system to maintain water depth and extent. Establishing water inflow through the groundwater table, surface water inlet and outlet facilities, or attachment to canal distribution network.	X	X	X	X	
Revegetating with shoots, seeds, or other propagules.	X	X	X		
Establishing a backwater area through dredging, surface excavation, or other means. This concept could include shallow water habitat.				X	X
Designing all water inflow and outflow facilities to prevent the movement of non-native aquatic species into the backwater if it is being established for native fish.				X	
Maintaining marsh vegetation by burning, water delivery, and other means.			X		X
Removing or controlling undesirable vegetation such as saltcedar and *Arundo*; and other appropriate means to maintain existing desirable habitat conditions.	X	X	X		X

1 Concepts are 1) converting agricultural land to cottonwood-willow and/or mesquite habitat; 2) converting undeveloped lands to cottonwood-willow and/or mesquite habitat; 3) establishing marsh; 4) establishing backwaters; and 5) maintaining existing habitat.

2.1.2 Alternative 2: No Action Alternative

The no action alternative describes a reasonable assumption of the expected future situation that would result if the Conservation Plan were not implemented as proposed and the section 10(a)(1)(B) permit were not issued. This alternative is based on the following assumptions regarding the actions that would be taken in the absence of the LCR MSCP.

Assumptions

- A comprehensive, regional multi-species conservation plan would not be implemented by non-Federal and Federal entities.
- The Service would not issue a comprehensive section 10(a)(1)(B) permit to the states of Arizona, California, and Nevada for incidental take resulting from the covered activities.
- The covered activities described in the LCR MSCP BA and LCR MSCP HCP would likely be implemented, but regulatory compliance would be required and applied on a case-by-case basis as each activity is considered and approved. The types of conservation measures and strategies described for the proposed Conservation Plan would likely be adopted to offset the impacts of each activity, but would be planned and implemented independently for each activity. Conservation could occur in the planning area as well as in the off-site conservation areas described below under Alternative 4. These include the lower reaches of the Virgin and Muddy rivers, Bill Williams River, and Gila River. In the absence of a comprehensive, coordinated conservation program, the following would be expected:
  - It is unlikely that funding would be provided to maintain existing habitat that is not impacted by the individual projects.
  - The individual project mitigation programs likely would not provide the regional wildfire suppression and law enforcement funding proposed in the Conservation Plan.
  - Coordinated monitoring and adaptive management programs would not be implemented.
  - Since each individual project would establish its own mitigation sites, it is likely that more maintenance and storage facilities would be required.
  - More, smaller mitigation sites would be established, requiring more infrastructure (access roads and irrigation pipelines/canals and pump facilities).
  - To the extent that the agencies undertaking the covered activities proceed with ESA compliance, there may be a reduced number of covered species because unlisted species likely would not be included. This would result in a reduction in the amount of habitat required.

Federal Regulatory Compliance Actions

- All Reasonable Prudent Measures (RPMs) and Reasonable Prudent Alternatives (RPAs) for the 1997 and 2002 BOs must be completed by April 30, 2005, when the current BO expires. Reclamation would need to reinitiate consultation with the Service on LCR

operations and maintenance activities, and the Service would issue a new BO, which may contain conservation measures or requirements not in the original 1997 BO or the 2002 extension. It is likely that Reclamation's consultation with the Service regarding ongoing operations and maintenance activities would incorporate the future actions for which coverage is provided by the proposed Conservation Plan.

- The provisions of the 2001 BO regarding the change in point of diversion of up to 400 kaf from Imperial Dam to Lake Havasu would remain in effect, assuming that the exchange is accomplished, until the time limits set in the BO expire.
- Future Federal actions would be required to comply with NEPA, the ESA, and other laws and regulations; compliance and permit requirements would be implemented on a case-by-case basis.
- It is likely that conservation measures similar to those of the proposed action would be implemented to comply with regulatory requirements, with the exceptions described above under "Assumptions."

Non-Federal Regulatory Compliance Actions

- Ongoing and future actions in Arizona, California, and Nevada would be required to comply with permit requirements, where appropriate, and all applicable laws and regulations. There is a reasonable possibility that potential non-Federal permittees would conclude that they do not require a section 10(a)(1)(B) permit for their activities, either because they choose not to implement those activities or they determine that their activities do not cause incidental take of protected species.

Ongoing Conservation Actions

- Conservation actions by Federal agencies that are tied to section 7 consultations under section 7(a)(2) would continue to be implemented as part of that proposed action or under the requirements of the BO. Implementation would cease only under the terms of the BO.
- Voluntary conservation actions initiated by Federal agencies under section 7(a)(1) would continue to be implemented at the discretion of the Federal agency.
- Voluntary conservation actions initiated by state agencies, tribes, or private groups would continue to be implemented at the discretion of the funding entity.
- Implementation of existing recovery plans for listed species would continue as Federal and non-Federal partners provide funding for specific projects relevant to the planning area.

2.1.3 Alternative 3: Implementation of a Conservation Plan Addressing ESA-Listed Species Only and Issuance of a Section 10(a)(1)(B) Permit (ESA-Listed Species Only)

This alternative would provide coverage only for those species listed under the ESA, and it would result in the issuance of a section 10(a)(1)(B) permit by the Service. Covered species would be the Yuma clapper rail, southwestern willow flycatcher, desert tortoise, bonytail,

humpback chub, and razorback sucker. The amount of take authorized would be as shown on Tables 2.1-2 and 2.1-3 for these species. This alternative would differ from the proposed action primarily in that no honey mesquite and less cottonwood-willow and marsh land cover would need to be established. Additionally, no take permit would be issued for unlisted species, and specific benefits for those species would not occur. Under this alternative, the Conservation Plan would be implemented in the same geographic area as the proposed action and would include:

- Establishment of a $25 million fund to support projects implemented by land use managers in the planning area that maintain existing habitat for listed species that would be covered by the Conservation Plan under this alternative;
- Creation of native habitat in the planning area (4,050 acres of cottonwood-willow, 382 acres of marsh, and 360 acres of backwaters);
- Long-term management of established habitat to maintain and preserve ecological functions;
- Avoidance and minimization of impacts resulting from covered activities and Conservation Plan implementation on listed species and their habitat;
- Population enhancement measures intended to directly or indirectly increase abundance of listed species; and
- Adaptive management measures, including monitoring and research necessary to assess and improve conservation measure effectiveness.
- Other conservation measures relating to the listed species and the strategies for implementing them, as discussed in section 2.1.1.

2.1.4 Alternative 4: Off-Site Conservation and Issuance of a Section 10(a)(1)(B) Permit (Off-Site Conservation)

The off-site conservation alternative would involve the application for and issuance of a section 10(a)(1)(B) permit for the same covered activities and covered species as the proposed action. The level of impacts to covered species, including the amount of authorized take that is requested, is the same for this alternative as for the proposed action, and therefore, the same level of conservation measures would be proposed to mitigate the impacts, including:

- Establishing a $25 million fund to support projects implemented by land use managers in the planning area that maintain existing covered species' habitat;
- Creation of native habitat (5,940 acres of cottonwood-willow, 1,320 acres of honey mesquite type III, 512 acres of marsh, and 360 acres of backwaters);
- Long-term management of created habitat to maintain and preserve ecological functions;
- Avoidance and minimization of impacts resulting from covered activities and Conservation Plan implementation on covered species and their habitat;
- Population enhancement measures intended to directly or indirectly increase abundance of covered species;

- Adaptive management measures, including monitoring and research necessary to assess and improve conservation measure effectiveness; and
- Other conservation measures relating to the covered species and the strategies for implementing them, as discussed in section 2.1.1.

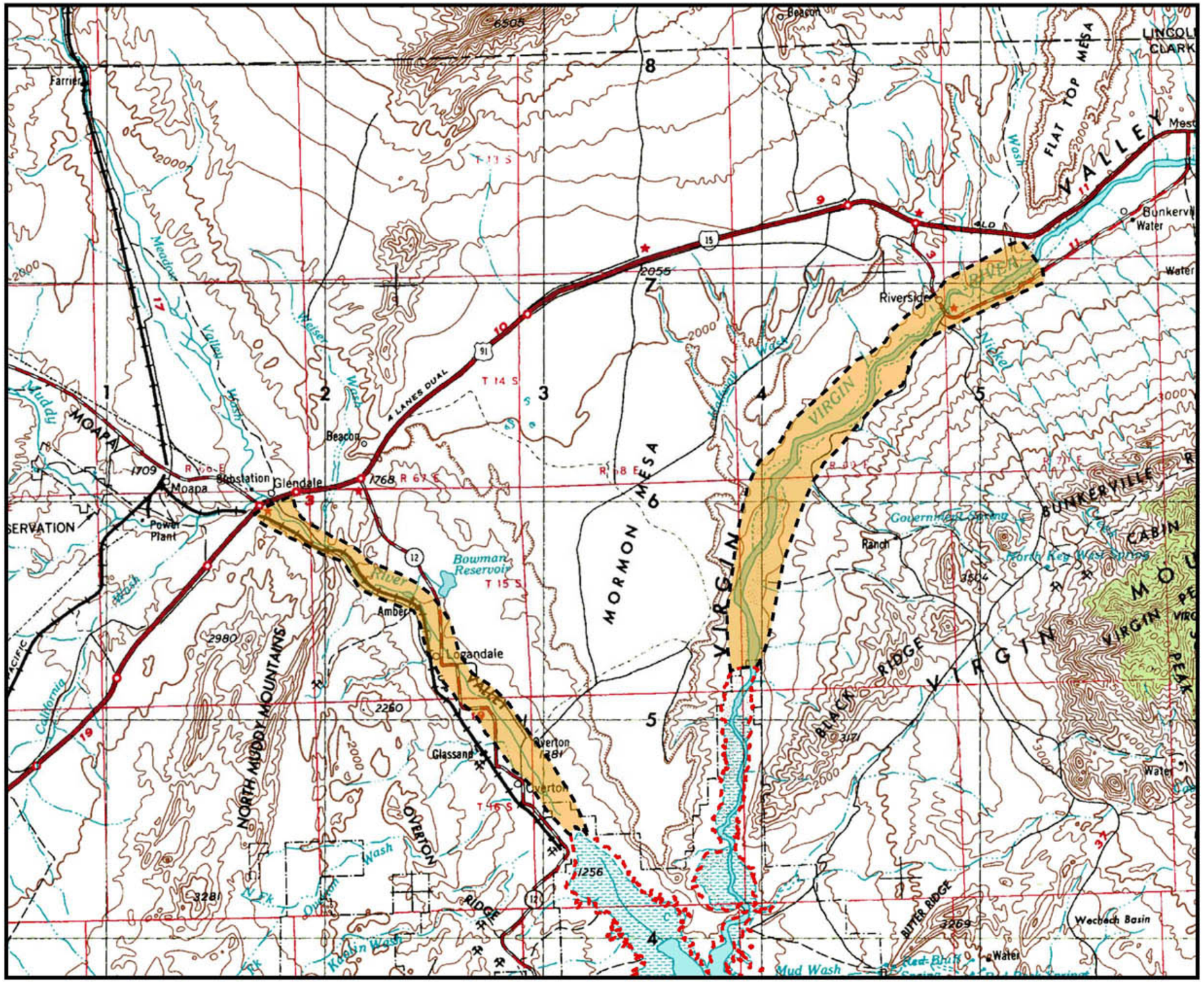
The only difference between this alternative and the proposed action is that habitat generally would be created along tributaries to the LCR. Fish conservation, including the creation of 360 acres of backwaters and fish augmentation strategies, would continue to take place in the mainstem, reservoirs, and backwaters of the LCR. For purposes of analysis, it is assumed that created habitat would be equally distributed between the three off-site conservation areas.

Potential off-site locations for implementing the Conservation Plan elements are: (1) the lower reaches of the Muddy River/Moapa Valley and Virgin River, proceeding upstream from the confluences with Lake Mead and overlapping the NDOW's Overton Wildlife Management Area (Figure 2.1-12); (2) the lower reach of the Bill Williams River, proceeding upstream from the confluence with the LCR and overlapping the Bill Williams NWR, to Alamo Dam (Figure 2.1-13); and/or (3) lower Gila River Valley, proceeding upstream from the LCR planning area and extending approximately ten miles east of Mohawk Valley (Figure 2.1-14). Land ownership for each of the off-site conservation areas is shown on Table 2.1-10. These locations were selected because they:

1. Provide essentially the same benefits to local-to-regional populations of covered species that would be provided by the proposed Conservation Plan. They are in close proximity to the planning area so that mitigation is effective at addressing local ecosystem concerns.
2. They would productively combine with and enhance other conservation efforts that are being and would be applied along the LCR mainstem through other initiatives.
3. They span the same range of ecological communities as the planning area, providing ecological counterparts to the upper (Reaches 1-2), middle (Reaches 3-5), and lower (Reaches 6-7) portions of the planning area.

In addition to the information used to develop the proposed Conservation Plan, the following key sources were consulted to identify the best locations for Alternative 4:

- *An Ecological Analysis of Conservation Priorities in the Sonoran Desert Ecoregion* (Marshall et al. 2000).
- The *Arizona Partners in Flight Bird Conservation Plan* (Latta et al. 1999).
- The *Final Recovery Plan for the Southwestern Willow Flycatcher* (USFWS 2002d).
- The Nevada Natural Heritage Program (NNHP) (2000) *Scorecard 2000: Highest Priority Conservation Sites*.
- The Southern Nevada Public Land Management Act's (SNPLMA 2003) website information on conservation land acquisition priorities (http://www.nv.blm.gov/snplma/default.asp).



Planning Area Boundary

Muddy and Virgin Rivers Off-Site Conservation Areas

0 8 Miles

Figure 2.1-12

Muddy and Virgin Rivers Off-Site Conseration Area

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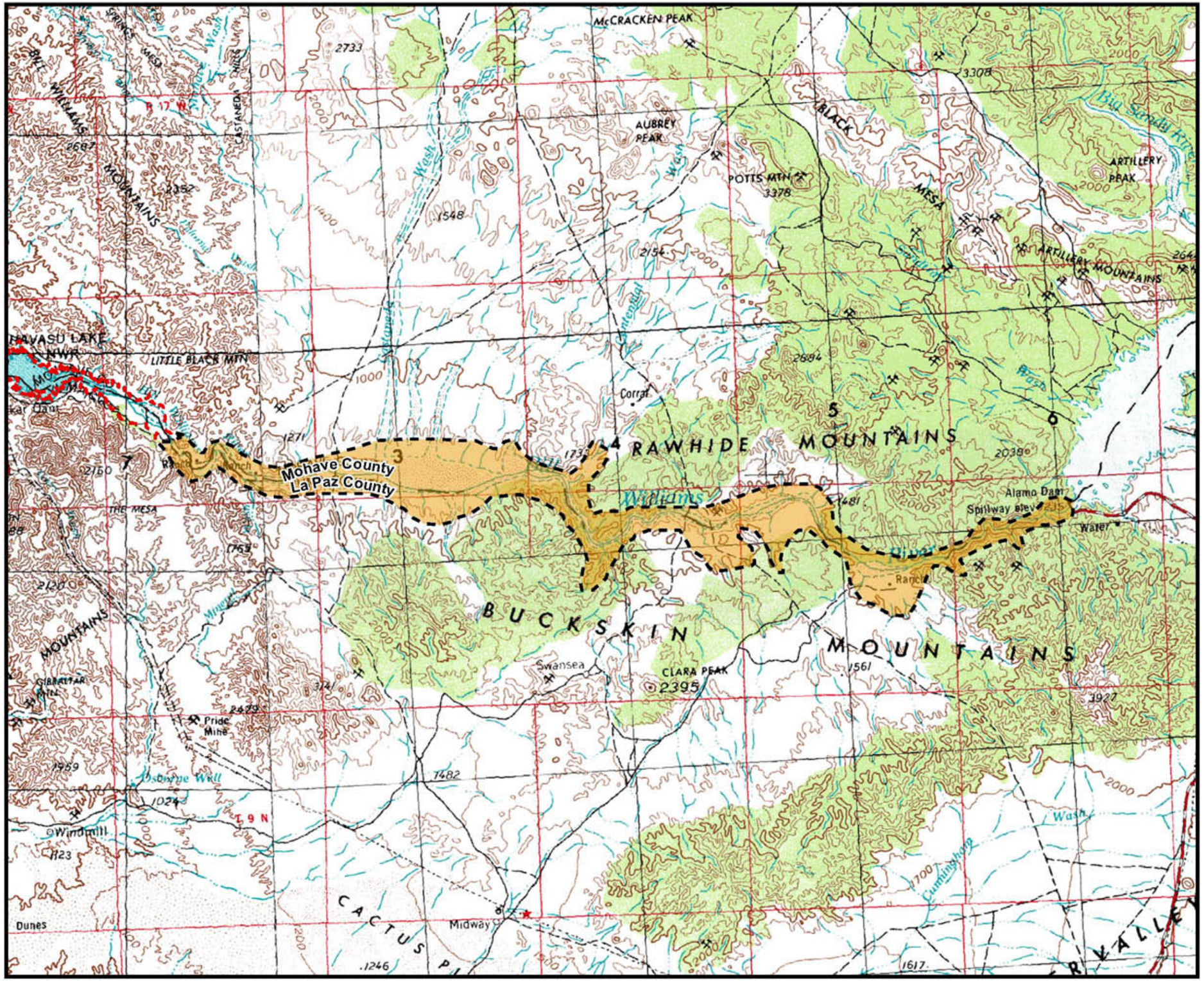

Planning Area Boundary

Bill Williams River Off-Site Conservation Areas

0 8 Miles

Figure 2.1-13.

Bill Williams River Off-Site Conservation Area

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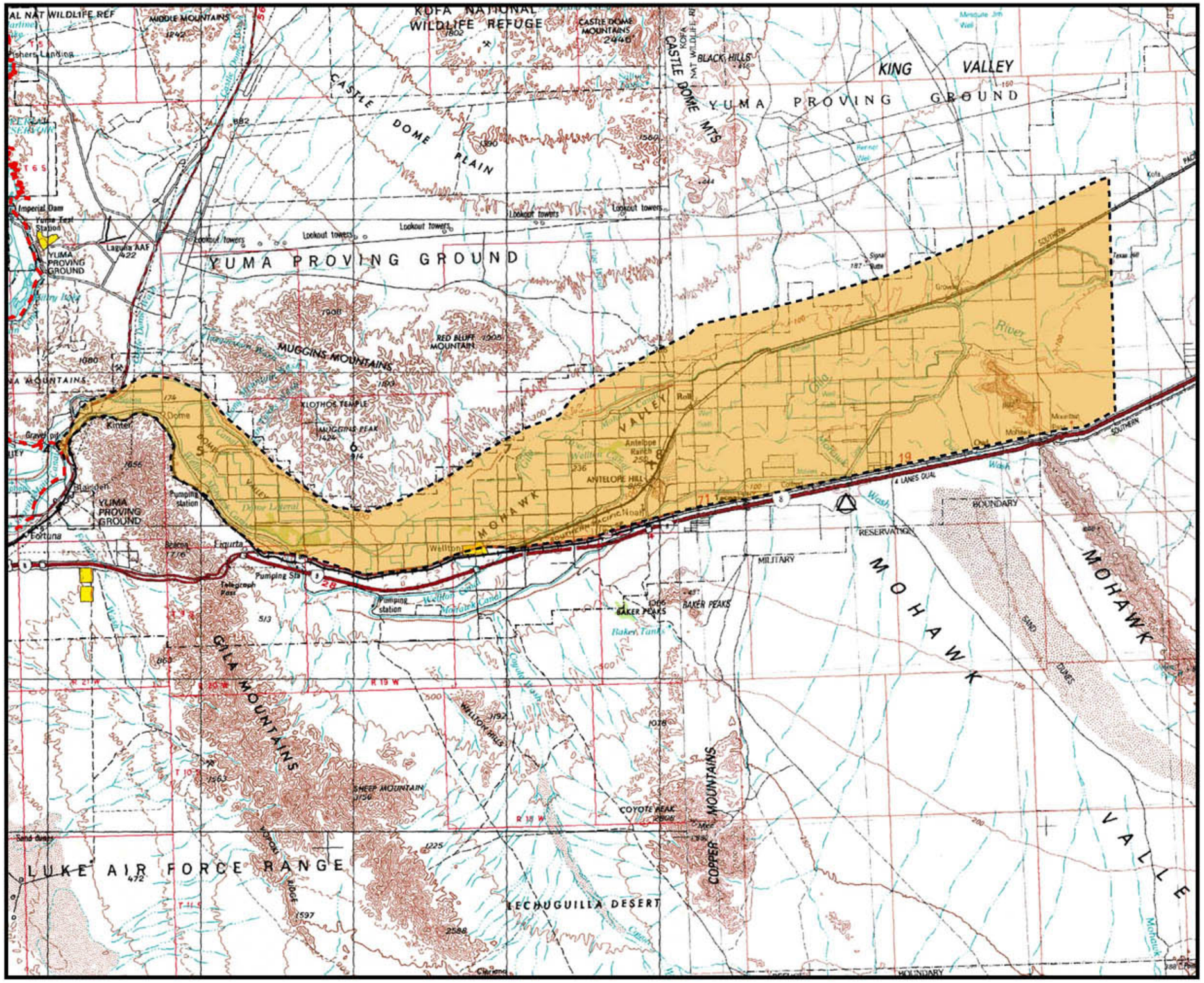

Planning Area Boundary

Gila River Off-Site Conservation Areas

0 10 Miles

Figure 2.1-14.

Lower Gila River Off-Site Conservation Area

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Table 2.1-10. Land Ownership in the Off-Site Conservation Areas (Acres)

Land Owner	*Lower Muddy and Virgin Rivers*	*Lower Bill Williams River*	*Lower Gila River Valley*
U.S. Bureau of Reclamation	0	0	0
U.S. Fish & Wildlife Service	0	2,187	0
Bureau of Land Management	7,524	10,004	45,003
U.S. Forest Service	22	0	0
Department of Defense	0	0	4,176
State	2,321	1,773	10,230
Private	7,958	7,426	92,716
National Park Service	318	0	0
Unknown	0	0	10
Acreage Totals	**18,142**	**21,390**	**152,135**

- Reclamation's (USBR 1999a) *Long Term Restoration Program for the Historical Southwestern Willow Flycatcher (Empidonax traillii extimus) Habitat along the Lower Colorado River* (Response to the Service pursuant to Reasonable and Prudent Alternative #11 from the 1997 BO).
- Other documents as cited.

2.1.4.1 Lower Muddy and Virgin Rivers

The areas included in this off-site conservation area include large acreages of land in private ownership that surrounds riverine aquatic and riparian habitat. Within both privately and publicly held lands there are numerous areas of opportunity for creating and/or maintaining aquatic and riparian habitat. These areas include existing and potential southwestern willow flycatcher habitat that is important to the recovery of the species (USFWS 2002d). Previously

identified conservation opportunities include 620 acres of potential habitat for southwestern willow flycatcher on private lands along a 15-mile stretch of the Virgin River upstream from Lake Mead to the Overton Wildlife Management area (USBR 1999a). Similarly, extensive private lands exist along the lower Muddy River in Moapa Valley.

This off-site conservation area includes habitat conservation opportunities for a number of species that are not known to occur in the other two areas: the desert pocket mouse; the relict leopard frog; and MacNeill's sootywing skipper. Conservation actions within this area would accordingly give priority to meeting the needs of these species. This area also contains two Federal- and Nevada-listed endangered fish species that are not covered by the proposed Conservation Plan: the woundfin (*Plagopterus argentisimus*) and Virgin River chub (*Gila seminuda*).

The covered species that occur or are likely to occur in each of the off-site conservation areas and would benefit from habitat creation and maintenance efforts are shown on Table 2.1-11.

Table 2.1-11. Species for which Habitat Establishment or Maintenance Could Occur in Each of the Off-Site Conservation Areas

Species Name	*Lower Muddy and Virgin Rivers*	*Lower Bill Williams River*	*Lower Gila River Valley*
Pale Townsend's big-eared bat	X	X	
Western yellow bat	X	X	X
Western red bat	X	X	X
California leaf-nosed bat	X	X	X
Desert pocket mouse	X		
Colorado River cotton rat		X	
Yuma hispid cotton rat			X
Western least bittern	X	X	X
Yuma clapper rail	X	X	X
California black rail		X	X
Western yellow-billed cuckoo	X	X	X
Gilded flicker		X	X
Gila woodpecker		X	X
Southwestern willow flycatcher	X	X	X
Vermilion flycatcher	X	X	X
Arizona Bell's vireo	X	X	X
Sonoran yellow warbler	X	X	X
Summer tanager	X	X	X
Elf owl		X	
Relict leopard frog	X		
Lowland leopard frog		X	
MacNeill's sootywing skipper	X		
Source: NNHP 2000; Marshall et al. 2000; see also species information included in the LCR MSCP HCP			

Water Supply

The Law of the River enjoins the Secretary from charging water use on the tributaries against a state's apportionment. In the case of the Muddy and Virgin rivers, laws of the State of Nevada govern the diversion and use of water. The doctrine of prior appropriation governs surface water rights in Nevada. An appropriative right is the right to divert a specified quantity of water at a specified point of diversion for reasonable and beneficial uses at a specified place of use for a specified manner of use. Appropriative rights are generally "first-in-time, first-in-right"; that is, one appropriative right has priority over appropriative rights established later. Water diverted under an appropriative right may be used on lands not contiguous with the watercourse and on lands outside of the watershed, and appropriative rights may authorize the seasonal storage of water. Before 1905, appropriative rights could be established simply by diverting water and applying it to the beneficial use. In 1905, the Nevada State Legislature enacted the process for establishing appropriative rights. The Nevada State Engineer through the Nevada Division of Water Resources (NDWR) administers all surface water rights in the

state. An appropriative water right granted by NDWR is required to divert and consumptively use water in the State of Nevada. Nevada has established procedures for the transfer of appropriative water rights and the transfer of a place of use for a water right (see Title 48, Chapter 533 of the Nevada Revised Statutes).

The NDWR had adjudicated both the Virgin and Muddy rivers. The adjudication process in Nevada focuses on verifying and quantifying pre-statutory water rights, as well as Native American Indian and Federal reserved water rights. An adjudication of surface water claims, other than claims of Native American Indian or Federal reserved rights, involves those rights established before the enactment of Nevada's statutory water law in 1905. Both the Virgin and Muddy rivers are considered "fully appropriated" or "fully designated" meaning all flows in the river have been appropriated to a water right holder and no additional water is available for a new appropriative water right.

LCR MSCP parties would obtain Virgin River and Muddy River waters for implementing the Conservation Plan projects from various sources in accordance with Nevada law and in coordination with the Nevada parties to the LCR MSCP whose water rights may be affected by the use. The legal structure governing water rights within Nevada would ensure that these uses would not increase the amount of Virgin River and Muddy River water used beyond existing apportionments. The geographic scope of Alternative 4 (Figure 2.1-12) would ensure that Virgin River and Muddy River water that would be used by the LCR MSCP is used within the respective historic floodplain of each river.

2.1.4.2 Lower Bill Williams River

The area of interest includes the Bill Williams NWR, where riparian vegetation restoration and management efforts are ongoing. Planet Ranch, owned by the City of Scottsdale, includes 8,400 acres, of which 2,300 acres are within the floodplain. It surrounds existing and potential riparian and aquatic habitats upstream of the refuge and includes water rights. The Bill Williams River is one of the key Management Units identified in the Service's (2002d) Recovery Plan for the southwestern willow flycatcher. Additionally, The Nature Conservancy (TNC) (in Marshall et al. 2000) identified the Bill Williams Complex, including the reach of the river under consideration here, as harboring a large number of regionally important species and habitats, making it one of the priority sites for the conservation of biodiversity. Creation of cottonwood-willow riparian habitat and honey mesquite would be given priority in this off-site conservation area.

Water Supply

As discussed above, the Law of the River only governs the diversion and use of water on the mainstream of the Colorado River. The laws of the State of Arizona govern the diversion and use of water from the Bill Williams River. The doctrine of prior appropriation (described above) also governs surface water rights in Arizona (see Title 45, Chapter 1 of the Arizona Revised Statutes). Before June 1919, appropriative rights could be established simply by diverting water and applying it to the beneficial use, or by posting a notice and recording a water right claim with the county recorder. The Arizona State Legislature enacted the Public Water Code in 1919 and established a procedure for obtaining appropriative rights under the Arizona Water Code. The Water Rights Registration Act of 1974 established a procedure for registering water rights

that existed prior to June 1919. Water rights may also be established pursuant to the Stockpond Registration Act of 1977, for stockponds constructed after June 12, 1919 and prior to August 27, 1977. The Arizona Department of Water Resources (ADWR) now administers all surface water rights in the state. To avoid abandonment and subsequent forfeiture of an appropriative water right granted by the state the rightholder is required to beneficially use that water in the State of Arizona. Arizona has established procedures for the transfer or exchange of surface water rights and the transfer of a place of use for a water right (see Title 45, Chapters 1 and 4 of the Arizona Revised Statutes). The Bill Williams River is considered fully appropriated.

LCR MSCP parties would obtain Bill Williams River water for implementing the Conservation Plan projects from various sources in accordance with Arizona law and in coordination with the Arizona parties to the LCR MSCP whose water rights may be affected by the use. The legal structure governing water rights within Arizona would ensure that these uses would not increase the amount of Bill Williams River water used beyond existing apportionments. The geographic scope of Alternative 4 (Figure 2.1-13) would ensure that Bill Williams River water that would be used by the LCR MSCP is used within the historic floodplain of the river.

2.1.4.3 Lower Gila River

Reclamation (1999a) identified promising opportunities for riparian restoration and management to benefit willow flycatcher in newly reestablishing areas of cottonwood-willow near Wellton. Tacna Marsh is one of the priority sites identified by TNC for the conservation of biodiversity (Marshall et al. 2000) and includes extensive marshes that provide habitat for Western least bittern and Yuma clapper rail.

The lower Gila River Valley encompasses habitat and conservation opportunities for southern species that are not known or likely to occur at the other sites, including the Yuma hispid cotton rat, flat-tailed horned lizard, and Colorado River toad. Conservation actions in this area would give priority to the needs of these species, along with the establishment of cottonwood-willow, honey-mesquite, and marsh habitats.

Water Supply

Water for irrigation along the lower Gila River is Colorado River mainstem water, and the lower Gila River conveys irrigation return flows back to the Colorado River. Therefore, the use of water for LCR MSCP conservation projects in this area must comply with the Law of the River. LCR MSCP parties would obtain Colorado River water to meet these requirements from various sources in accordance with the Law of the River and in coordination with the Lower Basin State(s) whose apportionment may be affected by the use. The legal structure governing the Colorado River would ensure that these uses would not increase the amount of water used in the lower Colorado River basin beyond existing entitlements. The geographic scope of Alternative 4 (Figure 2.1-14) would ensure that Colorado River water that would be used by the LCR MSCP is used within the historic floodplain of the Gila River, a tributary of the lower Colorado River.

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

During the development of the proposed Conservation Plan and the public scoping process, several concepts were proposed as potential alternatives to the proposed action. These alternatives were eliminated from detailed analysis because they did not substantially meet the goals and objectives of the LCR MSCP, did not provide a basis for issuance of incidental take authorizations pursuant to the ESA, or they resulted in potentially greater environmental consequences. The alternatives that were identified but eliminated from consideration include the following:

- Alternative A: Re-operation of the LCR without Modification of Existing Structures;
- Alternative B: Dam Removal;
- Alternative C: Removal of Banklines, Levees, and Similar Modifications;
- Alternative D: Use of Conserved Water for Environmental Purposes on the LCR;
- Alternative E: Larger-Scale Conservation Plan; and
- Alternative F: Longer or Shorter Permit Duration.

2.2.1 Operational or Structural Changes to the Lower Colorado River

Comments provided during the 1999 and 2000 scoping sessions identified a number of measures that would result in potential changes to the current environment along the LCR intended to reduce or eliminate the impacts to sensitive species from existing structural modifications and ongoing operational practices. These are not alternatives to the proposed action (implementation of a Conservation Plan and issuance of a section 10(a)(1)(B) permit), but they have been included for discussion because they were raised during scoping. The suggested measures include re-establishing the historic hydrograph and sediment regime of the LCR; removing, relocating, or destabilizing many of the existing banklines, levees, and other structures along the river; removing one or more of the major dams on the mainstem of the river; requiring more water conservation, and developing alternative water sources in coastal Southern California in order to divert less water from the Colorado River system. These measures were combined into four alternatives: (A) re-operation of the LCR without modifications to existing structures, (B) removal of dams on the LCR, (C) removal or modification of banklines and levees on the LCR, and (D) reducing demand for Colorado River water and dedicating the conserved Colorado River water to environmental uses along the river.

2.2.1.1 Alternative A: Re-Operation of the Lower Colorado River without Modifications to Existing Structures

This alternative would include the modification of current LCR operations from Hoover Dam to Morelos Diversion Dam for the benefit of species and habitats throughout the planning area. It would involve modifying releases of water from the dams along the LCR to better mimic the historic hydrograph. Figure 2.2-1 shows monthly average flows below Hoover Dam from January 1906 to January 1935 (prior to the beginning of storage in Lake Mead in February 1935).

These flows represent the historic (pre-dam) hydrograph. As shown on Figure 2.2-1, the average of all the monthly average flows over this time period was approximately 21,950 cubic feet per second (cfs), and the maximum of all the monthly average flows was approximately 129,120 cfs (June 1920). Because this is based on monthly average flows, actual daily flows could be substantially higher or lower than the monthly averages; thus, 120,000 cfs is used to represent the historic peak flow below Hoover Dam.

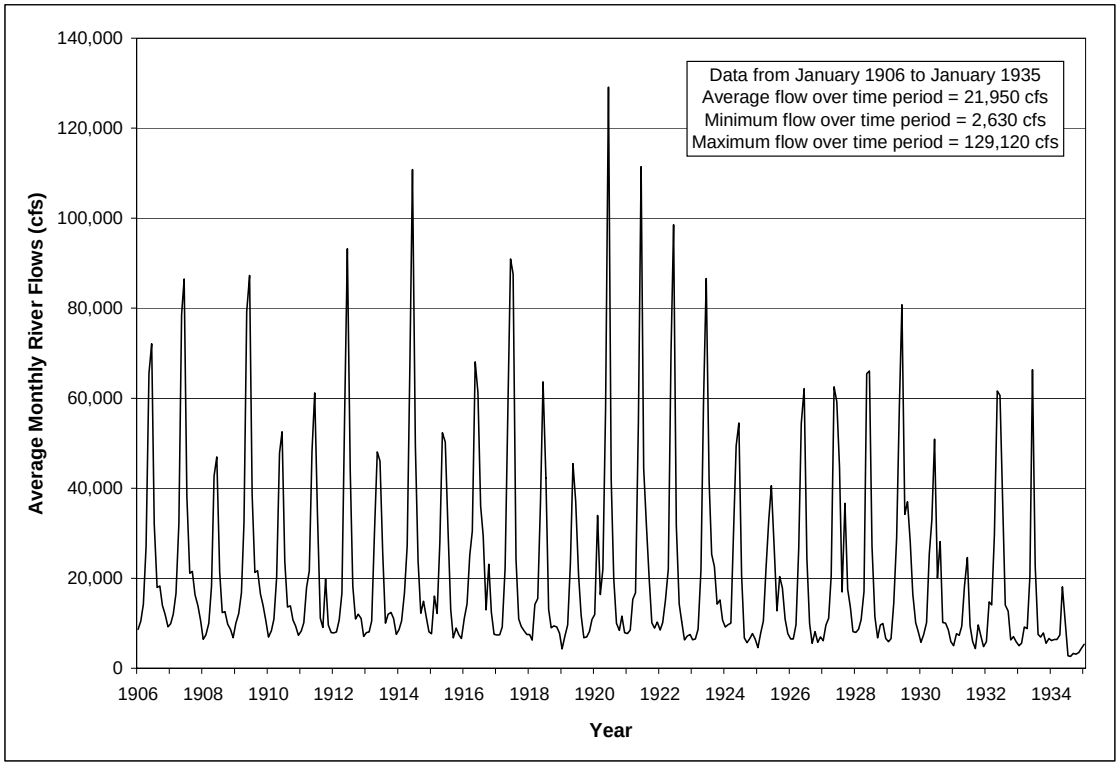

Figure 2.2-1. Average Monthly Colorado River Flows below Hoover Dam from January 1906 to January 1935

The intent of this alternative would be to release water in sufficient volumes and duration to inundate key portions of the historic floodplain to induce restoration of some measure of natural riverine function to selected reaches (based upon ecological or biological criteria) during the 50-year implementation period. Modifications to or removal of existing structures located within the river would not occur.

Several physical and institutional issues reduce or eliminate the effectiveness and feasibility of this alternative. This alternative has been eliminated for the following reasons:

1. Controlled releases[5] from Hoover Dam currently are limited to approximately 73,000 cfs by the physical constraints of the dam. This is far below the historic peak river flow of approximately 120,000 cfs. To release greater than 73,000 cfs from the dam, an uncontrolled release must be made. Uncontrolled releases (releases over the spillway) can range from a small amount up to 400,000 cfs in extreme flood conditions, depending on the lake level relative to the spillway crest. To release the additional approximately 50,000 cfs needed to obtain a total release of 120,000 cfs, water levels in Lake Mead must be at least 1212.5 feet above mean sea level (msl), or approximately 7.1 feet above the spillway crest (1205.4 feet above msl) [U. S. Army Corps of Engineers (USACE) 1982]. A release from the dam of 120,000 cfs is feasible, although this release can only occur under certain lake level conditions, which generally occur only after a series of wetter hydrologic years.

   To be effective for enhancement of habitat for aquatic and floodplain associated species, the 120,000 cfs release from Hoover Dam would need to be maintained through the LCR system (i.e., a corresponding release would need to be made at Davis and Parker dams) rather than re-captured in Lake Mojave or Lake Havasu. Controlled releases from Davis Dam currently are limited to about 44,000 cfs, of which a maximum of 31,000 cfs can be released through the powerplant. Uncontrolled releases from Davis Dam via the spillway can be up to 214,000 cfs, depending on lake level (USACE 1982). Controlled releases from Parker Dam are limited to 22,600 cfs, the amount of water that can be released through the powerplant. Uncontrolled releases from Parker Dam via the spillway can be up to 400,000 cfs. Overall, it would be physically feasible to release 120,000 cfs through the LCR dams; however, a release of this amount of water could result in damage to these structures (and the smaller structures such as Palo Verde Diversion Dam, Headgate Rock Dam, Imperial Dam, and others) along the LCR. It also would result in a substantial loss of revenue from power generation not realized. In addition, as discussed in number 3 below, under a release regime that would mimic the natural hydrograph of the river, a substantial amount of water could not be diverted for consumptive use since Lake Havasu is the last major reservoir in the LCR system that could re-capture all or the majority of the releases from Hoover Dam. It also should be noted that historic conditions included low flow rates, which may be insufficient to meet the requirements of the Law of the River for water delivery and power production.

2. The construction of Hoover Dam and other dams along the LCR has altered the sediment transport characteristics of the river, which has resulted in the lowering of the

5 Controlled releases are releases that occur through the dam structure. These releases can occur (1) by water flowing into the two southern-most intake towers, through the powerplant and discharged to the river, or bypassing the powerplant and discharged from the dam via two tunnels, one on each side of the river, that exits the canyon wall below the dam (referred to as the Canyon Wall Outlets), and (2) by water flowing into the northern-most intake towers, discharged via two tunnels, one on each side of the river, that also exists in the canyon wall below the dam (referred to as the Stoney Gates). The Stoney Gates and Canyon Wall Outlets are only used in an emergency or in flood conditions (USACE 1982). The present powerplant flow-through capacity at Hoover Dam is 49,000 cfs; releases above this amount (up to the maximum controlled release of 73,000 cfs) that are made through the Stoney Gates or Canyon Wall Outlets cannot be used to generate electricity. Hoover Dam has two spillways, one on each side of the river that spill into 50-foot diameter tunnels and eventually discharge into the river. With the spillway gates lowered and the lake at an elevation equivalent to the top of the gates in the raised position (about elevation 1221.4 feet above msl), total discharge capacity of the spillways is 184,000 cfs (USACE 1982). With the lake at the maximum design elevation 1,229 feet above msl and the gates in the lowered position, up to 400,000 cfs can be discharged (USACE 1982).

river bed and water surface, thereby substantially increasing the flows needed to achieve overbank flooding. This change is especially pronounced in the river reaches below Davis Dam. For example, for a few miles below both Davis and Parker dams, the sediment-deficient water released from each dam has resulted in degradation (erosion) of the channel bed, resulting in an incised and armored channel (overall lowering of the elevation of the channel and increase in the size of the bed material).

Hydrologic and hydraulic analyses performed by Reclamation indicate that flows of 50,000 cfs would be the threshold of overbank inundation for most of the undeveloped portions of the river system (those with natural or unarmored banklines). Conversely, in other areas of the river, the change in the sediment transport characteristics of the river has resulted in aggradation of the channel with the deposition of material due to a variety of reasons including, slowed river flows at the upstream end of reservoirs. This has resulted in an overall increase in the bed and water surface elevation of the channel and a reduction in the channel capacity. In the Needles area, the design flood of the levees is 70,000 cfs; however, due to sediment aggradation, flows above 30,000 cfs cause property damage (USACE 1982).

Property damage and flooding are also a concern along the Parker Strip (the reach from Parker Dam to Headgate Rock Dam), where the levee design flow is 50,000 cfs, but the popularity of this reach for recreation and land use planning decisions have resulted in development that would be damaged at a flow of 19,000 to 20,000 cfs (USACE 1982). In addition, property damage occurs at flows above approximately 38,000 cfs in the Blythe area, and at about 16,000 cfs in the Yuma area where development has occurred within the levee system and a substantial amount of sediment has been deposited in the area due to the 1993 Gila River flood (USACE 1982; USBR 1997).

Flows above these values identified above, or above those imposed by the channel capacity (approximately 40,000 to 50,000 cfs or greater with the exception of the limitations noted above) would result in flooding and substantial property damage. Due to the depositional and erosion characteristics of the river, it is not possible to release a flow of greater than 50,000 cfs for overbank inundation without causing substantial flooding and property damage. For example, a release of 50,000 cfs from Davis Dam would likely result in overbank inundation in the Topock area (where overbank inundation has the potential to restore some of the sediment transport and fluvial processes of the river), but would result in flooding and property damage in the Needles area. Marinas and other recreational facilities along the river could be damaged by large releases. In addition, flooding in agricultural and urban areas along the river would result in property damage and increased risk of injury or loss of life. Thus, the ability of a particular water release to produce overbank flows, continuously wetted riparian lands, and other effects required to produce beneficial restoration effects is not feasible under current conditions in the absence of significant damage to the human environment. In addition, the difference between the historic river flow and current release rate would result in a substantial difference in the physical characteristics of the river, such as the amount of sediment transported and the river's ability to overflow banks (other factors would contribute to the latter, as well). In some reaches of the river, these changes would be favorable (such as flushing sediment downstream and overbank

scour and deposition that benefits riparian ecosystem functions), while in other areas of the river, these changes may not be desirable (such as deposition of flushed sediment that reduce existing channel capacity).

3. Due to the limited storage capacity of the reservoirs in the LCR system (with the exception of Lake Mead) and the operation of these reservoirs to limit water level fluctuations, large releases from these reservoirs likely could not be re-captured and stored in downstream reservoirs for subsequent diversion by downstream water diverters. Since the water likely could not be recaptured, it would flow over the International Boundary and would be lost to the diverters who have a legal right to the water. This would be inconsistent with the Law of the River. In addition, the loss of the water over the International Boundary would reduce the total amount of water stored in the LCR system, reducing the amount of water available (in that year and in future years) for diversion by those who have a legal right to the water[6]. These releases would also result in a loss of potential power generation, because a substantial amount of water released would likely have to be released through the spillways of the LCR dams and would not generate power. Depending on the amount and rate of flow over the International Boundary, flooding and property damage could occur in Mexico as a result of these releases.

2.2.1.2 Alternative B: Dam Removal

This alternative would include the removal of the dams along the LCR for the benefit of species and as a mechanism to enhance and restore habitats throughout the planning area. The concept of removing the dams along the LCR was eliminated for a number of reasons:

System-wide dam removal would essentially eliminate the use of Colorado River water for municipal, agricultural use in both the United States, particularly in the major metropolitan centers of Las Vegas, Los Angeles/San Diego, Phoenix, and Tucson, and Mexico. Loss of this water and power resource would reduce the current overall capacity of these nations to produce goods and services. It also could result in the relocating of approximately 25 million residents who depend on this water supply for domestic uses, which would increase environmental impacts to other communities. Additionally, the agricultural production derived from farming enterprises in the Mohave, Parker, Palo Verde, Cibola, Yuma, Imperial, and Coachella valleys would be curtailed, if not eliminated, because of lack of reliable water supply, resulting in billions of dollars of economic impact to the local, regional, and national economies. Removing the dams also would prevent the management of water flow to generate hydroelectric power. Removal of dams would also eliminate existing reservoirs and associated water-based recreation in these reservoirs, resulting in a substantial economic loss for many communities along the river.

System-wide dam removal would result in the re-establishment of pre-development river flows (refer to Figure 2.2-1 for pre-development river flows). Under this alternative the ability to

6 Under Article 10(b) of the 1944 Water Treaty, Mexico was allotted "any other quantities arriving at the Mexican points of diversion." Any mainstream Colorado River water that reaches Morelos Diversion Dam is under the jurisdiction of Mexico, and is no longer available for diversion or consumptive use by water users in the United States.

regulate river flows, including the reduction of peak flood flows, would be lost. Because river flows would essentially be "uncontrolled," and because the levee system would not be able to protect existing communities and agricultural areas along the LCR (refer to number 2 of section 2.2.1.1, above, for limitations of the existing levee system), substantial flooding would occur. Removing the dams would have a substantial effect on the human habitation and use of the riverine corridor along the LCR. Many communities, Indian reservations, and major agricultural districts are located within the historic floodplain of the LCR, predominately, from Davis Dam to the SIB. Removing the dams and subsequent restoration of the pre-development hydrograph would dramatically limit or eliminate all of these uses, again with severe economic consequences to the regional and national economies.

Substantial technological considerations such as the physical disassembling of the dam structures and power facilities, and environmental considerations such as removal of sediment trapped behind the dams and restoration of a substantial amount of area previously inundated would need to be overcome. Moreover, Alternative B would be extremely costly and would conflict with the Law of the River since it would remove dams that were authorized for a number of purposes, including river regulation, flood control and protection, improving navigation, providing for the storage and delivery of water, and for the generation of electrical energy. Dam removal would require significant new or amended legislation, modifications to the 1944 Water Treaty (which required the construction of Davis Dam), and would also require modifications to various other components of the Law of the River.

Dam removal would result in considerable changes to the current ecosystem, which has developed in response to the hydrologic regime imposed by the dams. Flows would become more variable and seasonal, and it is possible that large areas of existing vegetation could be eliminated by flooding. It also is possible that some currently vegetated areas that are sustained by releases from the dams would dry up. Some areas could be colonized with native species, such as cottonwood-willow; however, this probably would not prevent invasive species such as saltcedar from attaining dominance.

2.2.1.3 Alternative C: Removal of Banklines, Levees, and other Modifications to the Lower Colorado River

Alternative C was eliminated for a number of technical, social, economic, environmental, and legal reasons. The ability or inability to remove or otherwise modify existing bankline stabilization structures to permit periodic flooding of the former river channel and floodplain terraces is constrained by numerous factors affecting the modern LCR channel. Principal among these factors is the reduction in peak discharge from historical rates caused by impoundment, which has altered the sediment transport characteristics of the river. As described under number 2 in section 2.2.1.1, this has result in degradation, incision, and armoring of the channel in some areas, and aggradation of the channel in other areas. Degradation of the channel has sharply reduced the potential for river stage to rise to an elevation sufficient to flood riparian plant communities during an appropriate season. Conversely, aggradation of the channel has increased the potential for the river stage to rise to an elevation sufficient to flood riparian plant communities during an appropriate season.

The areas of degradation and aggradation of the channel do not necessarily correspond with areas where overbank flooding would be desirable. Additionally, the relatively consistent

maximum dam releases have resulted in a well-defined river channel making overbank flooding under the normal operations of the river extremely infrequent. Under these normal operations, the removal of banklines, levees, and other channel modifications would result in a limited amount of additional overbank flooding and would have minimal benefits for riparian plant communities. However, these features were constructed to protect surrounding communities and farmlands from flooding, and under higher than normal dam releases the removal of banklines, levees, and other channel modifications would result in overbank flooding that may benefit riparian plant communities but could result in substantial property damage. If the existing bankline and levee system were removed, property damage would occur at lower river flows (since the banklines are not there to help contain and redirect flood flows) than those identified under number 2 of section 2.2.1.1. Additionally, removal of banklines, levees, and other channel modifications would not be consistent with the Law of the River, and specifically with the Colorado River Front Work and Levee System Act, which authorized the construction, repair, and preservation of public works on the Colorado river for the purposes of controlling floods, improving navigation and regulating the flow of the river.

Removal of bankline stabilization has shown potential as a means of river restoration for rivers with favorable hydraulic gradients. Unfortunately, those favorable hydraulic profiles do not exist on the LCR and significant uncertainty exists regarding the potential effectiveness of using this approach alone for restoration. The response of the river to stabilization after completion of Hoover, Parker, and Davis dams provides insight into the potential effectiveness or ineffectiveness of simply removing stabilization works as a means of restoring riparian habitat on the LCR. Review of a sequence of historic aerial photography of the river enables a qualitative assessment of the response of the river to the reduced flow regime with and without levee and bankline stabilization to be performed.

The report prepared for *RPA Provision No. 14: Synthesis of Ecological Restoration Concepts for the Lower Colorado River* (CH2MHill 1999), described a qualitative assessment of the potential response of the river in near Parker to the reduced flow regime resulting from the construction and operation of Hoover Dam with and without bankline stabilization. The report evaluated the ability of a non-stabilized section of the LCR to meander from 1902 to 1997; banklines in this area were not stabilized or modified until approximately 1995.

The analysis demonstrated the uncertainty about the effectiveness of bankline stabilization removal as a restoration technique in the LCR. A comparison between the 1902 depiction of the river and the 1942 aerial photograph clearly illustrates that high flood events in conjunction with tremendous sediment loads were fundamental to the reshaping and reconfiguration of the river. Since that time, the 1983 event was the only flood of magnitude, and the river has shown little variation in location and size. Channel widths have remained the same or are narrower, and the channel locations have not changed. The report concludes that:

> Without the hydraulic influence of extreme floods and high sediment loads, little change in channel morphometry can be expected, and none of the fluvial processes important to natural riparian habitat dynamics can take place (e.g., point bar and meander formation and channel erosion and aggradation). These results point to the limitations inherent to attempts to reflood the river floodplain of the LCR [lower Colorado River] under the current hydrologic regime. These

results can be extrapolated to other stabilized reaches of the LCR [lower Colorado River] (USBR 1999, page 2-6).

2.2.1.4 *Alternative D: Use of Conserved Water for Environmental Uses on the Lower Colorado River*

The key elements of this alternative include (1) the implementation of water conservation measures, (2) development of other water supplies for delivery to these districts, and (3) the dedication of the conserved Colorado River water to instream and other environmental uses. This alternative has been eliminated for the following reasons.

Due to competing demands for water and increasing environmental concerns, the affected water districts are already implementing a variety of water conservation measures and developing alternative water sources. Representative types of measures that are being implemented in urban areas include: water conservation, including the use of BMPs, increased storm water conservation through increased levels of groundwater replenishment; enhanced local groundwater recovery; desalination; regional surface reservoir storage; water marketing from other sources; and water recycling. Conservation measures implemented in agricultural areas include measures such as laser-leveling of fields, multi-sloping of fields, the use of drip irrigation, irrigation scheduling, water measurement, soil moisture measurements, conveyance lining, and fallowing. Even if additional conservation measures were implemented, it may not be feasible to apply additional water for habitat conservation because more Colorado River water is currently allocated than is available. Moreover, if additional conserved water were made available, it would go the next priority use and would not be available for habitat conservation.

Additionally, this alternative would not be consistent with the Law of the River. Under the Law of the River, and specifically, under Article II of the Decree, the Secretary is enjoined from releasing or delivering water other than to water users in the United States with valid contracts made pursuant to Section 5 of the BCPA, or to specified Secretarial reservations of water. The Law of the River requires water to be "beneficially used as reasonably required" (see 44 C.F.R. Part 417), and does not recognize instream flows a beneficial use of water. Additionally, based on the Law of the River, any water not used by one Lower Division State can be used by another Lower Division State. Likewise, within each Lower Division State, any water not used by one Colorado River Contractor can be used by another Colorado River Contractor within the state, up to the Contractor's contracted amount, based on the specific allocation of Colorado River within that particular state. Overall, a larger amount of Colorado River water is contracted for than is available for diversion under normal years. Instream flows for environmental uses would require that all Contractors in the Lower Division States and the Lower Division States themselves forebear their right to use this water.

2.2.2 Alternative Conservation Plans

2.2.2.1 *Alternative E: Larger-Scale Conservation Plan*

This alternative was developed by the Service in the course of defining the proposed action. It would not attempt to restore the LCR to its pre-development state; rather, it would conserve lost and degraded habitat through the restoration of viable, self-sustaining populations of

native fish and wildlife species to the river's ecosystem. This strategy would be focused on ensuring that native species are present in the river's ecosystem in sufficient numbers to ensure that they are part of the ecosystem and are not maintained strictly as refugia populations. This strategy would construct reasonably large patches of suitable habitat for riparian, marsh, and aquatic species spread up and down the river connected by pathways for migration. A total of approximately 70,000 acres of established or protected habitat would be established for the target species. Patches could be located along the LCR or in nearby areas, such as the Bill Williams and Virgin rivers. Fish species covered by this alternative include the bonytail, razorback sucker, pikeminnow, desert pupfish, and flannelmouth sucker. This alternative also would provide conservation for the following bird species: Yuma clapper rail, southwestern willow flycatcher, yellow-billed cuckoo, and black rail.

This alternative was eliminated for a number of reasons. First, there is not a requirement for the LCR MSCP to provide for the recovery of listed species; therefore, this alternative provides more conservation than is needed, and the costs would be so high as to render this alternative infeasible from an economic standpoint. (Based solely on the amount of acreage involved, costs are estimated to be between eight and nine times those of the Conservation Plan.) Since substantially more conservation would be required than under the Conservation Plan, it would not reduce or eliminate the significant impacts of the proposed action to agricultural resources, air quality, biological resources, cultural resources, and noise. Rather, it would result in greater construction-related or long-term impacts on these resources, as well as on environmental justice, hazards and hazardous materials, hydrology, Indian Trust Assets (ITAs), recreational resources, socioeconomics, topography, geology, and soils, and it could have greater impacts on Mexico (transboundary impacts).

2.2.2.2 *Alternative F: Shorter or Longer Permit Duration*

This alternative was eliminated because it does not meet the project goals and objectives. The Service's Five-Point Policy for HCPs (65 FR 106, June 1, 2000) identifies factors to consider when determining the duration of incidental take permits, including:

- The duration of the covered activities and effects on covered species;
- The time required to implement and acquire benefits from conservation measures; and
- The period that may be required to develop sufficient information through monitoring and research to address biological uncertainties.

Shortening the permit duration (e.g., to 25 or 35 years) was rejected because many of the covered activities are ongoing and continuing annually, and it takes time for replacement habitat to develop. A lesser period of time might not allow for implementation of covered activities or the successful implementation of the conservation plan. Increasing the permit duration (e.g., to 75 or 100 years) was rejected because of the uncertainties involved with implementing a conservation plan so far in the future. Fifty years was selected as a reasonable period of time for forecasting, planning, and implementing the Conservation Plan.

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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The following sections describe the environmental resources that could be affected by the proposed action, potential impacts to those resources, and mitigation measures that would reduce the severity of those impacts. The resources include those that are typically evaluated under both NEPA and CEQA, as well as those that are generally required for NEPA documents, such as socioeconomics, transboundary impacts, environmental justice, and energy and depletable resources. Significance criteria for evaluating impacts to resources that are considered under both NEPA and CEQA have been provided. They are based on CEQA Guidelines, Appendix G, and modified where appropriate to address impacts specific to the proposed action. NEPA does not require the use of specific significance criteria, and specifies that the description of their impacts is to be based on the context and intensity of the impacts and on the relationship between them. Thus, no significance criteria have been provided for those resources required only in an EIS.

Detailed analyses were not performed for resources for which there would be only minor impacts or no potential for environmental impacts. These include energy and depletable resources (section 3.6), population and housing (section 3.13), public utilities and services (section 3.14), and transportation (section 3.19). Each of these sections contains an explanation regarding why impacts would not occur.

Sections addressing resources that are considered in detail include a description of the affected environment and the environmental consequences of each alternative evaluated. Where appropriate, individual descriptions of the affected environment are provided for the planning area (applicable to Alternatives 1-3) and the three off-site conservation areas (applicable to Alternative 4). Impacts to some resources, such as socioeconomics and air quality, may affect a broader region than others, and the description of the affected environment for these resources is necessarily broader, as well. Environmental consequences are identified for each alternative. Each impact (i.e., less than significant, significant, and beneficial impacts) is given an alphanumeric number. These discussions are preceded, where appropriate, by a description of impacts that were considered but found to be minor. Mitigation measures also are given an alphanumeric number and are provided where necessary. The discussion of mitigation measures is followed by description of the residual impacts that would occur after the implementation of the mitigation measures.

OVERVIEW OF THE PLANNING AREA

The planning area includes seven reaches of the LCR, extending from Lake Mead to the SIB, and includes Federal, state, tribal, and private lands. The planning area is bounded by La Paz, Mohave, and Yuma counties in Arizona; Imperial, Riverside, and San Bernardino counties in California; and Clark County, Nevada. Of the approximately 716,230 acres (1,119 square miles) in the seven reaches of the LCR planning area, approximately 22,178 acres of urban/developed land are present, primarily in incorporated cities. These cities include Bullhead City, Lake Havasu City, Parker, San Luis, Somerton, and Yuma, Arizona; Blythe, and Needles, California;

and Laughlin, Nevada. Several Indian reservations are located along the LCR, as well, including those of the Chemehuevi, Cocopah, Colorado River Indian Tribes (CRIT), Fort Mojave, Fort Yuma-Quechan, and the Hualapai. The total population in the LCR planning area is approximately 106,000. Agriculture is one of the primary land uses in the planning area, comprising approximately 270,000 acres. The planning area also contains considerable open space and recreational uses, including a number of state and Federal parks and wildlife refuges.

Present conditions in the LCR are significantly different from historical conditions. The river is no longer free flowing and does not constitute a continuous ecosystem because of the many impoundments along its length. In addition, the hydrologic regime does not support extreme fluctuations mainly because of the presence of large, mainstem dams (e.g., Hoover Dam and Glen Canyon Dam) farther upstream, resulting in reduced natural backwaters and periods of inundation in adjacent floodplain lowlands. Reach 1 is defined by the boundary of Lake Mead when its water level is at 1,229 feet msl. Lake Mead, formed by Hoover Dam, traps Colorado River sediment not trapped in Lake Powell in its upper reaches, and the river downstream of the dam is relatively clear. Reach 2 extends from Hoover Dam to Davis Dam and is defined by the boundary of Lake Mohave when its water level is at 647 feet msl. Davis Dam and Lake Mohave were created to provide part of the capacity for water delivery to Mexico and to re-regulate fluctuating discharge from Hoover Dam. Additional sediments are trapped behind Davis Dam. Reach 3 extends from Davis Dam to Parker Dam and includes channelized river, a substantial marsh area, and Lake Havasu to its 450-foot msl. Immediately below Davis Dam, the system is characterized by a riverine reach controlled by the discharge from Davis Dam. Reach 4 extends from Parker Dam to Adobe Ruin and Reclamation's Cibola Gage. This reach is channelized. Reach 5 extends from southern extent of Cibola NWR and Reclamation's Cibola Gage to Imperial Dam. Imperial Dam created Imperial Reservoir and provides water to the Gila Gravity Main Canal in Arizona and the All-American Canal in California. Generally, Imperial Reservoir is warm and shallow. Reach 6 extends from Imperial Dam to the NIB and includes Laguna Dam, Mittry Lake, and the confluence with the Gila River. The Laguna Desilting Basin, which receives sediment from upstream sources, is periodically dredged. Flows in Reach 6 are minimal since mainstem water is diverted for irrigating agricultural lands. Reach 7 extends from the NIB to the SIB and includes Morelos Diversion Dam. Flows in this reach of the river vary. At times the lower part of the reach is dry. Cohen and Henges-Jeck (2001) reported average total flows in this reach of 22,000 af in non-flood years and 2,120,000 af in flood years. These flows are the result of seepage from Morelos Diversion Dam, flow releases from Morelos Diversion Dam (flood flows and excess water Mexico does not divert), irrigation return flows from Mexico, canal wasteways on the United States side of the border, and groundwater accumulation from both the United States and Mexico.

The vegetation within the planning area is also significantly different from historic conditions. Approximately 126,000 acres of woody riparian vegetation are present in the LCR planning area. Most of this is saltcedar (i.e., saltcedar, saltcedar–honey mesquite, and saltcedar–screwbean mesquite land cover types). Only 23,000 acres of native vegetative communities, including cottonwood-willow, honey mesquite, arrowweed, and atriplex, remain within the planning area. The LCR supports several hundred species of wildlife (birds, mammals, fish, reptiles, and amphibians), including both resident species and migratory visitors. A number of species that are Federally listed as threatened or endangered are known to occur or have the potential to occur along the LCR. Six of these are covered in the Conservation Plan. All of these

species also are listed by one or more states along the river. The Conservation Plan also includes six species that are state-listed but not Federally listed, 13 species that are designated as species of special concern or protected in one or more states, and two species that have no current regulatory status but could become listed over the 50-year life of the LCR MSCP. Four other species are included in the Conservation Plan as "evaluation species" that could be proposed for coverage under the section 10(a)(1)(B) permit in the future.

TECHNICAL ASSUMPTIONS REGARDING IMPLEMENTATION OF THE CONSERVATION PLAN

The following summarizes the technical assumptions used to assess potential impacts of implementation of the Conservation Plan. While specific conservation area establishment locations and design and construction details have yet to be developed, for purposes of assessing the proposed action's environmental impacts, these are considered to be reasonable assumptions about the range of actions that would be required, the general types of equipment that would be used, and the implementation schedule. Actual implementation may vary.

Location of Conservation Area Establishment Actions

Conservation area establishment actions could be implemented on a combination of Federal, state, tribal, and private lands using agricultural or undeveloped lands. Since specific sites have not been selected, it is not known how much development would occur on either private, public, or tribal lands; nor it is known to what extent agricultural or undeveloped lands would be used. The impact analysis in this EIS/EIR is based on the identification of the impacts that could potentially result under reasonably foreseeable worst-case scenarios from the implementation of the Conservation Plan, as well as the mitigation measures that would avoid, minimize, restore, reduce, or compensate for the potential impacts. For example, the analysis for impacts to agricultural and socio-economic resources assumes that the established conservation areas would be constructed on lands taken out of agricultural production for that purpose, although it is probable that non-agricultural lands would be used. Most conservation opportunities have been identified in Reaches 3-5 of the LCR due to the presence of existing habitat and suitable landforms. Other reaches include constraints, such as steep canyons, which limit the feasibility of conservation area establishment.

Construction Schedule

It is estimated that sites that currently are in agriculture and require minimal grading and infrastructure can be completed within approximately 3 years. Sites that require the removal of saltcedar, grading, and the installation of irrigation and other infrastructure likely would require up to five years. These durations include planning, design, and permitting. Actual construction would take considerably less time. Construction generally would take place during daylight hours any day of the week, although dredging would probably occur 24 hours a day.

Clearing and Grading

Habitat establishment would likely require modification to existing site conditions. Clearing would involve removing existing non-native vegetation, primarily with heavy equipment, such

as bulldozers with root plow attachments (use of prescribed fire to clear vegetation is addressed below). Actions would include clearing, deep plowing, root-ripping, tilling, and disking. Cleared vegetation could be trucked off-site and shredded and used as mulch. (Alternatively, it could be burned, as discussed below.) Undeveloped areas can be cleared at a rate of about 1-2.5 acres per day, depending on the density of existing vegetation. Agricultural lands can be cleared at a much faster rate. Hand clearing of some vegetation may occur on a limited basis using equipment such as weed-eaters. Additionally, chemical herbicides may be used to control non-native vegetation. Herbicides that are approved for use in the project area would be ordered for individual jobs and shipped to a licensed vendor, who would then apply them using accepted methods. Herbicides would be stored in accordance with appropriate standards at the field facilities described below or other existing facilities. They could be applied manually or aerially, depending on the size of the area to be cleared. Only vegetative material would be sprayed; herbicides would not be applied to open water. All state and Federal requirements to ensure public safety and environmental protection would be observed.

Grading would be required on both undeveloped and agricultural sites to provide suitable elevations for establishing habitat and to create access roads in some locations. Since agricultural land already is ready to plant and likely includes the necessary infrastructure, such as access roads and irrigation systems, it is assumed that agricultural sites would require approximately 1/5 of the grading of undeveloped sites (some grading would be needed to create mounds and depressions in order to provide micro-topographic diversity). Side slopes created for berms and access roads would be engineered for stability; the actual slope would depend upon the height of the slope and the composition of the graded material.

The BMPs of the state in which construction occurred would be used to control sedimentation in the vicinity of water bodies during ground-disturbing activities. Typical measures that could be used include the following:

- Providing for temporary pollution control measures such as dikes, basins, ditches, diversions, silt fences, and the application of straw and seed, to be functional prior to land disturbing activities;
- Minimizing the area to be cleared and graded to the extent possible;
- Constructing footings in water by the sheet pile cofferdam method and pumping water from within the dam to desilting ponds before returning it to the watercourse;
- Isolating the construction area by dikes and/or berms where necessary;
- Erecting barriers, covers, shields, and other protective devices as necessary to prevent any construction materials, equipment or contaminants/pollutants from falling or being thrown into a watercourse;
- Constructing drainage facilities with armoring when necessary to control erosion and sedimentation;
- Prohibiting the placement of oily or greasy substances originating from the contractor's operations where they would later enter a stream or watercourse;
- Storing and transporting fuel in appropriate safety containers.

- Mixing and loading hazardous materials in an accepted manner to prevent spills or leakage.
- Disposing of used containers in accordance with regulatory standards.

Prescribed Burns and Other Uses of Fire

Prescribed burns could be used to establish marshland approximately every seven to eight years. A less likely use of fire is to clear existing vegetation or, alternatively, to burn vegetation removed by mechanical methods. Prescribed burns would be conducted by the Interagency Fire Team (IFT), which is headed by the BLM. The Service and the BIA also are members of the IFT and are responsible for conducting prescribed burns on their own lands. Certain management practices would be followed prior to initiating prescribed burns, including developing measurable objectives, an approved prescription, and an escaped fire plan to be implemented in the event that a prescribed fire exceeded the limits of an approved prescription; using qualified personnel; identifying quantified ranges of conditions under which burns would be conducted (including such factors as wind direction and speed, relative humidity, temperature, atmospheric stability, and fuel moisture content); describing actions that would be taken if those conditions were exceeded; establishing a monitoring and documentation process; and establishing a review and approval process. All Federal, state, and local requirements would be followed, including air quality regulations, and coordination with the appropriate agencies would occur prior to initiating prescribed fires. Public notification also would occur at an appropriate interval before a fire was begun. Fires likely would be conducted in the late fall through early spring to avoid the breeding season of sensitive species and to take advantage of the optimal time for burning saltcedar and marsh vegetation.

Dredging

Hydraulic dredges would be used to establish 360 acres of backwaters. Amphibious trackhoes (excavators) would be used for clearing inlets and outlets. The exact size of backwaters would vary with site location, but for purposes of this analysis, it is assumed that individual backwaters would be a minimum of 10 acres each, and it is estimated that they would average about 6 feet in depth. Approximately 50 cubic yards (cy) per hour could be dredged. Dredged material could be disposed of onsite above the high-water mark and used for creating berms and contours or it could be sidecast into adjacent areas of the river. If dredged material were to be disposed at an upland site, it would be pumped into a bermed area, and the freshwater would be decanted and returned to the originating water body. Material discharged into the river eventually would be dredged as part of ongoing maintenance and disposed of at an upland site.

Field Facilities

Field facilities may be required, although the LCR MSCP participants would try to share existing facilities where possible. If not, no more than two facilities would be constructed, most likely in the Mohave Valley and Blythe. They could be constructed on private or public land in an already developed area. The facilities likely would consist of a small, prefabricated steel building that would serve as an office and an equipment yard to store tractors, dredges, or other heavy equipment and approved pesticides and fuel. These facilities would not be permanently

staffed; rather, they would be used on an as-needed basis. Routine maintenance of the stored equipment could be performed at the facilities. These facilities would require several acres at most and would be fenced. They likely would be constructed on bare ground or at an already developed and graded site. Thus, minimal grading would be required. A concrete truck would be required to pour the building foundation, and a small crew would be needed to assemble the building. A trencher would be required to extend underground utilities such as gas and waterlines. Power lines would be placed overhead. Other equipment would likely include a road motor grader, one to two front-end loaders, one to two dump trucks, a backhoe/excavator, a crane/boom truck, and a forklift truck. Construction likely would last from 1 to 3 months, depending on the size of the site and site conditions.

Infrastructure

It is likely that electric pumps would be used where possible (e.g., where power is readily available) to provide water for irrigation. Diesel pumps could be used, as well, however, and for this analysis it is assumed that roughly half would be electric and half would be diesel. Approximately 0.09 kilowatt hours (kWh) would be required for every 1,000 gallons of pumped water, and up to approximately 6 gallons of diesel would be used for each acre-foot of water. Diesel fuel would be delivered monthly and stored on-site in 500-1,000 gallon double-walled concrete tanks with spill containment.

Both above- and below-ground irrigation pipelines could be used. If the water delivery system were to be a temporary feature (i.e., 1-3 years) an aboveground system likely would be used. If the site would require periodic applications of water over the lifetime of the LCR MSCP, then a more permanent, belowground water delivery system would be used. Irrigation water also could be supplied via concrete-lined canals. Heavy equipment (articulating scrapers or towed cans) would be used to build up the areas identified for concrete canal systems. Road motor graders would be used to set finish grades. Front-end loaders and end dump trucks would assist with earth moving. Concrete slip forms and concrete trucks would place and form the concrete canal lining. Backhoes/excavators and forklifts would assist where necessary. Backhoes and trenchers would be used to construct irrigation pipelines.

Existing access roads would be used where possible. New access roads would be surfaced with gravel and would be sufficiently wide to allow access by maintenance vehicles and fire-fighting equipment (approximately 18 feet wide). Gravel likely would be transported to the site via dump trucks that hold between 10 and 22 cy of material, although larger, off-road vehicles could be used if necessary. It is estimated that 1-2, 22 cy belly dump truck, 1 front end loader, 1 water truck, and 1 road motor grader would be required to resurface 0.5 mile of road per day. It is estimated that 1 mile of roads per year would be constructed over a 20-30 year period.

Planting Methods

A variety of planting methods would be used, depending upon what was most cost-effective in a particular situation. Hydroseeding involves combining seed and mulch in a water truck with a rotating basket and physically spraying the seed on with a hose. Seed also could be placed in the water source if fields were to be flooded. Pole planting involves augering a hole and then hand or machine planting rooted stock or a cottonwood or willow pole. Another method involves attaching mechanized tree planters to a tractor that cuts a furrow, inserts a tree that has

been placed in a biodegradable container into the furrow, and pushes the dirt back in place. Under each method, only one piece of equipment would be required per site. The planting stock would originate from the LCR Valley, and most of it would be acquired from nurseries located in the general project area. Seeds would be collected from the local area.

Fish Rearing

If sufficient numbers of native endangered fishes cannot be produced by existing facilities for reintroduction into suitable LCR mainstream habitats, it is possible that the expansion of existing native fish production facilities would be required. This could involve the construction and maintenance of raceways and growout ponds. If needed, the ponds would be about 5-6 feet deep, lined with clay or plastic, and likely would not exceed 1 acre. The ponds likely would be dug by a crawler with dozer. All of these hatchery facilities would be constructed off-stream and it is possible that they could be above ground if pumping already were needed to provide water to the site, in which case excavation would not be required. This is not likely, however. Construction would likely last about 20-30 days. As needed, fish would be transported to the river in a hatchery truck.

Public Access

Public access to the established conservation areas would be highly restricted in order to protect the habitats and species that use them. Access could be limited by placing a wire cable across access roads, or in some cases fencing might be required. Access would not be restricted to any other portions of the planning area.

Long-Term Maintenance

The following measures would be implemented, as necessary.

- Dredging would be implemented if backwaters and marshes in conservation areas were lost due to flood-induced sedimentation. The description of dredging above is applicable to this measure.
- Land management and habitat establishment measures would be implemented in conservation areas to ensure the reestablishment of native vegetation through active management or natural processes in the event that terrestrial vegetation is lost to fire or other destructive event such as flooding. The types of measures that would be implemented would depend on how recovery proceeds. If the burned area revegetated with cottonwood-willow and mesquite, less active management would be needed. If saltcedar appeared, it would have to be removed, and revegetation generally would proceed as described above, although minimal dirt movement would be required and it is assumed that irrigation infrastructure still would be in place.
- Land management and habitat establishment measures would be implemented in conservation areas to ensure the establishment of the conservation area through active management or natural processes in the event of a toxic or hazardous substance spill. The specific types of measures that would be required would be dependent upon the nature of the spill. It may be necessary to remove soils, detoxify areas, and replant affected vegetation.

Other long-term maintenance actions may include tree trimming, non-native species control, spot replanting, diseased tree treatment, and road maintenance.

Employment

Construction could be performed either by Reclamation or independent contractors. Up to 30 workers could be involved in the construction of individual sites, but they all would not be present at the same time since they would be involved in different phases of work. The number of construction workers required would vary according to the type of construction activity involved. For example, preparing an agricultural site that was already leveled and contained the appropriate infrastructure, would require about three construction workers. Establishing or enhancing a specific habitat at an undeveloped site could take several workers to clear the site and six to eight workers to install infrastructure. Dredges would require two personnel per shift (in the absence of restrictions, dredges may operate 24 hours a day). The number of workers required for planting depends on the methods involved. Augering holes and placing plants in each hole could require 12-24 people. Mechanized tree planting could take 10-12 people.

Long-term maintenance and monitoring needs would require approximately 10 administrative staff; 9 planning, design, and engineering staff; and 8 conservation management and maintenance staff. Additionally, it is anticipated that one new law enforcement officer and one new wildland fire fighter would be provided, respectively, for every 5,000 and 2,500 acres of conserved land not already in public ownership. All new personnel would be stationed at existing facilities. Maintenance, law enforcement, and firefighting staff likely would be drawn from the local population. Monitoring and administrative staff would be stationed elsewhere and would make visits to the project sites as needed.

3.1 AESTHETICS

This section addresses the potential temporary aesthetic impacts resulting from construction and maintenance activities, as well as long-term impacts from the structures that could be constructed. Overall, impacts to visual resources would be beneficial since approximately 8,100 acres of conservation area would be established and returned to a more natural appearance.

3.1.1 Affected Environment

Visual resources consist of the natural and manmade features that give a particular environment its aesthetic qualities. These features may be natural appearing or modified by human activities. Together, they form the overall impression of an area, referred to as its *landscape character*. Landforms, water surfaces, vegetation, and manmade features are treated as characteristic of an area if they are inherent to the formation, structure, and function of the landscape. Landscape character is evaluated to assess whether a proposed project would appear compatible with the existing setting or would contrast noticeably with the setting and appear out of place.

Visual resources also have a social setting, which includes public values, goals, awareness, and concern regarding visual quality. Social setting is addressed as *visual sensitivity*, or the relative degree of public interest in visual resources and concern over adverse changes in the quality of that resource. Visual sensitivity is key in assessing how important an effect on the visual resource would be and whether it represents a significant impact. Recreational uses are generally considered to have high visual sensitivity, as are views from scenic routes or corridors, or along scenic highways and wilderness areas. The primary areas of concern generally are associated with changes to prominent topographic features, changes in the character of an area with high visual sensitivity, removal of vegetation, or blockage of public views of a visually sensitive landscape.

3.1.1.1 Lower Colorado River

Reach 1

This reach is characterized primarily by open waters of Lake Mead, Hoover Dam, and the surrounding natural and undeveloped land. Visually sensitive resources within this reach include the Lake Mead NRA and Grand Canyon National Park. Scenic routes in the project area include the Valley of Fire State Park scenic byway, which runs south of Interstate 15 (I-15) and north of Highway 93; and Highway 93, which crosses the Colorado River just below Hoover Dam. A popular scenic drive in the Lake Mead NRA is along the North Shore Road, which offers spectacular desert vistas. Visitors to the NRA also may experience scenic vistas from park roads, the lake surface, and while taking walks. Striking backdrops include deep canyons, narrow gorges, dry washes, sheer cliffs, distant mountain ranges, the lakes, colorful soils and rock formations, and mosaics of different vegetation. Panoramic vistas of the Muddy Mountains, the red rocks of Bowl of Fire, Bitter Springs Valley, and the Virgin Basin can be seen from the Northshore Summit Trail. From the water, noted visual resources include Iceberg Canyon in Lake Mead, with its steep, narrow gorges.

Reach 2

This reach is generally composed of undeveloped open space and open water, although Davis Dam is a prominent visual feature. The main visually sensitive resource within this reach is Lake Mohave, a narrow, 67-mile stretch of the Colorado River that is bounded for most of its length by the steep walls of Pyramid, Painted, Eldorado, and Black canyons. This area is for a variety of recreational activities, including fishing, boating, swimming, water skiing, camping, picnicking, exploring, auto touring, photography, many of which are enhanced by its scenic atmosphere.

Reach 3

This reach is composed of a mix of agriculture, developed land, riparian lands, saltcedar, desert scrub, and the open waters of Lake Havasu. It also includes Parker Dam, which is a prominent feature. Visually sensitive resources include Lake Havasu State Park (including views of the London Bridge) and the Havasu NWR, which includes Topock Gorge and Topock Marsh, and Bill Williams River NWR. Lake Havasu State Park includes a number of recreational opportunities, such as wildlife photography and viewing, hiking, backpacking, and boating, many of which are enhanced by the scenic environment present at the lake and surrounding areas. Havasu NWR contains a natural cottonwood-willow forest and a series of small lakes that comprise Topock Marsh and provides habitat for resident and migratory wildlife. This area is frequented by visitors who come to view wildlife, as well as appreciate the natural beauty of Topock Gorge, which offers views of rock spires, towering cliffs, sand dunes, and the desert. The Bill Williams River NWR has a large manmade marsh, mountains, ravines, sand dunes, water areas, and hills and also attracts visitors who come to view wildlife as well as enjoy its scenic qualities.

Reach 4

Most of this reach is dominated by agricultural uses, although it also contains riparian lands, saltcedar, and desert scrub. Urban development is concentrated in the city of Blythe. Visually sensitive resources within this reach include Three Finger Lake, Cibola Lake, and the Cibola NWR, which are characterized by open water and native vegetation. Cibola NWR includes trails and a scenic overlook of Cibola Lake, where visitors may view a wide variety of wildlife in a relatively undisturbed setting. No scenic highways within this reach are visible from the planning area.

Reach 5

This reach consists of a mix of open water, saltcedar, marshland, some cotton-willow and desert scrub patches, and other riparian land. Imperial Dam is located within this reach. Visually sensitive resources along this reach include Adobe and Martinez lakes, the Picacho State Recreation Area (SRA), Imperial Reservoir, and the Imperial NWR. These areas are appreciated by visitors for both their scenic qualities as well as the opportunity to view wildlife. Imperial NWR offers views of the last non-channelized section of the LCR, which flows through the refuge and includes more than 15,000 acres of Federally designated wilderness. Wilderness areas are protected to ensure that a quiet, natural setting is maintained. Picacho SRA is more

developed and is popular with boaters, hikers, anglers, and campers. The park offers diverse scenery and wildlife viewing, including, wild burros, bighorn sheep, and migratory waterfowl.

Reach 6

This reach includes agricultural land and patches of desert scrub, saltcedar, cottonwood-willow, and other riparian lands. Laguna Dam is located within this reach. Visually sensitive resources within this reach include the Mittry Lake Wildlife Area, and sensitive viewpoints associated with recreational areas around Laguna Dam. Mittry Lake covers approximately 750 acres and is popular for nature study and bird watching.

Reach 7

This reach is characterized by agricultural land and areas of urban development, particularly near Yuma, Arizona. Morelos Diversion Dam also is located in this reach. Agricultural and urban areas are not highly visually sensitive.

3.1.1.2 Muddy River/Moapa Valley and Virgin River

The Muddy River is bordered by large areas of agricultural land, desert scrub, and some riparian vegetation. Scattered towns also are present. The Virgin River is characterized primarily by desert scrub, riparian vegetation, and patches of agriculture and is generally undeveloped. Visually sensitive resources include Lake Mead NRA and the Overton Wildlife Management Area. Lake Mead NRA is described under Reach 1 in section 3.1.1.1. The Overton Wildlife Management Area provides vistas of grassy fields, canals, ponds, thickets, and other wildlife use areas.

3.1.1.3 Bill Williams River

This area is generally undeveloped, although Alamo Dam is located at the eastern end of the potential project area. Vegetation is typically desert scrub or riparian woodland/scrub, although small portions are in agricultural use or open water. Visually sensitive resources include Lake Havasu, the Bill Williams River NWR (both of which are described in section 3.1.1.1), and Alamo Lake State Park. Campgrounds at the park have excellent views of the lake and the surrounding mountains. Hiking and wildlife viewing are other activities that are enhanced by the scenic qualities of the lake and mountains.

3.1.1.4 Lower Gila River

This area is generally in agricultural use or in open space, although urban development is concentrated in Yuma and in small towns along I-8. This area is not highly visually sensitive.

3.1.2 Environmental Consequences

Significance Criteria

The project would have a significant environmental impact on aesthetic resources if it would result in any of the following:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

3.1.2.1 Alternative 1: Proposed Conservation Plan

Impacts

Impact AESTH-1: Construction/maintenance activities would temporarily lessen the visual quality of the conservation area establishment sites located on or near visually sensitive resources. Visually sensitive resources are located in Reaches 1 through 6 where much of the conservation area would be established. Implementation of conservation measures would require actions such as clearing/burning vegetation, grading, excavating, dredging, stockpiling soil, construction/modification of supply canals, berm and swale construction, and planting. These types of activities are common in agricultural areas, where at least some conservation area establishment likely would be implemented; moreover, agricultural areas are not considered visually sensitive. Conservation area establishment actions also could be implemented on undeveloped land on or near sensitive resources, such as wildlife refuges or recreational areas. The duration of the impact would depend upon the size of the site and on whether the site previously was used for agricultural purposes or was undeveloped. It is estimated that agricultural sites would require 1/5 of the grading of undeveloped sites. Impacts from developing individual sites could last from several months to several years, although only portions of the larger sites would be under development at any one time. While the construction activities could degrade the existing visual character or quality of a site, the impact would be temporary and would not be considered a substantial degradation of the visual character or quality of the site or its surroundings. Thus, construction impacts would be *less than significant.*

Impact AESTH-2: The construction of field facilities and fish-rearing facilities could be required, which could alter the visual quality of the selected sites. The proposed action also could involve the construction of two field facilities and fish-rearing facilities. The field facilities probably would be located in developed areas within Blythe and the Mohave Valley, and would consist of a small, prefabricated steel building and an equipment yard. These facilities would require several acres at most and would be fenced. They probably would be constructed on bare ground or at an already developed and graded site. Thus, minimal grading would be required. The fish-rearing facilities would include raceways and growout ponds that likely would not exceed 1 acre. Along with the growout ponds, the facilities could contain other structures, such as a small office building and feed and equipment storage, to support the operation. The only potential source of light or glare would be low-level security lighting should it be required. These facilities would not be located on recreational lands or other lands that are considered visually sensitive. Impacts would be *less than significant* since their construction would not substantially damage scenic resources or the existing visual character or quality of the construction sites, nor would they create a new source of substantial light or glare.

Impact AESTH-3: Conservation area establishment would return sites to a more natural appearance. Overall, impacts of the proposed action to the visual resources discussed above would be *beneficial* because it would establish and maintain over 8,000 acres of land that are currently in agricultural production or undeveloped land that is characterized by invasive, non-native species. The proposed action also includes measures that would establish native vegetation in the event of wildfires. Currently, when fires occur, native vegetation is often supplanted by saltcedar, which is an invasive, introduced species.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.1.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would likely be implemented since compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.1.2.4 below), as well as along the LCR. **Impacts AESTH-1, AESTH-2, and AESTH-3** generally apply to Alternative 2, although as noted below, **Impact AESTH-1** would not apply to conservation implemented along the lower Gila River since it is not considered a visually sensitive area. To the extent that the agencies undertaking the covered activities proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species would not be included. This would also likely result in less conservation area being established. Short-term construction disturbances, identified under **Impact AESTH-1**, would be somewhat lessened because smaller amounts of conservation area would be established. The establishment of a larger number of smaller-sized mitigation projects would, however, result in increased need for infrastructure (access roads and irrigation pipelines/canals and pump facilities). This would result in greater disturbance than would occur under the proposed action, and therefore incrementally greater aesthetic impacts from this component of the Conservation Plan. Overall, conservation area construction-related impacts would be comparable to the proposed action. Since each individual project would establish its own mitigation sites, it is likely that more maintenance and storage facilities would be required. Thus, impacts from this component of the Conservation Plan would be incrementally greater than described under **Impact AESTH-2** for the proposed action. The long-term beneficial impact described under **Impact AESTH-3** would be less than under the proposed action because less conservation area would be established.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.1.2.3 Alternative 3: Listed Species Only

Impacts

Impacts AESTH-1, AESTH-2, and AESTH-3 apply to Alternative 3. The magnitude of the impacts, including beneficial impacts, would be reduced since less conservation would occur.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.1.2.4 Alternative 4: Off-Site Conservation

Impacts

The potential impacts described in **Impact AESTH-1** also are applicable to visually sensitive resources located along the Muddy, Virgin, and Bill Williams rivers. They are not applicable to development on the lower Gila River since it is not considered a visually sensitive area. The scope of the activities required to establish conservation areas would be substantially the same as described in Alternative 1, but would be located in these off-site locations. Therefore, the effect of the impact described in **Impact AESTH-1** would be *less than significant* for the reasons set forth under Alternative 1. The location of backwaters, field facilities, and fish-rearing facilities would be the same under this alternative as Alternative 1, and the potential impacts from these facilities described under **Impact AESTH-2** would also be the same, i.e., *less than significant*. The *beneficial* impact described in **Impact AESTH-3** would also result from Alternative 4, but a portion of the benefit would be located along the Muddy, Virgin, Bill Williams and lower Gila rivers to the extent that conservation areas are located in these areas.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

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3.2 AGRICULTURAL RESOURCES

This section addresses the potential impacts associated with the voluntary conversion of agricultural land that is Important Farmland (defined in Table 3.2-1), zoned for agricultural use, or subject to Williamson Act contracts. It also addresses potential impacts to agriculture due to the proximity of established habitat. This analysis meets the requirements of the Farmland Protection Policy Act (7 U.S.C. 4201) on a programmatic basis. This Act is the Federal statute that provides the basis for the policy of avoiding impacts from Federal programs. The Act does not prohibit Federal agencies from undertaking actions that convert farmland to nonagricultural use, but only requires that Federal agencies "identify and take into account the adverse effects of Federal programs on the preservation of farmland; consider alternative actions, as appropriate, that could lessen such adverse effects; and assure that such Federal programs, to the extent practicable, are compatible with State (and local) programs and policies to protect farmland" (7 U.S.C. §4202[b]). The following analysis identifies and takes into account the potential effects of the proposed Conservation Plan on farmland in the whole planning area, considers alternative actions that could lessen those effects, and also assures that the Conservation Plan is compatible with state and local programs "to the extent practicable."

3.2.1 Affected Environment

Individual counties and municipalities regulate agricultural land uses primarily through the adoption of land use plans, policies, and agricultural zoning that restrict the location, type, and intensity of land development and use that is allowed. The California Department of Conservation (CDOC) has the primary responsibility for regulation and reporting related to California agricultural lands. Administering agencies in Arizona and Nevada are the Arizona Department of Agriculture and the Nevada Division of Agriculture. Agricultural resources on tribal lands are governed by the tribal governments.

The United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS), has defined Important Farmlands based upon a number of factors, including the physical and chemical characteristics of the land and the suitability of the land for producing crops (refer to Table 3.2-1 for these definitions). Important Farmlands are afforded special protection due to their importance to agricultural production.

3.2.1.1 Lower Colorado River

Important Farmland

The discussion of farmland present in the planning area is based on multiple sources, including Reclamation's LCRAS, CDOC, NRCS, and Yuma County. Important Farmland has not been mapped for all of the planning area; thus, LCRAS data, which do not distinguish between Important Farmland and other farmland, are used to give an overview of lands that are classified as agricultural. LCRAS defines agricultural areas as cultivated fields or fields that will be cultivated in the future, as well as all areas that are irrigated via a canal vs. a municipal water source, which could include non-agricultural areas such as grass fields and other areas. The

vast majority of the planning area that is classified as agricultural is, however, used for agricultural purposes (personal communication, K. Zander 2003).

Table 3.2-1. General Definitions of Categories Used in Important Farmland Maps[1]

Farmland Category	*Definition*
Prime Farmland[1]	Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, Prime Farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks.
Unique Farmland	Unique Farmland is land other than Prime Farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods.
Farmland of Statewide Importance[1]	This is land, in addition to Prime and Unique Farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Criteria for defining and delineating this land are to be determined by the appropriate State agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly Prime Farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as Prime Farmlands if conditions are favorable.
Farmland of Local Importance	In some local areas there is concern for certain additional farmlands for the production of food, feed, fiber, forage, and oilseed crops, even though these lands are not identified as having national or statewide importance. Where appropriate, these lands are to be identified by the local agency or agencies concerned.
Grazing Land[1]	Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities. The minimum mapping unit for Grazing Land is 40 acres.
Urban and Built-up Land	A Land Cover/Use category consisting of residential, industrial, commercial, and institutional land; construction sites; public administrative sites; railroad yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment plants; water control structures and spillways; other land used for such purposes; small parks (less than 10 acres) within urban and built-up areas; and highways, railroads, and other transportation facilities if they are surrounded by urban areas. Also included are tracts of less than 10 acres that do not meet the above definition but are completely surrounded by Urban and Built-up land. Two size categories are recognized in the National Resources Inventory (NRI): (1) areas 0.25 to 10 acres, and (2) areas greater than 10 acres.
Other Land	Land not included in any other mapping category. Common examples include low wetland and riparian areas.
Water	A General cover category consisting of permanent water, such as a perennial stream, lake, or pond with at least 25 percent open water. If the vegetative canopy obscures more than 75 percent of the water surface from view, the area is recorded under the category appropriate for the canopy vegetation. Four types of water areas are large streams, large water bodies, small streams, and small water bodies.

Notes: 1. The definitions for Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Urban Built-up Land were developed by the USDA-SCS as part of the nationwide Land Inventory and Monitoring (LIM) system. The LIM definitions have been modified for use in California with the most significant modification being that Prime Farmland and Farmland of Statewide Importance must be irrigated. In addition, mapping of Grazing Land as part of an Important Farmland Map is unique to California.

Sources: 7 CFR 657.5; NRI 1997; CDOC 2003; CDOC undated.

Table 3.2-2 shows the amount of agricultural land contained within each reach based on LCRAS data. No agricultural land is mapped in Reaches 1, 2, and 5. The river in Reaches 1 and 2 is generally bordered by cliffs, rather than the broad plains that are conducive to agricultural uses; and Reach 5 consists primarily of publicly owned land, most of which is managed by the Service as a wildlife refuge or by the State of California as a recreation area. The largest amount of agricultural land is in Reach 4 (170,048 acres), followed by Reach 7 (43,965 acres), Reach 6 (36,803 acres), and Reach 3 (18,186 acres). Agricultural land comprises 38 percent of the total land within the planning area.

Table 3.2-2. Agricultural Land by River Reach (2003)

River Reach	*Agricultural Land (acres)*	*Percentage of Reach*
Reach 3	18,186	20
Reach 4	170,048	59
Reach 6	36,803	56
Reach 7	43,965	71
Total	**269,002**	**—**

Source: USBR 2003a.

Important Farmland has been mapped in Imperial, Riverside, and Yuma counties and is shown by reach on Table 3.2-3. The greatest amount of Important Farmland is located in Reach 4 (113,284 acres), followed by Reach 7 (60,492 acres), Reach 6 (50,184 acres), and Reach 5 (245 acres). Since the LCRAS uses a different level of detail than the system used for mapping Important Farmland, in some cases, general agricultural land may not have been included in the totals for Important Farmlands and conversely, Important Farmland, such as that located in Reach 5 may not have been included in the agricultural area totals shown on Table 3.2-2.

Table 3.2-3. Known Important Farmland within the Planning Area (acres)

	Prime Farmland	*Unique Farmland*	*Farmland of Statewide Importance*	*Farmland of Local Importance*	*Percentage of Reach*
Reach 4	70,544	564	36,000	6,176	40
Reach 5	—	—	245[1]	—	<1
Reach 6	39,793	1,366	4,619	4,406	77
Reach 7	55,027	2,875	2,590	0	96
Total	**165,364**	**4,805**	**43,454**	**10,582**	**—**
Percentage of Reaches 1-7	**23**	**0.67**	**6.1**	**1.5**	**—**

Notes: [1]Includes Yuma County only (Yuma County 2003).
Sources: CDOC, Division of Land Resource Protection 2000; NRCS 2002; Yuma County 2003.

The amount of land in agricultural use in the planning area has undergone only a minor overall decline during the last 10 years. Table 3.2-4 shows the difference in the amount of agricultural land present in those reaches containing agricultural land in 1993 and 2003. The greatest change occurred in Reach 7, where agricultural land declined by 4.9 percent during this period (USBR 2003a). Minor increases in agricultural land occurred in Reaches 3 and 4 during the same period. Information regarding the conversion of Important Farmland is not available for the planning area.

Table 3.2-4. Agricultural Land Conversion Between 1993 and 2003 in the Planning Area

River Reach	*Agricultural Land in 1993 (acres)*	*Agricultural Land in 2003 (acres)*	*Change in Amount of Agricultural Land (acres)*	*Percent Change in Agricultural Land*
Reach 3	18,120	18,186	66	.36
Reach 4	169,857	170,048	191	.11
Reach 5	0	0	0	—
Reach 6	37,500	36,803	-697	-1.9
Reach 7	46,207	43,965	-2242	-4.9
Total	**271,684**	**269,002**	**-2682**	**-.99**

Source: USBR 2003a.

Land Zoned for Agricultural Use

This section identifies the portions of the planning area that contain substantial amounts of land zoned for agricultural use, as well as the generally allowed uses in these zoning districts. State and Federal agencies are not subject to local land use and zoning regulations, but they do take these into consideration and cooperate with local agencies to avoid conflicts to the extent feasible.

REACH 1

Reach 1 consists primarily of lands administered by the NPS and the Hualapai Indian Reservation. The remaining portion of the reach is located within Clark County and is zoned as Rural Open Land District (R-U); however, this reach contains no agricultural land.

REACH 2

Reach 2 consists primarily of lands administered by the NPS. The remaining portion of the reach is located within Clark County, and most of this land is zoned R-U; however, this reach contains no agricultural land.

REACH 3

Most of the portion of Reach 3 located within Clark County is zoned R-U. The R-U district provides for appropriate uses of vast areas of rural land, which would include the proposed Conservation Plan. Fish rearing ponds normally would be allowed under a Special Use Permit (personal communication, C. Pulsipher 2003). The Mohave County portion of Reach 3 includes General Agricultural (A) and Agricultural Residential (A-R) zoning. The A zone allows for all agricultural uses, as well a variety of residential and commercial uses. The A-R zone is primarily designed for agricultural uses, but other uses, such as single-family dwellings, schools, and churches, also are allowed. Although open space/wildlife habitat areas are not expressly permitted, they would be considered compatible uses in these zones (personal communication, B. Delmar 2003).

REACH 4

Within the portion of this reach that is in Riverside County, the zoning is mainly Agriculture (A-1 and A-2). These zones allow single family dwellings and numerous other uses, primarily related to agricultural production, such as water works facilities for the production and distribution of water for irrigation purposes, field crops, nurseries, greenhouses, farming operations, wineries, and grazing. Any use that is not specifically listed may be considered a permitted or conditionally permitted use provided that the Planning Director finds that the proposed use is substantially the same in character and intensity as those listed. Agricultural zones permit other uses if they are found to have substantially the same character and intensity as expressly permitted uses and would allow the development of habitat for wildlife (personal communication, P. Clark 2003).

Zoning in the Imperial County portion of Reach 4 is primarily General Agriculture (A-2). The purpose of the A-2 zone is to designate areas that are suitable and intended primarily for agricultural uses and agricultural related compatible uses. Uses include all agricultural and grazing uses; aquaculture to allow for the growing and harvesting of algae, fish, frogs, shrimp, and similar aquatic products; and some residential development. Although habitat for wildlife (other than fish farms, which are identified as an allowable use) is not expressly permitted, conservation areas would likely be allowed in these areas if there were no anticipated conflicts with agricultural operations (Imperial County 1998).

In the City of Blythe, the zoning is primarily Agriculture (A), which allows for the cultivation of land and for associated uses commonly tied to agriculture, including grazing. Residential uses also are allowed. Conservation areas would likely be considered an allowable use (City of Blythe 2003).

La Paz County zoning maps are being revised to obtain consistency with the county's first Comprehensive Plan, which is currently being developed. Therefore, accurate zoning information for La Paz County is currently not available.

REACH 5

Most of the land in Reach 5 is managed by the Service and not used for agricultural purposes. Agricultural zoning is present, however, in portions of the reach located in Yuma County, which are zoned as Rural Area (this zone is the equivalent of agricultural zoning in Yuma County). This district is intended to permit uses that are compatible with the use of the land for agriculture, farming, and open space preservation. The predominantly rural character of Rural Areas is to be maintained. Permitted uses include single family residences, farms and ranches, public schools and hospitals, hunting and fishing clubs, agricultural processing, public parks or buildings, and public or private utility installations. The Rural Area district would allow for establishment of wildlife habitat, including the establishment of fish rearing ponds; however, fish ponds may not be permitted in the areas that would conflict with airport land use plans (see section 3.8.2.1) for a more detailed discussion of this issue (personal communication, G. Gallagher 2003).

The La Paz County zoning maps are in the process of undergoing revisions to obtain consistency with the County's first Comprehensive Plan which is currently being developed. Therefore, accurate zoning information for La Paz County is currently pending.

REACH 6

Reach 6 includes lands zoned for agriculture in the city of Yuma, Imperial County, and Yuma County. The northwestern portion of the city of Yuma is zoned mainly as Agriculture (AG). The principal purpose of this district is to conserve and protect farms and other open land uses, foster orderly growth in rural and outlying areas, and prevent urban and agricultural land use conflicts. Principal permitted uses include commercial breeding, dairies, grazing, nurseries, riding stables, public utility buildings, single family residences, aviaries, and facilities necessary for service to the surrounding territory. Habitat conservation areas would be allowed in the AG district (personal communication, M. Spriggs 2003).

The Imperial County lands in Reach 6 are zoned as General Agriculture (A-2). (See the discussion under Reach 4 regarding uses allowed in this zone.) The Yuma County areas are zoned as Rural Area (see description of this zone under Reach 5).

REACH 7

The lands within the city of Yuma in Reach 7 are predominantly zoned as Agriculture (AG) on the western periphery of the city. (See the discussion under Reach 6 regarding allowable uses in this zone.) Yuma County lands with Reach 7 are mainly zoned as Rural Area (see the description of this zone under Reach 5).

The City of Somerton is also located within Reach 7 and has a small land area zoned for agricultural use (AG) on the eastern side of the city. This zone conserves and protects farms and other open land uses, fosters orderly growth in rural and outlying areas, and prevents urban and agricultural land use conflicts. The primary purpose of requiring minimum lot sizes is to discourage small lot or residential subdivisions where public facilities and governmental services could not reasonably be made available in the future. Principal uses include aviaries, corrals, grazing fields, public utility buildings, and public and private wild preservation areas. The Conservation Plan would be allowed in this district (personal communication, F. Villegas 2003).

Lands Subject to Williamson Act Contracts

This discussion is applicable only to lands within California, and more specifically to Reach 4 of the LCR. Approximately 25,484 acres of land under Williamson Act contracts are located within this reach, primarily in the Palo Verde Valley. This constitutes approximately 9 percent of the total area of the reach.

The Williamson Act provides an incentive program for farmers to continue agricultural use on their property. The statute authorizes cities and counties to create agricultural preserves in which land uses are limited to agricultural and compatible uses. Landowners may enter contracts that limit their property to commercial agricultural use for a rolling ten-year term in exchange for reduced property taxes. The contracts must exclude "uses other than agricultural, and other than those compatible with agricultural uses" (Cal. Govt. Code §51243[a]). Since

agricultural uses are defined as "producing an agricultural commodity for commercial purposes" (Cal. Govt. Code §51201[b]), the acquisition of lands with Williamson Act contracts would generally be precluded for the proposed Conservation Plan, unless the contract can be terminated or the local government agency allows the use of the land for wildlife conservation as a compatible use.

Not all lands within an agricultural preserve created pursuant to the Williamson Act are subject to contracts. The city or county must restrict the use of such lands by zoning or other means so as not to be incompatible with the agricultural use of lands in the preserve (Cal. Govt. Code §51230). The Act contains separate provisions that discourage the locating of public improvements within an agricultural preserve (Cal. Govt. Code §51292), and provide the local government agency and State Director of Conservation with the right to sue to enforce these provisions (Cal. Govt. Code §51294). However, these provisions do not apply to the location or construction of "(p)ublic works required for fish and wildlife enhancement and preservation" (Cal. Govt. Code §51293[e][2]). Under this exception, the LCR MSCP participants would be allowed to acquire and use non-contract lands within an agricultural preserve for the purposes of establishing habitat.

3.2.1.2 Muddy River/Moapa Valley and Virgin River

Important Farmland

Table 3.2-5 shows the amount of agricultural land present in the three off-site conservation areas. Most of the approximately 4,555 acres of agricultural land in this area is located in the Muddy River/Moapa Valley, rather than the Virgin River. This off-site conservation area is located within Clark County, where Important Farmland has not been mapped. The amount of land in agricultural production has not changed substantially in recent years.

Land Zoned for Agricultural Use

This off-site alternative conservation area is located within Clark County. The zoning is predominantly R-U. See the discussion above regarding this zoning district.

3.2.1.3 Bill Williams River

Important Farmland

The Bill Williams River forms the boundary between Mohave and La Paz counties. Most of the approximately 3,387 acres of agricultural land in this area is located in Mohave County, where Important Farmland has not been mapped. Much of the agricultural land in this area is located within Planet Ranch, where the amount of land in agricultural production has not changed substantially in recent years.

Land Zoned for Agricultural Use

Mohave County areas within this off-site conservation area are zoned as Agricultural Residential (A-R) (personal communication, B. Delmar 2003). See the discussion under Reach 3 of the LCR for the allowable uses in this zone.

The La Paz County zoning maps are in the process of undergoing revisions to obtain consistency with the County's first Comprehensive Plan, which is currently being developed. Therefore, accurate zoning information for La Paz County is currently pending.

3.2.1.4 Lower Gila River

Important Farmland

The lower Gila River is located within Yuma County. Approximately 82,840 acres of Important Farmland are located within this off-site conservation area, including 75,965 acres of Prime Farmland and 6,875 acres of Unique Farmland. This comprises approximately half of the total area. Approximately 79,421 acres within this off-site alternative location have been designated as general agricultural land (Ogden Environmental 1998). This information was obtained from the Gap Analysis Program (GAP) (a program that provides mapping of land cover types). Similar to the LCRAS, GAP uses different parameters for mapping general agricultural land than those used in the Important Farmland data, resulting in some discrepancies between the totals.

According to the Wellton-Mohawk Irrigation District, there essentially has been no change in the amount of agricultural land in this area since the mid-1990s (personal communication, W. West 2003).

Table 3.2-5. Agricultural Land in the Off-Site Conservation Areas

Off-Site Conservation Area	*Agricultural Land (acres)*[1]	*Percentage of Total Area*
Muddy River/Moapa Valley and Virgin River	4,555	24
Bill Williams River	3,387	16
Lower Gila River	79,421	52
Total	**87,363**	**45**

[1]*Source*: Ogden Environmental 1998 (based on GAP).

Land Zoned for Agricultural Use

The Yuma County zoning for the lower Gila River area is primarily Rural Area (see description of this zone under Reach 5 of the LCR). The single largest zone in the town of Wellton is Agricultural; approximately 50 percent of the incorporated area is zoned as such. Habitat conservation areas would be allowed in this zoning district.

3.2.2 Environmental Consequences

Significance Criteria

The proposed action would result in a significant impact if it would:

- convert a substantial portion of the available Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland) in the project area to nonagricultural use;
- conflict with existing zoning for agricultural use, or other legal protections for agricultural use; or
- involve other changes in the existing environment, which, due to their location or nature, could individually or cumulatively result in substantial loss of Important Farmland to nonagricultural use or a loss of agricultural productivity.

3.2.2.1 Alternative 1: Proposed Conservation Plan

Conservation measures would be implemented on agricultural or undeveloped land. The most likely scenario would include a mix of such lands, but in order to ensure that the maximum potential impact is considered, the analysis assumes a worst-case scenario; i.e., that all habitat establishment would occur on agricultural land.

Impacts

Lands subject to Williamson Act contracts would not be acquired for the Conservation Plan unless the responsible local agency agreed that the contract terms allow the establishment and maintenance of conservation areas as a compatible use, and that there is no significant adverse impact from the use of non-contract lands within an agricultural preserve because fish and wildlife enhancement and preservation is a compatible use of such lands.

Wildlife habitat likely would be considered a permitted use or a conditionally permitted use in the areas zoned for agricultural use potentially affected by the proposed action, as described above. Additionally, compatibility with zoning would be one of the factors considered during the site selection process. Thus, conflicts with agricultural zoning would not occur.

Other than those impacts described below, implementation of the proposed action would not adversely affect agricultural uses of nearby lands. Access would not be restricted to these lands, nor would they be affected by the application of pesticides on the conservation areas. Pesticides are commonly used in agricultural areas, and they would be applied in a manner that would be consistent with accepted practices and regulatory requirements.

Impact AG-1: Important Farmland could be converted to a nonagricultural use. The proposed action would establish 8,132 acres of conservation area. If the entire amount were implemented on Important Farmland, it would constitute approximately 3.6 percent of the total known to be present in Reaches 4 through 7, the only reaches where Important Farmland mapping has occurred. It also is possible that unmapped Important Farmland is present in other reaches and could be used for habitat establishment. If this were the case, it would reduce the total percentage of Important Farmland converted to habitat. The conversion of Important Farmland to nonagricultural use would be *less than significant* because a substantial amount of Important Farmland would not be converted to nonagricultural use. Additionally, during the site selection process, the amount and importance of the farmland would be considered before specific sites are selected, as required by the Farmland Protection Policy Act. The significance of this potential impact would be further minimized by the implementation of a number of

covered activities, described in detail in section 2.5.3.3 of the LCR MSCP BA, that would more than offset impacts of the proposed action. These include the (1) CRIT plan to bring an additional 25,000 acres into agricultural production should Congress appropriate adequate funds; (2) Fort Mojave Tribe plan to fully develop its farmland, which would increase farmed acreage by approximately 3,745 acres; (3) the Chemehuevi Tribe plan to irrigate up to 1,855 acres of agricultural land; (4) Fort Yuma Agency plan to irrigate 650 acres of agricultural land; and the (5) Cocopah Tribe plan to irrigate three agricultural sites, totaling 500 acres.

Impact AG-2: Waterfowl attracted to established backwaters and marshes could destroy crops grown on adjacent farmland. The species for which cottonwood-willow and honey mesquite habitat is being established would not impact crops grown on adjacent farmland because they eat insects rather than grains, fruit, and other crops grown in the planning area. Waterfowl, such as ducks and geese, that are attracted to newly established aquatic or wetland areas (particularly marshes and backwaters), could, however, consume crops on adjacent farmlands. The amount of marsh and backwaters that would be established is, however, small in comparison to that which currently exists in the planning area. (The Conservation Plan would result in the establishment of 512 acres of marsh and 360 acres of backwaters. For purposes of comparison, the LCR MSCP HCP indicates that approximately 12,000 acres of marsh are present in the planning area, and a backwater study of Reaches 3, 4, 5, and part of 6 identified 7,911 acres of open water [GEO/Graphics 2000]). The establishment of this comparatively small amount of marsh and backwater would not attract sufficient wildlife to result in the loss of agricultural productivity, and the impact would be *less than significant*.

Impact AG-3: Runoff from established conservation areas could alter the slopes of adjoining laser-leveled fields. Laser leveling is used to improve agricultural efficiency by contouring fields to allow moisture conservation and improve drainage. If the drainage from the newly established conservation areas exceeded the existing discharge rate, this could result in the alteration of slopes on adjacent laser-leveled fields. This would result in the loss of agricultural productivity on such lands, which would be a *significant impact, but mitigable to less than significant* through the implementation of **Mitigation Measure AG-1**.

Impact AG-4: Covered species attracted to established conservation areas could disperse to other lands within the planning area. The successful establishment of habitat for the covered species in the conservation areas may result in an increase in the number of individuals of those species within the planning area[1]. Dispersal of adults and juveniles from the conservation areas to other lands with suitable habitat within the planning area, with subsequent potential for such lands to be used as breeding, resting, or foraging habitat, is likely to occur. Agricultural lands within the planning area generally do not support habitat characteristics that would encourage covered species to become resident on these lands, however. Such lands have limited insect populations due to pesticide treatments to control crop pests, and the crops that are grown on agricultural land are unsuitable as roosting or resting habitat, which would limit the use of

[1] Only increases in populations of covered species that are protected under the ESA or specific state law could potentially affect agricultural resources. Although the LCR MSCP participants are requesting incidental take coverage for a number of species not listed under the ESA, that coverage does not come into effect unless or until the species is listed. There is no requirement for coverage for incidental take for any unlisted species by any agency or individual within the planning area. Thus, use of any lands outside the conservation areas by covered, but unlisted species, would not potentially require changes to land management.

these lands by birds and bats. Moreover, the conservation areas are more likely to contain better foraging resources than the adjacent agricultural lands. While insectivorous birds and bats may visit adjacent farmlands for limited foraging, effects to agricultural resources would be *less than significant.*

Mitigation Measures

AG-1 Grading plans shall be developed for newly established conservation areas that direct runoff away from adjacent agricultural lands to ensure that flow rates from the conservation area do not exceed existing discharge rates. (*Addresses Impact AG-3*).

Residual Impacts

Residual impacts would be *less than significant* given the implementation of **Mitigation Measure AG-1** because flow rates would not exceed existing discharge rates.

3.2.2.2 Alternative 2: No Action Alternative

Impacts

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented because compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.2.2.4 below), as well as along the LCR. **Impacts AG-1 through AG-4** apply to Alternative 2. The no action alternative is likely to result in the establishment and maintenance of less riparian vegetation. The same types of impacts would occur as described for the proposed action, but the overall magnitude could be lessened since a smaller amount of conservation area would be established. In addition, as described in Chapter 2, the smaller size of mitigation sites required as mitigation for individual projects would result in limitations on site selection criteria and would likely cause the mitigation to be located in more developed areas where land has been subdivided. This could further reduce impacts to agricultural resources.

Mitigation Measures

Mitigation measures would be developed as appropriate in the course of project-specific environmental reviews. If a significant impact were identified, a mitigation measure similar to that identified in this EIS/EIR (**Mitigation Measure AG-1)** could be implemented. Developing and implementing such a mitigation measure is outside the authority of the lead agencies and is beyond the scope of this EIS/EIR.

Residual Impacts

Residual impacts would be *less than significant* because a mitigation measure is available that would reduce or avoid significant impacts to agricultural resources.

3.2.2.3 Alternative 3: Listed Species Only

Impacts

Impacts AG-1 through AG-4 apply to this alternative, although since a smaller amount of conservation area would be developed than under the proposed action, the impacts to agricultural resources described in **AG-1, AG-3, and AG-4** would be even less than described for Alternative 1 because there would be reduced use of agricultural lands. The impacts to agricultural productivity from waterfowl (**AG-2**) would be substantially similar to the impact described in Alternative 1 and *less than significant* because the acreage of established backwaters would be the same.

Mitigation Measures

Mitigation Measure AG-1 applies to this alternative.

Residual Impacts

Residual impacts would be *less than significant* given the implementation of **Mitigation Measure AG-1** since flow rates would not exceed existing discharge rates.

3.2.2.4 Alternative 4: Off-Site Conservation

Impacts

Impacts AG-1 through AG-4 generally apply to this alternative, although impacts other than those associated with backwater establishment and other fish conservation measures would occur outside the planning area. Under this alternative, a total of 7,772 acres of conservation area would be established within the off-site conservation areas. Assuming an even distribution among the three areas, approximately 2,590 acres would be established in each. Important Farmland has been mapped only along the lower Gila River; however, as a worst-case scenario, it is assumed that all known farmland is Important Farmland. If all conservation area establishment occurred on farmland, it would represent approximately 57, 76, and 0.03 percent of the total farmland within the Muddy/Virgin, Bill Williams, and lower Gila River off-site conservation areas, respectively. While this would constitute a substantial portion of the farmland present in the Muddy/Virgin River and Bill Williams River conservation areas, it would not represent a substantial portion of the farmland available in the general area (the adjacent planning area contains approximately 269,000 acres of general agricultural land and approximately 224,200 acres of Important Farmland). This impact would be *less than significant*, as described for the proposed action under **Impact AG-1**. The impacts described in **Impact AG-2** would be similar to those described for Alternative 1 because the marsh and backwaters would be located in the planning area.

Mitigation Measures

Mitigation Measure AG-1 applies to this alternative.

Residual Impacts

Residual impacts would be *less than significant* given the implementation of **Mitigation Measure AG-1** since flow rates would not exceed existing discharge rates.

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3.3 AIR QUALITY

This section addresses short-term construction and maintenance emissions, as well as long-term emissions from irrigation pumping.

3.3.1 Affected Environment

Air quality at a given location can be described by the concentration of various pollutants in the atmosphere. Units of concentration are expressed in parts per million (ppm) or micrograms per cubic meter. The significance of a pollutant concentration is determined by comparing its concentration to an applicable national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The EPA establishes the National Ambient Air Quality Standards (NAAQS). The NAAQS generally are defined as the maximum acceptable ground-level concentrations that may not be exceeded more than once per year, except that annual standards may never be exceeded. California standards, established by the California Air Resources Board (CARB), are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist. In the Arizona project region, the Arizona Department of Environmental Quality (ADEQ) has adopted the NAAQS to regulate sources of air pollution. In the Nevada project region, the Nevada Bureau of Air Pollution Control (NBAPC) has adopted the NAAQS and has promulgated additional state standards to regulate sources of air pollution.

The air pollutants of primary concern that are considered in this air quality assessment include ozone (O_3), volatile organic compounds (VOCs), nitrogen oxides (NO_x), and particulate matter less than 10 microns in diameter (PM_{10}), as portions of the project region presently do not attain the national and/or California ambient air quality standards for O_3 and PM_{10}. Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O_3 formation.

Existing Air Quality

Identifying the region of influence (ROI) for air quality requires knowledge of the types of pollutants being emitted, emission rates of pollutant sources, and meteorological conditions. The ROI for inert pollutants (generally pollutants other than O_3 and its precursors) is generally limited to a few miles downwind from a source. The ROI for O_3 can extend much farther downwind than for inert pollutants. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. Ozone precursors are mainly the reactive portion of VOCs and NO_x. In the presence of solar radiation, the maximum effect of VOCs and NO_x emissions on O_3 levels usually occurs several hours after they are emitted and many miles from the source.

Ozone concentrations are highest during the warmer months and coincide with the season of maximum insolation. Inert pollutant concentrations tend to be the greatest during periods of light winds and surface-based temperature inversions. These conditions limit atmospheric dispersion. However, in the case of PM_{10} impacts from fugitive dust episodes, maximum dust

impacts within the project region often occur during high wind events and in proximity to manmade ground-disturbing activities.

The EPA designates all areas of the United States as having air quality better (attainment) or worse (nonattainment) than the NAAQS. The criteria for nonattainment designation varies by pollutant: (1) an area is in nonattainment for O_3 or 24-hour PM_{10} if its NAAQS has been exceeded more than three times in 3 years and (2) an area is in nonattainment for any other pollutant if its NAAQS has been exceeded more than once per year. Former nonattainment areas that have achieved attainment of the NAAQS are designated as maintenance areas. With regard to the NAAQS for O_3, Imperial County is the only part of the project region that does not attain this standard. The portions of the project region that do not attain the NAAQS for PM_{10} include San Bernardino County and the greater Yuma region in Arizona (roughly the Colorado River from Imperial Dam to the SIB) (EPA 2003b). The project region attains all other NAAQS.

The attainment status designations and new rule to implement the O_3 8-hour standard became effective on 15 June 2004. The EPA designates Imperial County as a marginal nonattainment area for the 8-hour O_3 standard (EPA 2004a). An area will attain this standard if its three-year running average of the annual fourth-highest daily maximum 8-hour O_3 concentration remains below 0.084 ppm. Implementation of the 1-hour O_3 standard will not be revoked in a given area until that area achieves this standard.

The EPA is in the process of implementing the new 24-hour and annual $PM_{2.5}$ national ambient air quality standards. On 11 February 2004, the CARB recommended to the EPA that the Imperial, San Bernardino, and Riverside county portions of the project region be designated attainment for the $PM_{2.5}$ NAAQS. The EPA intends to make final attainment designations in December 2004. The EPA will finalize rule development on the implementation of the $PM_{2.5}$ NAAQS in early 2005 (EPA 2004b).

The CARB also designates areas of California as being either in attainment or nonattainment of the CAAQS. An area is in nonattainment if a CAAQS has been exceeded more than once in 3 years. In regard to the CAAQS, the entire project region within California presently does not attain the O_3 and PM_{10} standards (CARB 2003).

Regulatory Setting

The Federal Clean Air Act of 1969 and its subsequent amendments (CAA) establish air quality regulations and the NAAQS and delegate the enforcement of these standards to the states. In California, Arizona, and Nevada, the CARB, ADEQ, and NBAPC, respectively, are responsible for enforcing air pollution regulations. The CARB and NBAPC have in turn delegated the responsibility of regulating stationary emission sources to local air agencies. In areas that exceed the NAAQS, the CAA requires preparation of a State Implementation Plan (SIP), detailing how the states will attain the standards within mandated time frames. The CAA identifies emission reduction goals and compliance dates based upon the severity of the ambient air quality standard violation within a region.

The following air pollution agencies regulate air quality within the project region:

- Imperial County Air Pollution Control District, which includes all of Imperial County;

- Mojave Desert Air Quality Management District (MDAQMD), which includes San Bernardino and Riverside counties;
- The Air Quality Division in the State of Arizona; and
- Clark County Air Pollution Control District, which includes all of Clark County, Nevada.

These regulatory agencies have developed air quality attainment plans designed to reduce emissions to a level that will bring their jurisdictions into attainment of the ambient air quality standards. Each regulatory agency has also developed rules to regulate stationary sources of air pollution within their jurisdictions. Some of these rules that may apply to proposed activities include those related to open burning and fugitive dust.

Section 176(c) of the CAA contains the *General Conformity Rule* (40 CFR 51.850-860 and 40 CFR 93.150-160). The General Conformity Rule requires a Federal agency responsible for a proposed action in a NAAQS nonattainment or maintenance area to ensure that the action conforms to the applicable SIP. This means that Federally supported or funded activities will not (1) cause or contribute to any new air quality standard violation, (2) increase the frequency or severity of any existing standard violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. Proposed attainment pollutant emissions are exempt from the General Conformity Rule. A Federal action would comply with an applicable SIP if it does not exceed identified annual emission *de minimis* thresholds, the magnitudes of which are based on the severity of the nonattainment rating of the project region. Actions that exceed these thresholds are required to conduct in depth conformity determinations. The requirements of the General Conformity Rule would apply to the portions of the project region within Imperial County (O_3 nonattainment area), San Bernardino County (PM_{10} nonattainment area), and the greater Yuma area (PM_{10} nonattainment area).

Reclamation has yet to identify specific locations or designs for the development of the proposed conservation measures. Therefore, it is not possible to accurately locate and quantify the emissions from the proposed action for the purpose of determining conformity since they are not deemed reasonably foreseeable. The General Conformity Rule allows a Federal agency to defer a conformity analysis for a programmatic action of this nature until project-specific information is available upon which to base the analysis (EPA 1993). As a result, the conformity analysis for the proposed action would occur at a future date in association with project-specific proposals.

Climate and Meteorology

The project region has an arid continental climate, which is characterized by hot summers, mild winters, low humidity, and large diurnal variations in temperature. The aridity of this region is due to a combination of factors, including (1) the presence of a semi-permanent atmospheric high pressure system that shields the regions from the passage of polar storm systems, (2) a cool ocean to the west that provides limited amounts of moisture, and (3) the rain shadow effects of the Coast Ranges, which blocks the flow of moisture into the region from the Pacific Ocean. This arid condition produces low soil moisture, which is responsible for one of the main air pollution problems in the region, fugitive dust (PM_{10}).

3.3.2 Environmental Consequences

Significance Criteria

An impact would be significant if proposed air emissions:

- conflict with or obstruct implementation of an applicable air quality plan;
- violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable Federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

3.3.2.1 Alternative 1: Proposed Conservation Plan

Air quality impacts would result from (1) combustive emissions due to the use of fossil fuel-fired construction and maintenance equipment; (2) fugitive dust (PM_{10}) emissions due to earth-moving activities and the use of vehicles on unpaved surfaces; (3) the use of fire to clear vegetation, burn cleared vegetation, or maintain marsh vegetation; and (4) potential odorous emissions from dredged materials. Air quality impacts would be both short-term and long-term: (1) short-term impacts would occur during the development of individual conservation area establishment projects and the construction of field and fish-rearing facilities, and (2) long-term impacts would result from the maintenance and operation of the conservation projects. Maintenance activities would produce fugitive dust emissions from the occasional use of mobile equipment on unpaved roads. These activities and sources would produce minor amounts of daily emissions.

Impacts

Ground-disturbing activities required for habitat establishment in conservation areas would not conflict with or obstruct implementation of an applicable air quality plan. Several air pollution agencies regulate air quality within the project region. These regulatory agencies have developed air quality plans designed to control emissions to a level that will either bring their jurisdictions into attainment of the ambient air quality standards or maintain these standards. Each agency adopts the attainment strategies into their applicable regional and state air regulations. Some of the regulations that may apply to the proposed action include those related to open burning and fugitive dust. The lead agencies would ensure that proposed habitat establishment activities would comply with these air regulations. Additionally, activities such as earth-moving and prescribed burns are common in the planning area, and such emissions are considered in the air quality attainment plans. Moreover, if agricultural land were used for LCR MSCP conservation projects, future emissions from cultivation and prescribed burns on these lands would not occur. Thus, the use of agricultural sites for LCR

MSCP projects would reduce the long-term potential for PM_{10} standard exceedances to occur on these sites.

Impact AQ-1: The use of fossil fuel-fired construction equipment during construction, maintenance, and operational activities would result in intermittent combustive emissions that would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Due to the mobile and intermittent nature of construction sources (the proposed action would occur over a period of about 30 years at varying locations along the LCR), combustive emissions would not produce substantial impacts at any particular location and would result in *less than significant* air quality impacts. Maintenance of individual conservation projects would require the occasional use of fossil fuel-fired mobile equipment, and irrigation would require the use of water pumps, some of which would use diesel fuel. These activities and sources would produce minor amounts of daily emissions, which would be dispersed throughout the planning area. As a result, maintenance and operational emissions associated with implementation of the Conservation Plan would not produce substantial impacts at any particular location and would result in *less than significant* air quality impacts.

Impact AQ-2: The development of the largest projects would produce fugitive dust emissions that could exceed an ambient 24-hour PM_{10} standard. Fugitive dust (PM_{10}) emissions from the use of mobile equipment on bare soils would occur at a rate of about 0.5 tons per acre per day of activity (EPA 1995). The size of daily disturbances from proposed activities could range from less than 1 acre for small projects (100 acres or less) on undeveloped lands to up to 5 acres for large projects (500 to 1,000 acres) on agricultural lands. Therefore, unmitigated PM_{10} emissions from these activities would range from less than 0.5 to 2.5 tons per day. Fugitive dust emissions currently occur within the planning area, especially from cultivation activities on agricultural lands. Development of conservation areas on agricultural lands would produce a net reduction in PM_{10} emissions on lands periodically cultivated, since the development emissions would occur only once. Fugitive dust emissions from the development of the largest projects would be substantial enough to have the potential to contribute to an exceedance of an ambient 24-hour PM_{10} standard. These potential exceedances would only occur in isolated locations that are immediately adjacent to the property line of each development site. If agricultural sites were used, the fugitive dust emissions from construction activities would replace some portion of the fugitive dust emissions that would occur as a result of common agricultural activities. This would minimize the potential for an increase in the number of PM_{10} standard exceedances in the vicinity of these lands. However, to be conservative, it is determined that PM_{10} emissions from the largest projects would produce *significant and potentially unavoidable* air quality impacts.

Impact AQ-3: Emissions from the largest prescribed burns during terrestrial vegetation establishment or maintenance activities would produce emissions that could contribute to an exceedance of an ambient 24-hour PM_{10} standard. The use of fire represents the largest source of air emissions from the establishment of vegetation. Emissions would vary, depending on the fuel type, the mass of fuel per area, the fuel moisture content, and atmospheric conditions. For example, burns to clear vegetation on harvested agricultural lands would produce fewer emissions than those that would occur in areas with a higher fuel density, such as saltcedar stands. Prescribed burn activities currently occur within the project region, especially on agricultural lands where it is commonly used to clear vegetation. Burning agricultural lands for

the purpose of developing habitat could produce a net reduction in burn emissions on lands burned periodically, since this activity would occur only once. The air pollutant of most concern that occurs from prescribed burns is PM_{10}. Emission factors for burn activities are not available for most of the vegetation types that would be affected; however, they have been established for grass (10 pounds of PM_{10} per ton) and sagebrush (30 pounds of PM_{10} per ton) (EPA 1996). The largest prescribed burns would produce substantial amounts of PM_{10} emissions that could contribute to an exceedance of an ambient 24-hour PM_{10} standard. These potential exceedances would only occur in isolated locations that are immediately adjacent to the property line of each burn area. If agricultural sites were used, the PM_{10} emissions from construction activities would replace some portion of the PM_{10} emissions that would occur as a result of common agricultural activities. This would minimize the potential for an increase in the number of PM_{10} standard exceedances in the vicinity of these lands. However, to be conservative, it is determined that PM_{10} emissions from the largest prescribed burns would produce *significant and potentially unavoidable* air quality impacts.

Impact AQ-4: Air emissions from proposed conservation area establishment activities and facility construction could exceed the MDAQMD daily NO_x or PM_{10} emission significance thresholds, which would result in a cumulatively considerable net increase of a nonattainment pollutant. The MDAQMD is the only air jurisdiction within the project region that uses quantitative thresholds to determine the significance of proposed emissions for CEQA or NEPA purposes. These daily thresholds are (1) 137 pounds of VOC, (2) 548 pounds of carbon monoxide, (3) 137 pounds of NO_x, (4) 137 pounds of oxides of sulfur, and (5) 82 pounds of PM_{10}. Development of the largest conservation establishment projects or prescribed burn actions could produce emissions in excess of one or more of these daily thresholds. For example, daily use of several large pieces of diesel-powered construction equipment could produce emissions in excess of the daily NO_x threshold. Additionally, fugitive dust emissions from the development of the largest projects, as described under **Impact AQ-2**, could exceed the daily PM_{10} threshold. If construction activities produced emissions that exceeded the NO_x or PM_{10} daily threshold, they would result in cumulatively considerable net increases of a nonattainment pollutant (O_3 or PM_{10}).

If emissions exceed a significance threshold described above, further analysis of the emissions and their consequences would be performed to assess whether there was likelihood of a significant impact to air quality. The nature and extent of such analysis would depend on the specific circumstances. The analysis could range from simply a more detailed and precise examination of the likely emitting activities and equipment, to air dispersion modeling analyses. If project emissions were determined to increase ambient pollutant levels from below to above a national or state ambient air quality standard, these emissions would be *significant*.

Impact AQ-5: Air emissions from the proposed conservation area establishment activities would not expose sensitive receptors to substantial pollutant concentrations. Due to the rural nature of the project region, air emissions from this alternative would not occur in proximity to a substantial number of people or sensitive receptors. As a result, this alternative would not expose sensitive receptors to substantial pollutant concentrations. Therefore, the proposed action would produce *less than significant* air quality impacts to sensitive receptors.

Impact AQ-6: Air emissions from the proposed conservation area establishment activities would not create objectionable odors that affect a substantial number of people. Due to the

rural nature of the project region, air emissions from the alternative would not occur in proximity to a substantial number of people. Exposure of wet sediments to the atmosphere from dredging activities could produce offensive emissions from the decomposition of organic matter; this is unlikely, however, because such matter typically is not contained within the sandy material that is usually dredged along the LCR. Additionally, due to the intermittent nature of this emission source and low population density of the project region, odorous emissions from the proposed action would not affect a substantial number of people. As a result, odorous emissions would produce *less than significant* air quality impacts.

Mitigation Measures

AQ-1 One or more of the following measures shall be implemented as standard operating practices to minimize fugitive dust (PM_{10}) emissions during construction activities. (*Addresses Impacts AQ-2 and AQ-4*)

1. Comply with applicable local and state rules that regulate proposed sources of fugitive dust.
2. Apply water or other dust palliatives to areas where vehicles and equipment perform ground-disturbing activities on dry soil. Effective application of water would reduce fugitive dust emissions by at least 50 percent from these areas.
3. Reduce dust from dirt roads used by project equipment with the use of pavement, gravel, water, or non-toxic soil stabilizers.
4. Increase water applications or reduce ground-disturbing activities as wind speeds increase. Curtail ground-disturbing activities when sustained wind speeds exceed 25 miles per hour.
5. Minimize the amount of disturbed area.
6. Cover inactive soil stockpiles or treat them with soil binders, such as crusting agents or water them to keep moist.
7. Cover trucks that haul soils or fine aggregate materials.
8. Clean dirt from construction vehicle tires and undercarriages when leaving the construction site and before entering local roadways.
9. Sweep streets near the construction area at the end of the day if soil track-out occurs on these roadways.
10. Designate personnel to monitor dust control program activities to ensure that they effectively minimize fugitive dust emissions.

AQ-2 A smoke management plan shall be implemented for all construction and maintenance activities involving the use of fire. (*Addresses Impact AQ-3*) This plan shall include, as a minimum, the following components:

1. Obtain local or state air permits prior to each burn event, if applicable.
2. Perform burns when conditions minimize burn emissions, such as low fuel moisture, warm temperatures, and adequate wind speeds.

3. Avoid periods of stagnant atmospheric conditions that inhibit smoke dispersion, such as early morning hours during the presence of a strong surface-based inversion.
4. Review the most recent National Weather Service weather predictions that apply during the time of the burn event as a means to estimate the direction of smoke transport during the burn period. Postpone the burn event if weather predictions show that winds would transport smoke in the direction of nearby residences or sensitive receptors.
5. Prior to each burn event, clear the burn area of any combustible non-vegetative materials, such as plastics or chemicals.
6. Do not conduct burns if a non-project burn is proposed to occur simultaneously in proximity to the project burn.
7. When feasible, do not conduct burns in proximity to residents, sensitive receptors, or gatherings of a substantial number of people.
8. Consider the use of measures to minimize burn emissions, such as forced air or air curtain ventilation techniques.
9. Direct personnel to monitor proposed burns to ensure that this plan will effectively minimize burn emissions.
10. Include burn suppression contingency strategies.

Residual Impacts

Mitigation Measure AQ-1 would reduce fugitive dust emissions from project activities. The exact site sizes and locations and construction methods are not known; thus, even with mitigation, the emissions from the development of the largest projects may still exceed the significance criteria considered in **Impacts AQ-2 and AQ-4**. Therefore, residual impacts of PM_{10} emissions from the development of the largest projects would be *potentially significant*.

Mitigation Measure AQ-2 would reduce combustive emissions from prescribed burns. However, mitigated burn emissions could be sufficiently substantial to contribute to an exceedance of an ambient 24-hour PM_{10} standard. Therefore, residual impacts associated with the largest prescribed burns under **Impact AQ-3** would be *potentially significant*.

3.3.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered actions, although some conservation could occur in the off-site conservation areas (as described in section 3.3.2.4 below), as well as along the LCR. **Impacts AQ-1 through AQ-6** generally apply to Alternative 2, although none of the off-site conservation areas are located within California; therefore, **Impact AQ-4** would not apply to conservation implemented in these areas. The no action alternative is likely to result in the establishment of less riparian vegetation than the proposed action, and the projects involving maintenance of existing habitat that would be funded would not likely occur under the no action alternative. Since the no action alternative would develop fewer acres of conservation area than the proposed action, proportionately fewer air quality impacts would result from grading, clearing,

and other actions directly associated with the establishment of conservation areas. Since more, smaller mitigation sites would be established, however, requiring more infrastructure (access roads and irrigation pipelines/ canals and pump facilities), greater air quality impacts would be expected to result from the construction of these facilities than under the proposed action. The precise differences between this alternative and the proposed action cannot be quantified since specific projects have not been identified at this time; however, overall air quality impacts likely would be similar.

Mitigation Measures

Mitigation measures would be developed as appropriate in the course of project-specific environmental reviews. If significant impacts were identified, mitigation measures similar to those identified in this EIS/EIR (**Mitigation Measures AQ-1** and **AQ-2)** could be implemented. Developing and implementing such mitigation measures is outside the authority of the lead agencies and is beyond the scope of this EIS/EIR.

Residual Impacts

As described above, the exact site sizes and locations and construction methods are not known; thus, even with mitigation identified in **Mitigation Measures AQ-1** and **AQ-2**, the emissions from the development of the largest projects may still exceed the significance criteria considered in **Impacts AQ-2** and **AQ-4**. Therefore, residual impacts of PM_{10} emissions from the development of the largest projects would be *potentially significant*. Implementation of **Mitigation Measure AQ-2** would reduce combustive emissions from prescribed burns. However, mitigated burn emissions could be sufficiently substantial to contribute to an exceedance of an ambient 24-hour PM_{10} standard. Therefore, residual impacts associated with the largest prescribed burns under **Impact AQ-3** would be *potentially significant*.

3.3.2.3 Alternative 3: Listed Species Only

Impacts AQ-1 through AQ-6 apply to Alternative 3. It is estimated that Alternative 3 would develop fewer acres of conservation area than the proposed action, which generally would result in proportionately fewer air quality impacts.

Mitigation Measures

Mitigation Measures AQ-1 and AQ-2 apply to Alternative 3.

Residual Impacts

Mitigation Measure AQ-1 would reduce fugitive dust emissions from project activities. The exact site sizes and locations and construction methods are not known; thus, even with mitigation, the emissions from the development of the largest projects may still exceed the significance criteria considered in **Impacts AQ-2** and **AQ-4**. Therefore, residual impacts of PM_{10} emissions from the development of the largest projects would be *potentially significant*.

Mitigation Measure AQ-2 would reduce combustive emissions from prescribed burns. However, mitigated burn emissions could be sufficiently substantial to contribute to an

exceedance of an ambient 24-hour PM_{10} standard. Therefore, residual impacts associated with the largest prescribed burns under impact AQ-3 would be *potentially significant*.

3.3.2.4 Alternative 4: Off-Site Conservation

Impacts AQ-1, AQ-2, AQ-3, AQ-5 and AQ-6 apply to Alternative 4. Air emissions from the implementation of Alternative 4 would be comparable to those of the proposed action. Although activities associated with Alternative 4 would occur in slightly different locations than those proposed for Alternative 1 (with the exception of backwater establishment and other conservation measures specific to fish), the existing background pollutant levels do not differ substantially between these areas. The Muddy, Virgin, and Bill Williams rivers air shed areas all attain the ambient air quality standards, as does most of the project region under Alternative 1. Additionally, the lower Gila River area is within the Yuma PM_{10} nonattainment area, which also encompasses portions of the Alternative 1 project region along the LCR from about Imperial Dam to the SIB. None of the off-site conservation areas are located within California; therefore, the impacts identified in **Impact AQ-4** would not apply to this alternative, nor would the discussion of the CAAQS.

Mitigation Measures

Mitigation Measures AQ-1 and AQ-2 apply to Alternative 4.

Residual Impacts

Mitigation Measure AQ-1 would reduce fugitive dust emissions from project activities. The exact site sizes and locations and construction methods are not known; thus, even with mitigation, the emissions from the development of the largest projects may still exceed the significance criteria considered in **Impacts AQ-2** and **AQ-4**. Therefore, residual impacts of PM_{10} emissions from the development of the largest projects would be *potentially significant*.

Mitigation Measure AQ-2 would reduce combustive emissions from prescribed burns. However, mitigated burn emissions could be sufficiently substantial to contribute to an exceedance of an ambient 24-hour PM_{10} standard. Therefore, residual impacts associated with the largest prescribed burns under impact AQ-3 would be *potentially significant*.

3.4 BIOLOGICAL RESOURCES

This section addresses the impacts of the proposed action and alternatives on biological resources, including vegetation, fish and wildlife, and sensitive species, including those covered and evaluation species that are included in the proposed Conservation Plan. The proposed action is the adoption of the Conservation Plan and the issuance of incidental take authorization. Therefore, this section evaluates the effects of the incidental take of covered species resulting from the implementation of the covered activities, but does not evaluate the covered activities themselves. Impacts include short-term and long-term impacts from implementing the Conservation Plan, as well as impacts associated with the incidental take authorized by the issuance of the section 10(a)(1)(B) permit by the Service.

3.4.1 Affected Environment

3.4.1.1 Lower Colorado River

The hydrologic regime and habitats of the LCR have been substantially altered by people so that the river is no longer a continuous ecosystem. The changes include loss of riparian vegetation and floodplains, altered aquatic habitat structure and function, regulated flows, altered water quality (temperature, salinity/conductivity, pollutants), discontinuity of sediment and nutrient transport, and introduction of non-native species (plants and animals).

The dams and their resultant reservoirs have eliminated riparian vegetation and converted large areas of riverine habitat to lacustrine (reservoir/lake) habitat. The dams also pose barriers to movement of aquatic organisms, particularly fish, and regulate flows. This change in habitat structure, along with the release of water from deep in the reservoirs, has altered water temperature, transport of nutrients and sediments, and productivity. Agricultural and urban/industrial developments along the river have altered water quality through input of pollutants and salts, as well as removed riparian vegetation through flood control activities and water diversion. Non-native fish, invertebrates, wildlife, and plants have been introduced to the area and compete with or prey upon native species.

Vegetation

The Conservation Plan uses a land cover type classification system to describe vegetation and other habitat types that was derived from previous classifications (Anderson and Ohmart 1984a; 1984b, Younker and Anderson 1986, Salas et al. 1996, Ogden 1998). Reservoir, agriculture, and developed land cover types have been added for this Conservation Plan. The major land cover types present are woody riparian, marsh, aquatic, desert scrub, agriculture, and developed (Table 3.4-1). The woody riparian land cover type is further divided based on plant community (seven) and structural type (six), and the marsh is divided into seven types based on composition. The amount of each land cover type per reach is summarized in Table 3.4-2. The following descriptions of the vegetation within the land cover types were summarized from the LCR MSCP HCP. Some of these cover types are not carried forward into the impact analysis because little or no effect on species using them is anticipated to occur.

WOODY RIPARIAN

Currently, approximately 126,000 acres of woody riparian vegetation are present in the planning area. Of this, only 23,000 acres are native cottonwood-willow and honey mesquite land cover types. The remainder is dominated by the non-native saltcedar.

Table 3.4-1. Land Cover Type Classification

Land Cover Type	*Characteristics*
Woody Riparian	
Cottonwood-willow (6 structural types)	Goodding willow & cottonwood at least 10% of total trees
Saltcedar (6 structural types)	Saltcedar species constituting 80-100% of total trees
Honey mesquite (4 structural types)	Honey mesquite constituting 90-100% of total trees
Saltcedar-honey mesquite (4 structural types)	Honey mesquite at least 10% of total trees (usually <40%)
Saltcedar-screwbean mesquite (5 structural types)	Screwbean mesquite at least 20% of total trees
Arrowweed	Arrowweed at least 90-100% of total vegetation
Atriplex	Saltbush species constituting 90-100% of total vegetation
Marsh (7 compositional types)	1: nearly 100% cattail/bulrush; little common reed & open water 2: nearly 75% cattail/bulrush; many trees & grasses 3: about 25-50% cattail/bulrush; some common reed, open water, trees, & grasses 4: about 35-50% cattail/bulrush; many trees & grasses 5: about 50-75% cattail/bulrush; few trees & grasses 6: nearly 100% common reed; little open water 7: open marsh (75% water) adjacent to sparse marsh vegetation
Aquatic	
River	Mainstem plus tributaries and natural/artificial channels
Reservoir	"Lakes" formed by dams with variable water levels
Backwater	Open water plus marsh, temporary to permanent
Desert scrub	Adjacent to riparian and aquatic land cover types
Agriculture	Active or fallow, adjacent to riparian and aquatic land cover types
Developed	Buildings, roads, campgrounds, landscaped areas

Woody riparian structural types are as follows:
I Mature stand with distinctive overstory >15′ tall; intermediate class 2-15′ tall; understory 0-2′ tall
II Overstory >15′ tall and >50% of trees; little or no intermediate class
III Largest proportion of trees 10-20′ tall; few above 20′ or below 5′ tall
IV Few trees >15′; 50% of vegetation 5-15′ tall and 50% 1-2′ tall
V 60-70% of vegetation 0-2′ tall, remainder 5-15′ tall
VI 75-100% of vegetation 0-2′ tall

Cottonwood-Willow

The cottonwood-willow plant community is made up of winter-deciduous trees that reach about 60 feet in height (Holland 1986; Rowlands et al. 1995). Fremont cottonwood (*Populus fremontii*) and Goodding's willow (*Salix gooddingii*) are the dominant tree species, although other species of willows may be present as well; and willows are usually more abundant than cottonwoods. The trees form a closed to open canopy with a variable understory on deep, well-

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Table 3.4-2. Amount (Acres) of Each Land Cover Type By Reach

Land Cover Type	*Reach 1*	*Reach 2*	*Reach 3*	*Reach 4*	*Reach 5*	*Reach 6*	*Reach 7*	*Total*
Woody Riparian								
Cottonwood-willow	1,721	1	1,541	889	616	1,325	675	6,768
Saltcedar	2,254	838	13,647	26,923	5,581	6,257	2,800	58,300
Honey mesquite	0	4	627	6,443	175	5	0	7,253
Saltcedar-honey mesquite	58	359	3,463	13,398	778	234	2	18,293
Saltcedar-screwbean mesquite	0	32	5,058	4,654	579	786	49	11,159
Arrowweed	0	0	496	6,541	48	1,069	48	8,201
Atriplex	0	0	19	582	0	177	121	899
Marsh	137	22	4,358	2,091	3,762	1,414	129	11,914
Aquatic								
River	2,486	27,345	20,753	7,464	4,089	887	140	63,164
Reservoir	154,091	13	2,992	680	544	615	9	158,944
Backwater	NA	NA	7,841	3,427	4,994	1,510*	NA	17,772
Desert scrub	353	31	7,676	11,710	397	3,151	129	23,447
Agriculture	0	0	19,166	169,664	260	36,799	44,705	270,594
Developed	1	0	6,391	32,722	0	10,205	14,307	63,626
Other riparian**	0	0	6,634	6,268	0	2,337	13	15,252
TOTAL	161,100	28,645	100,661	293,456	21,825	66,772	63,127	735,586

NA = Not Available
*Not all of Reach 6 was surveyed
**Riparian cover types from LCR Accounting System database that do not fit into LCR MSCP land cover types as described

watered, loamy alluvial soils on floodplains of the Colorado River and its major tributaries (Holland 1986). This plant community requires periodic winter or spring flooding to create new silt beds for cottonwood and willow seed germination, and the dominant trees do not tolerate permanent inundation (Ohmart et al. 1988, Brown 1994). As a result of flow stabilization, stands of the cottonwood-willow community remaining along the Colorado River are primarily decadent and show little evidence of seedling recruitment (Brown 1994).

Saltcedar

Several species of the genus *Tamarix* make up this community (*T. chinensis, T. parviflora, T. ramosissima, and T. aphylla*). All are non-native and have aggressively displaced native riparian vegetation along the river, particularly in saline areas where native vegetation has been cleared or removed by fire (Brown 1994, Turner and Karpiscak 1980, Ohmart et al. 1988). Saltcedar generally occurs as a monoculture because it promotes conditions that it tolerates better than the native species. It grows on sandy or gravelly soils and produces a large number of very small seeds, from March through October, that are dispersed long distances by wind and water (DeLoach et al. 2000, Lovich 2000). Stabilized low flows and regular summer flooding of river bars provide ideal conditions for establishment of saltcedar (Turner and Karpiscak 1980). It also takes up and excretes salts that increase soil salinity, and it increases fire frequency by producing large amounts of litter (DeLoach et al. 2000).

Honey Mesquite

Honey mesquite (*Prosopsis glandulosa* var. *torreyana*) often forms monotypic stands of trees less than 30 feet tall, and it also grows mixed with other shrubby species. The canopy can be open or continuous, and the understory is usually of sparse shrubs or of grasses. This species does not tolerate prolonged inundation during the growing season and historically grew on secondary and higher terraces on the floodplain. Conversion of these terraces to agriculture decimated the populations in those areas. Regulation of the river, however, allowed the species to colonize areas closer to the river where it is vulnerable to replacement by saltcedar after flooding, fire, and vegetation clearing because it does not colonize open areas as rapidly as saltcedar (Minckley and Brown 1982; Ohmart et al. 1988). Honey mesquite is a facultative wetland plant (equal chance of being in upland or wetland plant communities) and has a long taproot to reach deep water tables (Reed 1988; Ohmart et al. 1988).

Saltcedar-Honey Mesquite

Honey mesquite comprises 10 to 40 percent of the trees in this community (Younker and Andersen 1986), which forms as saltcedar becomes well established in openings within a mesquite stand. Saltcedar gradually replaces honey mesquite, particularly after fires and floods, and as soil salinity increases (Ohmart et al. 1988).

Saltcedar-Screwbean Mesquite

Screwbean mesquite (*Prosopsis pubescens*) is always found in association with saltcedar in the planning area and reflects the expansion of saltcedar with its displacement of screwbean mesquite (Ohmart et al. 1988; DeLoach et al. 2000). Historically, this species was fairly scarce

along the LCR, but it increased in abundance downstream from Parker Dam after that dam was completed due to stabilized summer low flows and reduced spring flooding (Ohmart et al. 1988). The subsequent expansion of agriculture on tribal lands reduced its abundance, and this decline has continued due to replacement by saltcedar.

Arrowweed

Arrowweed (*Pluchea sericea*) occurs along drier portions of the river floodplain, along canyon bottoms and irrigation ditches, around springs, and in sandy or gravelly washes (Ohmart et al. 1988, Holland 1986, Brown 1994, Sawyer and Keeler-Wolf 1995). It reproduces by seed and can spread vegetatively. Once established, it spreads laterally by rhizomes to form continuous stands. The species can recolonize open alluvial deposits by resprouting from roots and buried stems (Stromberg 1993). It has replaced cottonwood-willow vegetation in some areas because it tolerates higher soil salinities and can survive with greater groundwater depths (Holland 1986; Ohmart et al. 1988; Busch and Smith 1995) although it is being replaced by saltcedar in other areas (Turner and Karpiscak 1980).

Atriplex

Several species of saltbush (*Atriplex lentiformis, A. canescens, A. polycarpa*) form this community that occurs in saline areas along the LCR, often between stands of cottonwood-willow or saltcedar and stands of mesquite (Ohmart et al. 1988; Brown 1994; Younker and Andersen 1986). Quailbush (*A. lentiformis*) is the primary species in the community along the river, while the other species are more commonly found in the desert scrub community.

MARSH

Marshes occur in areas characterized by long-term flooding such as oxbow lakes, backwaters, and around reservoirs with minimal daily and annual fluctuations in water level (Ohmart et al. 1988; Brown 1994). The dominant species are cattails (*Typha* spp.), bulrush (*Scirpus* spp.), and common reed (*Phragmites australis*) (Ohmart et al. 1988). Cattails grow in shallow water up to 3 feet deep while bulrushes can grow in water to a depth of 5 feet. Common reed forms dense stands along the banks (Ohmart et al. 1988; Brown 1994). At the upper elevation limit of marshes, the plants can intergrade with riparian scrub species (Brown 1994). Marshes can include open water, as well as sandbars and mudflats when the water level is low (Salas et al. 1996).

OTHER

The river land cover type includes marshes in shallow waters and can include riparian vegetation when these areas are inundated by high water. Marshes can also be part of backwaters. Desert scrub comprises several plant communities that occur adjacent to the floodplain and river channel along with agriculture and development. Agricultural fields are dominated by various crops, while fallow fields support primarily weedy species. A variety of landscape species are used in developed areas.

Fish and Wildlife

The LCR supports several hundred species of wildlife (birds, mammals, fish, reptiles, and amphibians), including both resident species and migratory visitors, that use the land cover types described above. Woody riparian vegetation and upland land cover types such as desert scrub and, to some extent, agriculture provide habitat for common mammals such as mule deer (*Odocoileus hemionus*), burro (*Equus asinus*) (a non-native mammal), coyote (*Canis latrans*), bobcat (*Felis rufus*), Audubon cottontail (*Sylvilagus audubonii*), several species of rodents and bats, striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*) (Anderson and Ohmart 1984b). Reptiles and amphibians are represented by several species of lizards, snakes, toads, and frogs, many of which are native to the area. Most of these use upland and riparian areas, but the amphibians require water for reproduction. The spiny soft-shelled turtle (*Trionyx spiniferus*) has also been introduced and is present in Lake Mead and Lake Mohave (Allan and Roden 1978). A variety of aquatic invertebrates inhabit the reservoirs and river. Fourteen species of zooplankton have been reported in Lake Mead and Lake Mohave as well as mollusks, crustaceans, aquatic and terrestrial insects, and a freshwater jellyfish (Allan and Roden 1978).

Historically, the Colorado River in the planning area was inhabited by eight native fish species. Four of these native species are marine or brackish water species that probably never got much farther upstream than the Imperial Dam area: spotted sleeper (*Eleotris picta*), machete (*Elops affinis*), longjaw mudsucker (*Gillichthys mirabilis*), and striped mullet (*Mugil cephalus*). Of the other four species (Colorado pikeminnow [*Ptychocheilus lucius],* razorback sucker [*Xyrauchen texanus*], bonytail [*Gila elegans*], and desert pupfish [*Cyprinodon macularius*]), only the bonytail and razorback sucker are still present. At least 23 non-native fish species have been introduced into the LCR in California (Moyle 2002). These include threadfin shad (*Dorosoma petenense*), five species of minnow, four species of catfish, mosquitofish (*Gambusia affinis*), striped bass (*Morone saxatalis*), six species of centrarchids (bass and sunfish), and four species of cichlids. Most of these species plus several species of trout and salmon have been stocked in Lake Mead and Lake Mohave (Allan and Roden 1978). The Lake Mead fish hatchery and the Willow Beach hatchery (on Lake Mohave) supply rainbow trout (*Oncorhynchus mykiss*) for stocking into the LCR.

The Colorado River corridor provides important habitat for migratory birds, both upland species and waterfowl, as well as habitat for resident species. Woody riparian vegetation and wetlands provide habitat for a variety of raptors that include sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus johannis*), common black hawk (*Buteogallus anthracinus*), Harris' hawk (*Parabuteo unicinctus*), bald eagle (*Haliaeetus luecocephalus*), golden eagle (*Aquila chrysaetos*), white-tailed kite (*Elanus leucurus*), American kestrel (*Falco sparverius*), and peregrine falcon (*Falco peregrinus*). Other common birds include egrets, herons, flycatchers, and woodpeckers. Backwaters and reservoirs provide resting and foraging habitat for waterfowl and shorebirds.

Sensitive Species

Sensitive species, for the purposes of the Conservation Plan, are defined as special-status species that meet one or more of the following criteria:

- animal species listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.11 [listed animals], and various notices in the Federal Register [proposed species]);
- animal species that are candidates for possible future listing as threatened or endangered under the ESA (61 FR 40: 7596-7613, February 28, 1996);
- wildlife species of special concern to AGFD;
- plants listed as rare under the California Native Plant Protection Act;
- plants included on California Native Plant Society (CNPS) List 1A, 1B, 2, or 3;
- animal species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5);
- animal species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines, section 15380);
- animal species of special concern to CDFG (Remsen 1978 [birds], Williams 1986 [mammals], and Jennings and Hayes 1994 [amphibians and reptiles]);
- animals fully protected in California (California Fish and Game Code, section 3511 [birds], section 4700 [mammals], section 5050 [reptiles and amphibians], and section 5515 [fish]);
- animal species included in CDFG's list of Special Animals and monitored by the California Natural Diversity Database (CNDDB);
- animal and plant species that are protected under State of Nevada Administrative Code (503.030); and
- BLM and Service designated sensitive species.

Covered and Evaluation Species

A number of species that are Federally listed as threatened or endangered are known or have the potential to occur along the LCR, and six of these are included in the proposed Conservation Plan. All of these are also listed by one or more states along the river. In addition, the Conservation Plan includes six species that are state-listed but not Federally listed; 13 species that are designated as species of special concern in one or more states; and two species that have no current regulatory status but could become listed over the 50-year life of the Conservation Plan. Four other species are included in the Conservation Plan as "evaluation species" that could be proposed for coverage under the section 10(a)(1)(B) permit in the future. Table 3.4-3 lists the species proposed for coverage in the Conservation Plan and their regulatory status with brief notes about the species. More detailed information is provided in the LCR MSCP BA and is summarized in Appendix I.

Other Sensitive Species

Additional species are considered sensitive and have special status, are known or suspected to have occurred in the planning area, and are not covered under the Conservation Plan. These species are not covered under the Conservation Plan because covered activities would not affect

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Table 3.4-3. Covered and Evaluation Species for the Conservation Plan

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Covered Species*[5]	*Notes*[6]
MAMMALS						
California leaf-nosed bat *Macrotus californicus*	–	ASC	CSC	–	E	Roost in caves/mines, forages near open water
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	–	–	CSC	–	E	Roost in caves or structures, forages over desert scrub, riparian vegetation, or open water
Western red bat *Lasiurus blossevillii*	–	ASC	–	–	C	Roost in riparian trees
Western yellow bat *Lasiurus xanthinus*	–	ASC	–	–	C	Roost in palms or riparian trees, forages over canopy
Desert pocket mouse *Chaetodipus penicillatus sobrinus*	–	–	–	–	C	Endemic to R1-2, sand in riparian/mixed desert scrub
Colorado River cotton rat *Sigmodon arizonae plenus*	–	–	CSC	–	C	R3-4 in mesic herbaceous vegetation
Yuma hispid cotton rat *Sigmodon hispidus eremicus*	–	–	CSC	–	C	Moist grassy areas or brushy areas along river
BIRDS						
Western least bittern *Ixobrychus exilis hesperis*	–	ASC	CSC	–	C	Cattail & bulrush marshes, summer resident & breeder
Yuma clapper rail *Rallus longirostris yumanensis*	FE	ASC	CT/FP	–	C	R1, 3-7 in marshes with water <12"
California black rail *Laterallus jamaicensis coturniculus*	–	ASC	CT/FP	–	C	Bulrush marsh with shallow water
Yellow-billed cuckoo *Coccyzus americanus*	FC	ASC	CE	–	C	R3-5 in mature CW forest
Elf owl *Micrathene whitneyi*	–	–	CE	NP	C	R3-4 in CW or mesquite with large snags
Gilded flicker *Colaptes chrysoides*	–	–	CE	–	C	Primarily at Bill Williams Delta in CW with saguaro nearby
Gila woodpecker *Melanerpes uropygialis*	–	–	CE	–	C	R3-6 in tall trees; nest in snags
Southwestern willow flycatcher *Empidonax trailii extimus*	FE	ASC	CE	–	C	Dense riparian vegetation close to ground with water or moist soil
Vermilion flycatcher *Pyrocephalus rubinus*	–	–	CSC	–	C	CW with mesquite, open water and pasture nearby

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Table 3.4-3. Covered and Evaluation Species for the Conservation Plan (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Covered Species*[5]	*Notes*[6]
Arizona Bell's vireo *Vireo bellii arizonae*	–	–	CE	–	C	CW and mesquite; forage in dense riparian vegetation
Sonoran yellow warbler *Dendroica petechia sonorana*	–	–	CSC	–	C	Nest in wet deciduous thickets of saltcedar or CW
Summer tanager *Piranga rubra*	–	–	CSC	–	C	Nest in CW or saltcedar; forage in top of trees
REPTILES						
Desert tortoise (Mojave population) *Gopherus agassizii*	FT	ASC	CT	NT	C	R1-6 in desert scrub with creosote bush; burrows; critical habitat in R1-4
Flat-tailed horned lizard *Phrynosoma mcalli*	–	ASC	CSC	–	C	R6-7 in fine sand in sparse desert scrub
AMPHIBIANS						
Colorado River toad *Bufo alvarius*	–	–	CSC	–	E	Requires water for breeding; uses burrows Aug-Feb
Relict leopard frog *Rana onca*	FC	ASC	–	NP	C	R1-2 in Lake Mead NRA; shallow water with emergent vegetation & adjacent CW with moist soil
Lowland leopard frog *Rana yavapaiensis*	–	ASC	CSC	–	E	Bill Williams River NWR in flowing water with aquatic vegetation & adjacent CW with moist soil
FISH						
Bonytail *Gila elegans*	FE	ASC	CE	NE	C	R2-3; critical habitat in planning area; population not self-sustaining
Humpback chub *Gila cypha*	FE	ASC	–	–	C	Not currently in planning area
Flannelmouth sucker *Catostomus latipinnis*	–	ASC	–	–	C	R3 in main channel; juveniles use backwaters
Razorback sucker *Xyrauchen texanus*	FE	ASC	CE/FP	NE	C	R1-5; critical habitat in planning area; population not self-sustaining

Table 3.4-3. Covered and Evaluation Species for the Conservation Plan (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Covered Species*[5]	*Notes*[6]
INVERTEBRATES						
MacNeill's sootywing skipper *Pholisora gracielae*	–	–	–	–	C	R1-3 & below Parker Dam in R4; interface of quailbush & honey mesquite with high groundwater
PLANTS						
Sticky buckwheat *Eriogonum viscidulum*	–	–	–	NEP	C	R1-2 in Mohave mixed scrub in deep sands with seasonally moist soil
Threecorner milkvetch *Astragalus geyeri* var. *triquetrus*	–	–	–	NEP	C	R1-2 in creosote bush scrub with stabilized sandy soil

Notes:
1 Federal Status
FE = Listed as endangered under the ESA.
FT = Listed as threatened under ESA.
FC= Candidate for listing under ESA.
2 Arizona Status
ASC = Arizona wildlife of special concern.
3 California Status
CE = Listed as endangered under CESA.
CT = Listed as threatened under CESA.
CSC = California species of special concern.
FP = Fully protected under the California Fish and Game Code.
4 Nevada Status
NE = Nevada endangered
NT = Nevada threatened.
NEP = Nevada critically endangered plant.
NP = Nevada protected.
5 C = Conservation Plan covered species.
E = Conservation Plan evaluation species.
6 R = Reach.
CW = Cottonwood-willow.

(result in take of) the Federally listed species or because the species are not anticipated to become Federally listed over the life of the proposed action. These species, however, are included in the impact analysis because actions that are part of the Conservation Plan could adversely affect one or more of these species, and such impacts must be addressed under CEQA and NEPA. The status of these sensitive species and the primary habitats or plant communities where they generally are found are presented in Table 3.4-4, and additional information is provided in Appendix D. These sensitive species include a number of bats, Yuma puma, piscivorous (fish-eating) birds, wading birds, waterfowl, raptors, riparian-dependent song birds, several bird species associated with agriculture and grasslands, other upland and water-associated birds, two species of toad, the banded Gila monster and rosy boa, two invertebrates, and one plant.

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Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Notes*[5]
MAMMALS					
Mexican long-tongued bat *Choeronycteris mexicana*	–	–	CSC	–	Northern limit of range just over U.S./Mexico border; migratory with adult females into U.S.
Occult little brown bat *Myotis lucifugus occultus*	–	–	CSC	–	Roost in tree cavities, under rocks/wood, or in structures; forage along shorelines
Small-footed myotis *Myotis ciliolabrum*	–	–		–	Roost in trees, bridges, rocks; occur in CW, pinyon-juniper, chaparral
Fringed myotis *Myotis thysanodes*	–	–		–	Roost and breed in caves, mines, buildings; occur in oak woodland near water
Cave myotis *Myotis velifer*	–	–	CSC	–	Forage in linear stands of mesquite, saltcedar, or acacia along still water
Yuma myotis *Myotis yumanensis*	–	–	CSC	–	Roost in buildings; prefer cliffs/rock walls near open woodland or scrub; forage over water
Spotted bat (*Euderma maculatum*)	–	ASC	CSC	NT	In montane, riparian, & scrub vegetation; forage on moths
Allen's big-eared bat *Indionycteris (=Plecotus) phyllotis*	–	–		–	At higher elevations (e.g., Mogollon Rim); forage near water
Pallid bat *Antrozous pallidus*	–	–	CSC	–	Primarily in desert scrub; roost in rocks, hollow trees, buildings etc.
Pocketed freetail bat *Nyctinomops femorosaccus*	–	–	CSC	–	Roost in buildings, caves, crevices in semi-arid desert; forage on insects
Big freetail bat *Nyctinomops macrotis*	–	–	CSC	–	Roost in rocky areas of desert scrub; forage on insects
Greater western mastiff bat *Eumops perotis californicus*	–	–	CSC	–	Prefer rugged rocky areas in desert scrub; forage on insects & require water
Yuma puma *Felis concolor browni*	–	ASC	CSC	–	Requires open water, rocky shelters; prey on medium to large mammals
BIRDS					
Clark's grebe *Aechmophorus clarkii*	–	ASC	–	–	Common year-round; breeds in open marshes; forages/rests in open water in reservoirs
California brown pelican *Pelecanus occidentalis*	FE	–	CE/FP	NP	Rare late summer/fall; forages in open water in reservoirs; rests on sandbars
American white pelican *Pelecanus erythrorhynchos*	–	–	CSC	NP	Uncommon migrant; forages in open water in reservoirs; rests on sandbars

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Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Notes*[5]
Double-crested cormorant *Phalacrocorax auritus*	–	–	CSC[6]	–	Common year-round; forages in open water in reservoirs; rests on sandbars and perches in trees; breeds on large trees
American bittern *Botaurus lentiginosus*	–	ASC	–	–	Uncommon, winter; forages in dense marshes
Great blue heron *Ardea herodias*	–	–	–	–	Common year-round; forages in marshes & shallow waters, and in agricultural fields & irrigation ditches
Great egret *Ardea alba*	–	ASC	–	–	Common year-round; forages in marshes & shallow waters, and in agricultural fields & irrigation ditches
Snowy egret *Egretta thula*	–	ASC	–	–	Common year-round; forages in marshes & shallow waters, and in agricultural fields & irrigation ditches
Black-crowned night-heron *Nycticorax nycticorax*	–	–	–	–	Common year-round; forages in marshes& shallow waters, and in agricultural fields & irrigation ditches
White-faced ibis *Plegadis chihi*	–	–	CSC[6]	NP	Common year-round; forages and breeds in marshes, also forages in agricultural fields
Wood stork *Mycteria americana*	–	–	CSC	–	Casual post-breeding visitor; forages along river banks and backwaters
Turkey vulture *Cathartes aura*	–	–	–	NP	Common year-round; forages throughout; nests primarily on cliff faces, and perhaps in CW
Fulvous whistling-duck *Dendrocygna bicolor*	–	–	CSC	–	Casual post-breeding visitor; forages in marshes
Redhead *Aythya americana*	–	–	CSC	–	Uncommon, winter; forages in marshes and open water
Osprey *Pandion haliaetus*	–	ASC	–	NP	Uncommon migrant; forages in open water; roosts in tall trees
Bald eagle *Haliaeetus leucocephalus*	FT	ASC	CE/FP	NE	Rare, winter; forages in open water; roosts in tall trees
White-tailed kite *Elanus leucurus*	–	–	CSC	NP	Casual, winter; forages in agricultural fields; roosts in trees and shrubs
Northern harrier *Circus cyaneus*	–	–	CSC	NP	Common, winter; forages in agricultural fields & open riparian areas
Cooper's hawk *Accipiter cooperi*	–	–	CSC[6]	NP	Common, winter; forages primarily in riparian woodlands
Harris' hawk *Parabuteo unicinctus*	–	–	CSC	NP	Casual, year-round; forages primarily in riparian woodlands & mesquite scrub

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Notes*[5]
Swainson's hawk *Buteo swainsoni*	–	–	CT	NP	Uncommon migrant; forages in agricultural fields & open riparian areas
Ferruginous hawk *Buteo regalis*	–	ASC	CSC[6]	NP	Uncommon, winter; forages in agricultural fields
Golden eagle *Aquila chrysaetos*	–	–	FP	NP	Rare, winter; forages in agricultural fields and open riparian areas
American kestrel *Falco sparverius*	–	–	–	NP	Common year-round; forages in agricultural fields and riparian areas; breeds in cavities in large trees
Merlin *Falco columbarius*	–	–	CSC[6]	NP	Uncommon, winter; forages in agricultural fields and open riparian areas; roosts in trees and on fences
Peregrine falcon *Falco peregrinus*	–	ASC	CE/FP	NE	Rare, winter; forages in agricultural fields and water areas on waterfowl
Prairie falcon *Falco mexicanus*	–	–	CSC	NP	Uncommon, winter; forages in agricultural fields & open riparian areas
Greater sandhill crane *Grus canadenis tabida*	–	–	CT/FP	–	Common, winter; forages in agricultural fields
Western snowy plover (interior population) *Charadrius alexandrinus nivosus*	FT	ASC	CSC	–	Rare migrant; forages in agricultural fields; also found in marshes
Mountain plover *Charadrius montanus*	–	–	CSC	–	Uncommon, winter; forages in agricultural fields
Long-billed curlew *Numenius americanus*	–	–	CSC[6]	–	Common migrant; forages in agricultural fields
California gull *Larus californicus*	–	–	CSC[6]	–	Common migrant; forages in agricultural fields; roosts in open water & on sandbars
Black tern *Chlidonias niger*	–	–	CSC	–	Uncommon migrant; forages in open water
Greater roadrunner *Geococcyx californianus*	–	–	–	NP	Common year-round; forages and breeds in open scrub
Long-eared owl *Asio otus*	–	–	CSC	NP	Rare year-round; forages in agricultural fields & open riparian; breeds in dense riparian woodland
Short-eared owl *Asio flammeus*	–	–	CSC	NP	Rare, winter; forages in agricultural fields and open riparian
Burrowing owl *Athene cunicularia*	–	–	CSC	NP	Common to uncommon, year-round in open areas (grassland, agriculture, desert) with existing burrows
Lesser nighthawk *Chordeiles acutipennis*	–	–	–	NP	Common, summer; forages over open water, agricultural fields and open riparian

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Notes*[5]
Vaux's swift *Chaetura vauxi*	–	–	CSC	–	Uncommon migrant; forages over open water, agricultural fields and open riparian
Belted kingfisher *Ceryle alcyon*	–	ASC	–	NP	Common, winter; forages in marshes and open water plus in irrigation ditches
Olive-sided flycatcher *Contopus cooperi*	–	–	CSC	–	Uncommon migrant; forages in mature CW woodland, parks, suburban areas, golf courses, and sometimes in mature honey mesquite
Ash-throated flycatcher *Myiarchis cinerascens*	–	–	–	–	Common year-round; forages and breeds in riparian areas/desert scrub
Brown-crested flycatcher *Myiarchis tyrannulus*	–	–	CSC[6]	–	Rare, summer; forages and breeds in mature CW woodland, parks, suburban areas, golf courses, and sometimes in mature honey mesquite
Purple martin *Progne subis*	–	–	CSC	–	Rare migrant; forages over open water, agricultural fields and open riparian
Bank swallow *Riparia riparia*	–	–	CT	–	Uncommon migrant; forages over open water, agricultural fields and open riparian
Swainson's thrush *Catharus ustulatus*	–	–	CSC	–	Uncommon spring migrant; forages in CW woodland, parks, suburban areas, golf courses, & sometimes in honey mesquite
Bendire's thrasher *Toxostoma bendirei*	–	–	CSC	–	Rare, winter; forages in riparian & upland desert scrub
Crissal thrasher *Toxostoma crissale*	–	–	CSC	–	Common year-round; forages and breeds in riparian scrub
Loggerhead shrike *Lanius ludovicianus*	–	–	CSC	–	Common year-round; forages in agricultural fields and open riparian areas; breeds in trees and shrubs in agricultural, landscape, & riparian areas
Lucy's warbler *Vermivora luciae*	–	–	CSC	–	Common, summer; forages and breeds in mesquite & CW woodland
Yellow-breasted chat *Icteria virens*	–	–	CSC	–	Uncommon, summer; forages and breeds in mesquite & CW woodland
Northern cardinal *Cardinalis cardinalis*	–	–	CSC[6]	–	Rare year-round; forages and breeds in riparian scrub and suburban areas
Abert's towhee *Pipilo aberti*	–	–	–	–	Common year-round; forages and breeds in riparian woodland and scrub, plus edges of agricultural fields

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Notes*[5]
Large-billed savannah sparrow *Passerculus sandwichensis rostratus*	–	–	CSC	–	Rare, winter; forages in open scrub and perhaps in agricultural fields
Sage sparrow *Aimophila belli*	–	–	CSC	–	Uncommon, winter; forages in inkweed/open mesquite scrub
Grasshopper sparrow *Ammodramus savannarum*	–	–	CSC	–	Rare, winter; forages in agricultural fields
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	–	–	CSC	–	Common year-round; breeds and forages in marshes, also forages in agricultural fields
Lawrence's goldfinch *Carduelis lawrencei*	–	–	CSC	–	Variable, winter; forages in mesquite, riparian scrub, and edges of agricultural fields
REPTILES					
Banded Gila monster *Heloderma suspectum cinctum*	–	–	CSC	NP	In a variety of plant communities, desert to riparian; use animal burrows or crevices for shelter
Desert rosy boa *Lichanura trivirgata gracia*	–	–	CSC[6]	–	In rocky shrubland and desert; attracted to intermittent and permanent water
AMPHIBIANS					
Arizona toad *Bufo microscaphus microscaphus*	–	–	–	–	In rocky streams and washes; eggs laid in pools
Couch's spadefoot toad *Scaphiopus couchii*	–	–	CSC	–	Breeds in rain pools lasting at least 7 days; dormant in burrows much of year
INVERTEBRATES					
Maricopa tiger beetle *Cicindela oregona maricopa*	–	–	–	–	Often on sandy stream banks; burrow
Obsolete Viceroy butterfly *Limenitis archippus obsoleta*	–	–	–	–	Willow is host plant; feed on tree sap, dung, flower nectar
PLANTS					
Mud nama *Nama stenocarpum*	–	–	–	–	Intermittent wet areas (mud flats, lake shores, river banks)

Table 3.4-4. Other Sensitive Species that Could Be Present in the Planning Area (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*California Status*[3]	*Nevada Status*[4]	*Notes*[5]

Notes:
1 Federal Status
FE = Listed as endangered under the ESA.
FT = Listed as threatened under ESA.
FP = Proposed for listing as threatened under ESA.
FC= Candidate for listing under ESA.
2 Arizona Status
ASC = Arizona wildlife of special concern.
3 California Status
CE = Listed as endangered under CESA.
CT = Listed as threatened under CESA.
FP = Fully protected under the California Fish and Game Code.
CSC = California species of special concern.
4 Nevada Status
NE = Nevada endangered
NT = Nevada threatened.
NEP = Nevada critically endangered plant.
NP = Nevada protected.
5 CW = Cottonwood-willow
6 Under review by CDFG for removal from the current list of California Species of Special Concern.

The CNDDB identifies the following sensitive plant communities in the planning area: Sonoran Cottonwood-Willow Riparian Forest, Mesquite Woodland, and Alkali Bulrush-Cattail Marsh and Brackish Bulrush-Cattail Marsh.

3.4.1.2 Muddy River/Moapa Valley and Virgin River

Both the Muddy River and Virgin River are tributaries to Lake Mead and are not in the planning area. The Virgin River is a perennial stream that originates in the plateaus of southern Utah above Zion National Park. It flows through the park and southwesterly in the Virgin River Canyon, between the Virgin and Mormon mountains. Strong seasonal flows are associated with spring snowmelt and flash floods during summer thunderstorms (BIO/WEST 2001). Although the Virgin River upstream of Lake Mead is a largely intact riparian ecosystem, its plant and animal communities are strongly affected by non-native invasive species.

The headwaters of the Muddy River are formed by the outflows of numerous hot springs that discharge in the vicinity of Warm Springs and support a unique ecosystem that includes several endemic species. Downstream, the Muddy River flows through agricultural lands of the Moapa Valley and is heavily altered by flood control structures, channels, and canals.

Vegetation

A detailed evaluation of the lower Virgin River riparian corridor, extending upstream from Lake Mead to about 4 miles above Littlefield, Arizona and covering 11,132 acres, completely overlapping and extending upstream beyond the area considered as part of this alternative, was conducted by CH2MHill for Reclamation (1999). The mapping of vegetation communities and open water/river channel was based on 1997 surveys. Totals for the study area as a whole are as follows:

- Saltcedar (8,612 acres), by far the dominant vegetation of this off-site conservation area, in four structural types (III-VI).
- Saltcedar-Honey Mesquite (264 acres), dominated by tamarisk but including honey mesquite.
- Arrowweed (95 acres), as mapped along the LCR and occurring throughout the riparian corridor on sandy sites or in old channels.
- Honey Mesquite (92 acres) and Screwbean Mesquite (48 acres), occurring in small pockets on the edges of the riparian corridor.
- Cottonwood-Willow (729 acres), dominated by willow and cottonwood trees in five structural types (I-V). An additional 20 acres were identified as Cottonwood Regeneration Areas based on recent recruitment and presence of young cottonwoods in otherwise open areas.
- Marsh (412 acres), dominated by herbaceous wetland plants.
- Open Water/River Channel (758 acres), consisting of the river channel, including bars and adjacent ponds and reservoirs. An additional 1,144 acres consists of unvegetated alluvium subject to heavy scouring or deposition during the study.
- Agriculture (101 acres) crops, and fallow fields.

Similar to the earlier, more generalized mapping done by Ohmart (USBR 1982a), the numbers indicate the riparian corridor is strongly dominated by saltcedar. This would provide the opportunity to expand native riparian vegetation acreage in this region by removing/converting saltcedar. The relatively natural floodplain of the Virgin River also provides substantial opportunity for reestablishing backwater and marsh habitats.

The area considered for off-site conservation along the Muddy River/Moapa Valley riparian corridor extends upstream from the Overton arm of Lake Mead to the headwaters of the Muddy River at Warm Springs, Nevada, the location of the Moapa NWR, which is part of the larger Desert NWR. The Warm Springs area is remarkable for the discharge of numerous hot springs that provide a unique and effectively isolated habitat for several species of endemic fishes (see Fish and Wildlife below). At the refuge and extending downstream, a non-native palm woodland of California fan palms (*Washingtonia filifera*) and date palms (*Phoenix dactylifera*) is prevalent alongside the stream, intermixed with marsh vegetation and pools of open water. Native mesquite and saltbush vegetation exists but is of limited extent (e.g., see http://desertcomplex.fws.gov/). Farther downstream, the riparian corridor is dominated by saltcedar, with surrounding lands a mix of agriculture and desert scrub vegetation (Scoppettone et al. 1998). The palms and saltcedar promote fires and encroach upon the streambed and pools, jeopardizing the native fishes (Scoppettone et al. 1998).

Fish and Wildlife

Native fishes of the lower Virgin River downstream of the Riverside Bridge and within the off-site conservation area include the desert sucker (*Catostomus clarki*) and speckled dace (*Rhinichthys osculus*) (BIO/WEST 1999). Woundfin (*Plagopterus argentissiums*) and Virgin River chub (*Gila seminuda*) are also present (see sensitive species below), and critical habitat for both

of these species is present in this area. Non-native fishes inhabiting this reach of the river include red shiner (*Cyprinella lutrensis*), common carp (*Cyprinus carpio*), and mosquitofish, among others (USBR 1982a).

The Muddy River/Moapa Valley area provides limited woody riparian vegetation that is dominated by saltcedar. Critical aquatic habitat for endemic fishes exists in the headwaters at Warm Springs and downstream (USFWS 1995; Scoppettone et al. 1998). Native fishes of the Muddy River include the Moapa speckled dace (*Rhinichthys osculus moapae*), Moapa White River springfish (*Crenichthys baileyi moapae*), and Muddy River roundtail chub (*Gila seminuda*). A large number of non-native fish species are present, predominantly downstream of the Warm Springs area and continuing into Lake Mead (see USFWS 1995). Non-native species that co-occur with native fishes in spring-fed pools include shortfin mollies (*Poecilia mexicana*), mosquitofish, and tilapia (*Oreochromis aureus*) (Scoppettone et al. 1998).

As part of the BIO/WEST (2001) study, wildlife surveys were conducted over a 3-year period in all the major vegetation types. A total of 233 wildlife species were observed. The greatest number of species (140) were associated with the open water/river channel area. Although amounting to a small percentage of the total area surveyed, more than half (121) of the total number of species observed were in riparian forest, and about 18 percent (43) of the total were almost exclusively associated with that vegetation type. Emergent wetlands and springs are of very limited extent along the river but provide nesting habitat for many species. Saltcedar-dominated, mixed (saltcedar plus natives) shrublands, and willow-dominated riparian scrub all were found to support moderate wildlife diversity. A detailed breakdown of species' occurrences by vegetation type is provided by BIO/WEST (2001).

Sensitive Species

Sensitive species, including covered and evaluation species, that are present or could be present in each of the off-site conservation areas are listed in Table 3.4-5.

COVERED AND EVALUATION SPECIES

Of the 31 covered and evaluation species, 19 are present or could be present within the Virgin and Muddy rivers off-site conservation area (Table 3.4-5) and would benefit from habitat establishment and subsequent management actions on a combination of public and private lands. The Virgin River supports the largest concentration of southwestern willow flycatchers (40 known territories) in the LCR recovery unit and is one of the key areas targeted for recovery of the species, with a goal of 100 territories (USFWS 2002d). In addition, the flannelmouth sucker occurs in the Virgin and Muddy rivers.

OTHER SENSITIVE SPECIES

A total of 65 additional sensitive species that are or could be present in or near this off-site conservation area are listed in Table 3.4-5. Sensitive fish species that could be present in or adjacent to this off-site conservation area that are not present in the planning area described above are the Moapa dace (*Moapa coriacea*), Virgin river spinedace (*Lepidomeda mollispinis*), woundfin (*Plagopterus argentisimus*), and Virgin River chub (*Gila seminuda*). Other potentially

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Nevada Status*[3]	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	*Lower Bill Williams River*	*Lower Gila River*
MAMMALS						
California leaf-nosed bat[4] *Macrotus californicus*	–	ASC	–	X	X	X
Pale Townsend's big-eared bat[4] *Corynorhinus townsendii pallescens*	–	–	–	X	X	X
Western red bat[5] *Lasiurus blossevillii*	–	ASC	–	X	X	X
Western yellow bat[5] *Lasiurus xanthinus*	–	ASC	–	X	X	X
Mexican long-tongued bat *Choeronycteris mexicana*	–	–	–		X	X
Occult little brown bat *Myotis lucifugus occultus*	–	–	–	X	X	X
Small-footed myotis *Myotis ciliolabrum*	–	–	–	X	X	X
Fringed myotis *Myotis thysanodes*	–	–	–	X	X	X
Cave myotis *Myotis velifer*	–	–	–	X	X	X
Yuma myotis *Myotis yumanensis*	–	–	–	X	X	X
Spotted bat *Euderma maculatum*	–	ASC	NT	X	X	X
Allen's big-eared bat *Indionycteris (=Plecotus) phyllotis*	–	–	–	X	X	X
Pallid bat *Antrozous pallidus*	–	–	–	X	X	X
Pocketed freetail bat *Nyctinomops femorosaccus*	–	–	–		X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Nevada Status*[3]	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	*Lower Bill Williams River*	*Lower Gila River*
MAMMALS						
Big freetail bat *Nyctinomops macrotis*	–	–	–	X	X	X
Greater western mastiff bat *Eumops perotis californicus*	–	–	–	X	X	X
Desert pocket mouse[5] *Chaetodipus penicillatus sobrinus*	–	–	–	X		
Yuma hispid cotton rat[5] *Sigmodon hispidus eremicus*	–	–	–			X
Yuma puma *Felis concolor browni*	–	ASC	–		X	X
BIRDS						
Double-crested cormorant *Phalacrocorax auritus*	–	–	–		X	
American bittern *Botaurus lentiginosus*	–	ASC	–		X	
Western least bittern[5] *Ixobrychus exilis hesperis*	–	ASC	–	X	X	X
Great blue heron *Ardea herodias*	–	–	–	X	X	X
Great egret *Ardea alba*	–	ASC	–	X	X	X
Snowy egret *Egretta thula*	–	ASC	–	X	X	X
Black-crowned night-heron *Nycticorax nycticorax*	–	–	–	X	X	X
White-faced ibis *Plegadis chihi*	–	–	NP		X	

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Nevada Status*[3]	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	*Lower Bill Williams River*	*Lower Gila River*
BIRDS						
Turkey vulture *Cathartes aura*	–	–	NP	X	X	X
Osprey *Pandion haliaetus*	–	ASC	NP	X	X	X
Bald eagle *Haliaeetus leucocephalus*	FT	ASC	NE	X	X	X
White-tailed kite *Elanus leucurus*	–	–	NP	X	X	X
Northern harrier *Circus cyaneus*	–	–	NP	X	X	X
Cooper's hawk *Accipiter cooperi*	–	–	NP	X	X	X
Harris' hawk *Laterallus jamaicensis coturniculus*	–	–	NP	X	X	X
Swainson's hawk *Buteo swainsoni*	–	–	NP	X	X	X
Ferruginous hawk *Buteo regalis*	–	ASC	NP	X	X	X
Golden eagle *Aquila chrysaetos*	–	–	NP	X	X	X
American kestrel *Falco sparverius*	–	–	NP	X	X	X
Merlin *Falco columbarius*	–	–	NP	X	X	X
Peregrine falcon *Falco peregrinus*	–	ASC	NE	X	X	X
Prairie falcon *Falco mexicanus*	–	–	NP	X	X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Nevada Status*[3]	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	*Lower Bill Williams River*	*Lower Gila River*
BIRDS						
Yuma clapper rail[5] *Rallus longirostris yumanensis*	FE	ASC	–	X	X	X
California black rail[5] *Laterallus jamaicensis coturniculus*	–	ASC	–		X	X
Black tern *Chlidonias niger*	–	–	–	X	X	
Yellow-billed cuckoo[5] *Coccyzus americanus*	FC	ASC	–	X	X	X
Greater roadrunner *Geococcyx californianus*	–	–	NP	X	X	X
Long-eared owl *Asio otus*	–	–	NP	X	X	X
Short-eared owl *Asio flammeus*	–	–	NP	X	X	X
Burrowing owl *Athene cunicularia*	–	–	NP	X	X	X
Elf owl[5] *Micrathene whitneyi*	–	–	NP		X	X
Lesser nighthawk *Chordeiles acutipennis*	–	–	NP	X	X	X
Vaux's swift *Chaetura vauxi*	–	–	–	X	X	X
Belted kingfisher *Ceryle alcyon*	–	ASC	NP	X	X	X
Gilded flicker[5] *Colaptes chrysoides*	–	–	–		X	X
Gila woodpecker[5] *Melanerpes uropygialis*	–	–	–		X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Nevada Status*[3]	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	*Lower Bill Williams River*	*Lower Gila River*
BIRDS						
Olive-sided flycatcher *Contopus cooperi*	–	–	–	X	X	X
Southwestern willow flycatcher[5] *Empidonax trailii extimus*	FE	ASC	–	X	X	X
Ash-throated flycatcher *Myiarchis cinerascens*	–	–	–	X	X	X
Brown-crested flycatcher *Myiarchis tyrannulus*	–	–	–	X	X	X
Vermilion flycatcher[5] *Pyrocephalus rubinus*	–	–	–	X	X	X
Arizona Bell's vireo[5] *Vireo bellii arizonae*	–	–	–	X	X	X
Purple martin *Progne subis*	–	–	–	X	X	X
Bank swallow *Riparia riparia*	–	–	–	X	X	X
Swainson's thrush *Catharus ustulatus*	–	–	–	X	X	X
Bendire's thrasher *Toxostoma bendirei*	–	–	–	X	X	X
Crissal thrasher *Toxostoma crissale*	–	–	–	X	X	X
Loggerhead shrike *Lanius ludovicianus*	–	–	–	X	X	X
Lucy's warbler *Vermivora luciae*	–	–	–	X	X	X
Sonoran yellow warbler[5] *Dendroica petechia sonorana*	–	–	–	X	X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Nevada Status*[3]	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	*Lower Bill Williams River*	*Lower Gila River*
BIRDS						
Yellow-breasted chat *Icteria virens*	–	–	–	X	X	X
Summer tanager[5] *Piranga rubra*	–	–	–	X	X	X
Northern cardinal *Cardinalis cardinalis*	–	–	–	X	X	X
Abert's towhee *Pipilo aberti*	–	–	–	X	X	X
Large-billed savannah sparrow *Passerculus sandwichensis rostratus*	–	–	–	X	X	X
Sage sparrow *Aimophila belli*	–	–	–	X	X	X
Grasshopper sparrow *Ammodramus savannarum*	–	–	–	X	X	
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	–	–	–	X	X	X
Lawrence's goldfinch *Carduelis lawrencei*	–	–	–	X	X	X
REPTILES						
Desert tortoise (Mojave population)[5] *Gopherus agassizii*	FT	ASC	NT	X		
Desert tortoise (Sonoran population) *Gopherus agassizii*	--	ASC	--		X	X
Banded Gila monster *Heloderma suspectum cinctum*	–	–	NP	X	X	X

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Nevada Status*[3]	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	*Lower Bill Williams River*	*Lower Gila River*
REPTILES						
Flat-tailed horned lizard[5] *Phrynosoma mcalli*	–	ASC	–			X
Desert rosy boa *Lichanura trivirgata gracia*	–	–	–	X	X	X
AMPHIBIANS						
Arizona toad *Bufo microscaphus microscaphus*	–	–	–	X	X	
Couch's spadefoot toad *Scaphiopus couchii*	–	–	–		X	X
Relict leopard frog[5] *Rana onca*	FC	ASC	NP	X		
Lowland leopard frog[4] *Rana yavapaiensis*	–	ASC	–		X	
FISH						
Moapa dace *Moapa coriacea*	FE	-	NE	X		
Virgin River spinedace *Lepidomeda mollispinis mollispinis*	-	-	NP	X		
Woundfin *Plagopterus argentissimus*	FE	-	NE	X		
Virgin River chub *Gila seminuda*	FE	-	NE (NS)[6]	X		
Flannelmouth sucker[5] *Catostomus latipinnis*	–	ASC	–	X		
INVERTEBRATES						
Aegialian scarab beetle *Aegialia knighti*	–	–	–	X		

Table 3.4-5. Sensitive Species that Could Be Present in the Off-Site Conservation Areas (continued)

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Nevada Status*[3]	POTENTIALLY PRESENT IN OFF-SITE CONSERVATION AREAS		
				Lower Virgin and Muddy Rivers	*Lower Bill Williams River*	*Lower Gila River*
INVERTEBRATES						
MacNeill's sootywing skipper[5] *Pholisora gracielae*	–	–	–	X		
Maricopa tiger beetle *Cicindela oregona maricopa*	–	–	–		X	
Obsolete Viceroy Butterfly *Limenitis archippus obsoleta*	–	–	–	X	X	X
PLANTS						
Sticky buckwheat[5] *Eriogonum viscidulum*	–	–	NEP	X		
Threecorner milkvetch[5] *Astragalus geyeri* var. *triquetrus*	–	–	NEP	X		
Las Vegas bearpoppy *Arctomecon californica*	–	–	NEP	X		
Virgin River thistle *Cirsium virginensis*	–	–	–	X		

Notes:

1 Federal Status
- FE = Listed as endangered under the ESA.
- FT = Listed as threatened under ESA.
- FP = Proposed for listing as threatened under ESA.
- FC = Candidate for listing under ESA.

2 Arizona Status
- ASC= Arizona wildlife of special concern.

3 Nevada Status
- NE = Nevada endangered
- NT = Nevada threatened.
- NEP = Nevada critically endangered plant.
- NP = Nevada protected.
- NS = Nevada sensitive.

4 Conservation Plan evaluation species.

5 Conservation Plan covered species.

6 Muddy River population only.

present sensitive species include the Aegialian scarab beetle, Las Vegas bearpoppy, and Virgin River thistle.

3.4.1.3 Bill Williams River

Vegetation

Vegetation downstream of Alamo Dam within the riparian corridor has been characterized by the Corps (1999), using categories consistent with those used along the LCR. Amounts of these vegetation categories in the Bill Williams River NWR and on Planet Ranch were provided by the NWR (personal communication, K. Blair 2003). Vegetation types and acreages are as follows:

- Cottonwood-Willow (2,168 acres), occurring along the active channel and including substantial areas where saltcedar is the dominant understory;
- Mesquite (742 acres), dominated by honey mesquite, but also including *Atriplex* spp. and screwbean mesquite;
- Mesquite-Saltcedar (161 acres), a mixture of mesquite and saltcedar, often including Atriplex spp. and arrowweed;
- Saltcedar (56 acres), including other species, but with more than 50 percent coverage of saltcedar;
- Open Water-Freshwater Marsh (498 acres), mostly equivalent to the Marsh category in the LCR, but including seedlings of woody riparian species; and
- Barren-Open Space/Herbaceous (1,477 acres), consisting of sparsely vegetated areas.

Surrounding areas consist of upland desert scrub.

Fish and Wildlife

The lower Bill Williams River riparian corridor is contiguous with the central part of the LCR planning area, and most of the fish and wildlife species that occur along the mainstem are also reported as occurring here. Wildlife diversity is relatively high, and wildlife includes many of the covered and evaluation species because of the excellent condition of riparian vegetation along the lower Bill Williams River (USACE 1999).

Sensitive Species

COVERED AND EVALUATION SPECIES

Of the 31 covered and evaluation species, 16 are present or could be present within the lower Bill Williams River off-site conservation area (Table 3.4-5) and would benefit from habitat establishment and subsequent management actions on a combination of public and private lands. The Bill Williams River as a whole (including upstream of Alamo Dam) supports a relatively large breeding population of southwestern willow flycatchers (32 known territories) and is another of the key areas targeted for recovery of the species, with a goal of 100 territories

(USFWS 2002d). Four nests were documented along the lower Bill Williams River during 2001 (McKernan and Braden 2002).

OTHER SENSITIVE SPECIES

A total of 68 additional sensitive species that are present or could be present in the lower Bill Williams River off-site conservation area are listed in Table 3.4-5. Habitat requirements and status of these species are described above for the planning area.

3.4.1.4 Lower Gila River

Vegetation

Vegetation along the lower Gila River has been mapped by HEG as part of a Corps Reconnaissance Report (USACE 1995). Vegetation was classified according to Brown et al. (1979) and Ohmart et al. (1988) in a manner generally consistent with what has been done for the LCR. From the Wellton-Mohawk area downstream to the confluence with the Colorado River north of Yuma, in addition to agricultural lands, which occupy much of the floodplain, there are five distinct vegetation communities or series:

- Cottonwood-Willow (2,080 acres), forming a riparian forest that is similar to that described for the LCR and dominated by native Fremont cottonwoods and willows;
- Saltcedar Disclimax (3,687 acres), essentially riparian scrub vegetation, dominated by *Tamarix* spp. but including thickets of other riparian shrubs such as arrowweed;
- Leguminous Short Tree Species (11,959 acres), this community type represents the intermingling of honey mesquite and desert scrub vegetation as the two types are described along the LCR;
- Cattail Series (400 acres), equivalent to the Marsh-Wetlands category mapped along the LCR; and
- Sparsely vegetated open areas (16,102 acres).

These communities occur under conditions similar to those described above for the LCR. As a result of massive floods along the lower Gila River in 1993, many areas were denuded, but subsequently recolonized by cottonwoods and willows, creating opportunities for habitat establishment by taking actions to foster the reestablishment of native riparian vegetation (USACE 1995; personal communication, B. Werner 2003).

Fish and Wildlife

Fish that are present along the lower Gila River are limited almost entirely to non-native, warm-water species that occur in areas of permanent water sustained by return flows from agriculture (USFWS 1994). Wildlife along the lower Gila River is similar to that described previously for the LCR, although dominated by Sonoran Desert species. Riparian forest supports a rich variety of neotropical migrant species, including several species covered by the Conservation Plan. Marshes along the lower Gila River are structurally and functionally similar to those along the LCR and support the same species.

Sensitive Species

COVERED AND EVALUATION SPECIES

Of the 31 covered and evaluation species, 17 are present or could be present within the lower Gila River off-site conservation area (Table 3.4-5) and would benefit from habitat establishment and subsequent management actions on a combination of public and private lands. The lower Gila River is included as part of the LCR region as one of the targeted areas for recovery of the southwestern willow flycatcher.

OTHER SENSITIVE SPECIES

A total of 61 additional sensitive species that are present or could be present in the lower Gila River off-site conservation area are listed in Table 3.4-5. Habitat requirements and status of these species are described above for the planning area.

3.4.2 Environmental Consequences

Significance Criteria

The proposed action would result in a significant impact if it would result in any of the following:

- have a substantial adverse effect on any sensitive natural vegetation community identified for special status under local, state, tribal or Federal laws, regulations, or policies;
- have a substantial direct or indirect effect on sensitive wildlife species identified for special status under local, state, tribal, or Federal laws, regulations, or policies ;
- have a substantial adverse effect on any riparian vegetation or other sensitive natural community identified in local or regional planning documents, policies, and regulations of the CDFG, AGFD, NDOW, BLM, Reclamation, BIA, Service, and county and tribal governments;
- have a substantial adverse effect on wetlands and waters of the U.S. as covered by section 404 of the CWA;
- have a substantial adverse effect on native resident or migratory wildlife corridors, breeding or spawning habitats, and nursery habitats;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (discussed in section 3.11); or
- conflict with provisions of an approved local, state, tribal, or Federal habitat or species conservation plan (discussed in section 3.11).

3.4.2.1 Alternative 1: Proposed Conservation Plan

Impacts

The following analysis describes the impacts of (1) issuing the section 10(a)(1)(B) permit, which would authorize the incidental take of up to 27 covered species from implementation of both the covered activities and the Conservation Plan, and (2) implementing the Conservation Plan, which could have short-term and long-term impacts not only on covered species' habitats, but on habitat for non-covered common and sensitive species as well. The covered activities are not part of the proposed action, and their impacts are not analyzed in this EIS/EIR, with the exception of the incidental take that would be allowed as a result of the issuance of the section 10(a)(1)(B) permit.

IMPACTS OF ISSUING THE SECTION 10(A)(1)(B) PERMIT

Impact BIO-1: Issuance of the section 10(a)(1)(B) permit would authorize the incidental take of up to 27 covered species from implementation of both the covered activities and the Conservation Plan. The description of the estimated level of incidental take associated with implementing the covered activities and the Conservation Plan is summarized for each covered and evaluation species in Table 2.1-3. A detailed description of the impact analysis methods and results is provided in the LCR MSCP HCP. The impacts of issuance of the section 10(a)(1)(B) permit on each species are also summarized in Table 2.1-3 (see column entitled "Summary of Expected Outcomes").

Impacts to covered species resulting from the incidental take caused by the covered activities includes loss of habitats for covered species. Flow-related covered activities are estimated to affect 2,540 acres of land cover types that provide covered species habitat (2,008 acres of cottonwood-willow, 133 acres of marsh, and 399 acres of river and backwaters), while non-flow-related covered activities would affect 1,454 acres of land cover types that provide covered species habitat (134 acres of cottonwood-willow, 110 acres of marsh, 590 acres of honey mesquite III, and 620 acres of honey mesquite IV). Degradation or loss of land cover types that provide habitat for wildlife species would occur linearly along the LCR corridor over the term of the LCR MSCP. Impacts to covered species would also result from harassment and entrainment.

The effects of the incidental take to biological resources cannot be evaluated independently of the Conservation Plan. As shown in Table 2.1-3, the Conservation Plan would effectively offset and compensate for the effects of the incidental take that would result from both the covered activities and the implementation of the Conservation Plan. Thus, implementation of the covered activities and the Conservation Plan are not likely to negatively affect the overall populations of covered species within the LCR MSCP planning area or regionally. Therefore, impacts of issuing the section 10(a)(1)(B) permit would be *less than significant*.

IMPACTS OF IMPLEMENTING THE CONSERVATION PLAN

The Conservation Plan would establish 8,132 acres of land cover types supporting habitat for covered species, including 5,940 acres of cottonwood-willow, 1,320 acres of honey mesquite type III, 512 acres of marsh, and 360 acres of backwaters. Habitat would be established

primarily on agricultural lands and saltcedar areas, some of which are mixed with honey mesquite and screwbean mesquite. Impacts on covered and evaluation species from the implementation of covered activities and the Conservation Plan would be avoided, minimized, or fully mitigated by conservation measures that would maintain existing habitat, establish new habitat or enhance existing habitat, and enhance the populations of some species. Impacts on other special-status species would also be avoided or minimized to the extent practicable through the measures to protect the covered species.

The actions necessary to establish the desired habitats for covered species could have short-term and/or long-term effects not only on the covered species (i.e., take), but also on other sensitive or special status species; riparian vegetation, wetlands, or other sensitive natural communities; and resident or migratory fish or wildlife species. Short-term effects (e.g., physical disturbances, biological disturbances, and altered irrigation drainage) would result from construction activities, while long-term effects would result from the conversion of one land cover type to another. In general, habitat establishment actions are intended to provide long-term beneficial impacts that would offset any short-term losses. No woody riparian, marsh, or aquatic land cover types that support covered, evaluation, and other special-status species would be removed as part of habitat establishment activities. The Conservation Plan includes monitoring and evaluation to determine if the goals and objectives of the plan are being met as well as an adaptive management strategy to address any problems or failure to meet those goals and objectives.

The four habitat establishment concepts described in Chapter 2 would involve the conversion of agricultural lands, saltcedar, desert scrub, or other land cover type to cottonwood-willow or mesquite land cover types; the establishment of backwaters; and the establishment of marshes by providing a water source to existing topographically low areas (e.g., old river oxbows) or newly excavated areas. The impacts of these activities on biological resources and of take for covered species are addressed below, as are impacts from population enhancement measures and maintenance activities.

IMPACTS OF CREATING HABITAT FOR COTTONWOOD-WILLOW AND HONEY MESQUITE-ASSOCIATED COVERED SPECIES

Impact BIO-2: The establishment of 7,260 acres of cottonwood-willow and honey mesquite land cover would increase the extent of cottonwood-willow riparian forest and mesquite woodland sensitive communities. As described above, covered activities would remove or degrade an estimated 3,352 acres of cottonwood-willow and honey mesquite land cover types. Loss of this native vegetation, along with associated individuals of common and sensitive wildlife species and covered species, as a result of covered activities would be more than offset by creation of 7,260 acres of the same type of habitats through implementation of the Conservation Plan. This represents a *beneficial* impact for vegetation as well as for the covered and non-covered wildlife species using these habitat types. Expansion of these native plant communities would provide habitat for native species, including species whose populations have declined due to loss or degradation of habitat, and help to restore the natural ecosystems that these communities can support.

IMPACTS FROM CONVERSION OF AGRICULTURAL LAND TO HABITAT

Impact BIO-3: Clearing, grading, planting, and site maintenance during conversion of agricultural lands to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing low value habitat used by resident and migratory wildlife, removal of weedy vegetation and crops, alteration of habitat characteristics through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife. Establishing cottonwood-willow and honey mesquite (Type III) land cover types to compensate for losses of those types from covered activities (3,352 acres) and implementing the Conservation Plan would result in short-term (less than 1 to 5 years) disturbances and long-term alteration of vegetation and wildlife habitat. The cottonwood-willow and honey mesquite vegetation would be established in an integrated mosaic with marshes and backwaters. Short-term disturbances associated with converting agricultural land to these habitats include grading to provide topographic diversity where needed and seeding of native species. Soil disturbances would increase the potential for erosion and sediment runoff. These disturbances would occur for a period of days to months, usually within a single year. Recovery of the disturbed area (primarily vegetation) would progress over 3 or more years, depending on the land cover type and factors such as weather patterns during that time. Irrigation to establish the new plants could result in short-term alteration in site hydrology and soil moisture regimes. Impacts associated with converting agricultural land to backwaters or marshes are discussed below under **Impacts BIO-5 and BIO-6**, respectively. Long-term effects of maintenance are discussed under **Impact BIO-7**.

Vegetation. Conversion of agricultural lands to cottonwood-willow and honey mesquite plant communities would have a *less than significant impact* on existing vegetation because the plants that would be replaced are primarily non-native species (i.e., crops and weeds along farm roads and ditches). Furthermore, the amount of agricultural land to be affected represents a small amount (less than 2 percent) of that present in the planning area. Irrigation would continue, but the timing and amounts would be changed to benefit the native species being restored. Soil disturbance resulting from the vegetation restoration efforts initially would favor growth of weeds from seed present prior to the conversion. Soils would stabilize over time, thus making the disturbed area less suitable for weeds and reducing the potential for erosion and sediment transport. Weed control would be implemented as part of the Conservation Plan to reduce the seed source and competition with native species.

Several *beneficial impacts* on vegetation would result from the proposed action. The amount of native riparian plant communities in the planning area would be increased as described in **Impact BIO-2**. In addition, airborne dust produced by agricultural grading would be reduced, reducing the effects of dust (physical damage and reduced photosynthesis) on adjacent riparian vegetation.

Common Wildlife. Converting agricultural land to native riparian vegetation along the LCR would have short-term, *less than significant impacts* on a number of common wildlife species through temporary disturbances. Individuals of less mobile species, such as lizards, snakes, and small mammals (e.g., mice), would be lost, but the newly established plant community would be colonized by these and other common riparian species from nearby areas. More mobile species such as striped skunk, raccoon, Audubon cottontail, and coyote would move out of the disturbance area. The change in land cover type would alter the species composition and

abundance of individuals within a species to favor a greater diversity and a lower abundance for species adapted to human disturbance. The establishment of additional native vegetation would allow population expansion for these species, a *beneficial impact*. The level of disturbance to wildlife by agricultural workers and machinery would be reduced. In addition, the conversion of agricultural land to riparian vegetation would lessen the input of sediment, salts, nutrients, and agricultural chemicals to the river, improving water quality and aquatic habitat conditions. The establishment of riparian vegetation along an expanded portion of the river would provide increased shading, water filtration, and nutrient and pollutant uptake, improving water quality and aquatic habitat conditions downstream. Establishing native plant communities would aid in soil stabilization, a benefit for micro-organisms and invertebrates that live in the soil as well as vertebrates that burrow in the ground. Irrigation that mimics natural hydrologic regimes would also benefit native ground-dwelling species adapted to those conditions.

Non-Covered Sensitive Species. Conversion of agricultural lands to cottonwood-willow and honey mesquite land cover types could affect 31 species of non-covered sensitive bird species, (see Table 3.4-4), that use agricultural lands and irrigation ditches for foraging habitat. In addition, the burrowing owl will also use field berms and embankments as nesting habitat. Implementation of the Conservation Plan could affect burrowing owls by:

- Removing nesting habitat provided by berms, earthen embankments, and other such features that are associated with agricultural-related infrastructure that could support burrowing owl nesting burrows as a result of conversion to native habitats; and
- Disturbing nesting burrows as a result of maintaining roads, ditches, and other infrastructure in LCR MSCP conservation areas that could support nesting burrows.

Other sensitive mammal, reptile, amphibian, invertebrate, and plant species are not expected to use agricultural fields and would not be adversely affected by conversion of this land use to natural plant communities.

Conversion of agricultural lands associated with implementation of the Conservation Plan would have a *less than significant impacts* on all non-covered sensitive species. The creation of 8,132 acres of covered species habitat proposed under the LCR MSCP would occur within the participating states of Arizona, Nevada, and California. Assuming that all conservation areas would be established on agricultural land, this would comprise only a small percentage, less than 2 percent of agricultural lands in the planning area would be converted in the process. Thus, individuals displaced during the conversion would have abundant suitable habitat in the vicinity.

In addition, the establishment of marshes and backwaters, which would be included in the integrated mosaics to be developed, would provide higher value habitat for non-covered sensitive water-associated birds (e.g., great blue heron, great egret, snowy egret, black-crowned night heron, and Clark's grebe) than that present in irrigated fields. Soil disturbance and irrigation resulting from activities to establish the new plant communities would cause short-term disturbances that would be *less than significant* and offset by the increase in native vegetation. These impacts would be *beneficial* to native species in the long term as described above for vegetation and wildlife.

Covered Species. Covered species are not expected to be present in agricultural areas and, thus, would not be affected by land cover type conversion activities.

Summary. Overall, the short-term impacts of the native vegetation establishment would be *less than significant* because the actions taken would not have substantial adverse effects on sensitive species, communities, or habitats due to implementation of measures to avoid or minimize effects on covered species in the Conservation Plan. These measures would also protect non-covered sensitive species, as well as common native species present in the agricultural areas to be used. In addition, voluntary "Implementation Measures," discussed below, would be used to further reduce potential, less than significant impacts to non-covered sensitive species. Long-term impacts would be *beneficial* to vegetation and both covered and non-covered sensitive species, as well as common wildlife, that use cottonwood-willow and mesquite land cover types by reestablishing a more natural ecosystem.

IMPACTS FROM CONVERSION OF UNDEVELOPED LAND TO HABITAT

Impact BIO-4: Clearing, grading, planting, and site maintenance during conversion of undeveloped lands (primarily saltcedar) to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing non-native vegetation and the habitat it provides for wildlife, short-term effects on habitat characteristics from alteration of local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife. As described under **Impact BIO-3**, establishing native riparian vegetation to compensate for losses of that land cover type from covered activities (3,352 acres) and implementing the Conservation Plan would result in short-term disturbances and long-term alteration of vegetation and wildlife habitat as a result of grading, removal of saltcedar, and seeding of native species as well as maintenance (e.g., irrigation) activities. Impacts associated with converting undeveloped land to backwaters or marshes are discussed below under **Impacts BIO-5 and BIO-6**, respectively. Long-term effects of maintenance are discussed under **Impact BIO-7**.

Vegetation. Conversion of saltcedar-dominated land cover to establish cottonwood-willow and honey mesquite land cover types would have *beneficial impacts* on vegetation because saltcedar is a non-native, invasive species. The conversion would only affect a relatively small proportion (less than 3 percent) of the saltcedar present in the planning area. Irrigation would occur to help establish the native species being restored. Habitat creation efforts temporarily would disturb soils, which would favor growth of weeds from seed present prior to the conversion. Soils would stabilize over time, thus making the area less suitable for weeds and reducing the potential for erosion and sediment transport. Weed control would be implemented as part of the Conservation Plan to reduce the source of seeds and competition with native species.

The amount of native riparian plant communities in the planning area would be increased as described in **Impact BIO-2**. Furthermore, the removal of saltcedar and its replacement by native riparian vegetation would reduce the incidence of fires and their adverse effects on native vegetation (e.g., preventing natural cycles in regeneration and increasing the potential for proliferation of weedy species), a *beneficial impact*.

Common Wildlife. Individuals of common species using the saltcedar would be displaced or lost during the conversion process, and those in adjacent areas would be disturbed by the

vegetation establishment activities (e.g., noise and human presence). Impacts would be *less than significant* because work would be scheduled, when feasible, to avoid the nesting season of covered species that may use adjacent riparian areas. This would avoid the nesting season of most, if not all, common birds as well. It is anticipated that most of the work would be scheduled outside of the breeding season. Relatively small areas of saltcedar (estimated to be less than 380 acres per year) would be removed over 25 to 30 years during the term of the LCR MSCP and would not be concentrated in one portion of the planning area, thereby minimizing the amount of habitat for common species that would be affected at any particular location and time. Soil disturbance during the conversion process would have short-term effects on micro-organisms and invertebrates that live in the soil as well as vertebrates that burrow in the ground (e.g., small mammals) or are associated with ground cover (e.g., lizards and snakes). These impacts would be *less than significant* because measures in the Conservation Plan would be implemented to rapidly stabilize soils and allow colonization by native species. Irrigation to aid in establishment of the new plant communities would have *less than significant* effects on ground-dwelling animals. The change in moisture regime would be short-term, located in relatively small areas at a time, and the locations phased over 25 to 30 years. Individuals of common wildlife species in those areas would avoid or adapt to the changed conditions. The newly established habitat would be colonized by common riparian species from nearby areas, and the establishment of additional native vegetation would likely allow population expansion for these species, a *beneficial impact* (i.e., an expansion of native species that add to the complexity and function of the ecosystem).

Non-Covered Sensitive Species. Several sensitive bird species may nest in saltcedar or saltcedar-dominated land cover types, and a few reptiles and amphibians are likely to be present. Loss of saltcedar-dominated land cover types through conversion to cottonwood-willow or honey mesquite would affect individuals of species using those areas by causing them leave the disturbance area, to at least temporarily, and by causing mortality (directly or indirectly). Short-lived sensitive species generally have high reproductive and colonization potentials that would aid in rapid recovery from soil and vegetation disturbance impacts. Impacts on non-covered sensitive species would be *less than significant* for the following reasons. The total amount of the saltcedar-dominated land cover types in the planning area is large relative to the amount potentially lost (about 3 percent) so that other similar habitat would be available. The Conservation Plan would be phased in over 25 to 30 years and would not be concentrated in one portion of the planning area. The maximum amount of habitat to be developed per year is estimated to be 300 acres for cottonwood-willow and 80 acres per year for honey mesquite (see Tables 2.1-6a and b). Implementation of Conservation Plan measures to minimize the amount of construction work for site conversion during the breeding season of most birds also reduces the potential for impacts. This combination of factors minimizes the potential for adverse effects of the conversion on non-covered sensitive species.

Short-term effects of soil disturbance and irrigation resulting from activities to establish the new plant communities would be *less than significant* and, in the long-term, *beneficial* to native sensitive species as described above for vegetation and common wildlife.

Covered Species. Cottonwood-willow and honey mesquite (Type III) would be established in an integrated mosaic with backwaters and marshes where undeveloped lands are converted to cottonwood-willow habitat or within existing degraded riparian areas. Riparian woodland

establishment activities involving removal of saltcedar and planting of mesquite and understory species would cause short-term disturbances in the new habitat as well as in the adjacent areas, with soil disturbance only in the new areas. Two covered bird species, Sonoran yellow warbler and summer tanager, are known to nest in saltcedar. Both species are uncommon in the planning area, making the probability of any being present at the specific locations being converted unlikely. Impacts on covered species would be *less than significant* due to the implementation of measures to avoid and minimize effects on these species as described in the Conservation Plan. For example, existing native riparian trees would be avoided, only a portion of the saltcedar would be removed from the planning area, and BMPs would be used to prevent erosion and sediment runoff from disturbed soils. In addition, phasing of the proposed action as described above under non-covered sensitive species, would minimize the potential for effects on covered species. Irrigation to establish the new plants and to mimic hydrologic conditions that support this habitat type would not affect covered species in the short term because none would be present as the vegetation is being established. Impacts in the long-term would be *beneficial* to covered species by helping to establish and maintain the native habitat.

Summary. Overall, impacts on vegetation, wildlife, non-covered sensitive species, and covered species from construction activities would be *less than significant*. Nonetheless, voluntary Implementation Measures, discussed below, would be used to reduce potential, less than significant impacts to non-covered sensitive species. Long-term impacts from establishing native riparian plant communities would be *beneficial* to vegetation (see **Impact BIO-2**) and many wildlife species, including both covered and non-covered sensitive species, that use saltcedar but whose native habitat is provided by cottonwood-willow and/or honey mesquite.

IMPACTS ASSOCIATED WITH ESTABLISHMENT OF MARSH ES

Impact BIO-5: Clearing, grading, planting, and site maintenance during establishment of marsh would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife. Covered activities would affect 243 acres of marsh along with its associated wildlife. Implementing the Conservation Plan would result in establishing 512 acres of new marsh, which would involve excavation of uplands, such as agricultural lands and saltcedar, and providing a water source, followed by planting of emergent vegetation; or providing a water source to an existing topographically low area, such as an old river oxbow, and planting emergent vegetation. Construction of new marshes is more likely to occur than restoration of existing marshes, and both would likely involve major reconstruction activities. At some locations, such work could occur immediately adjacent to existing marshes in order to expand their size. The establishment activities would occur in the same land cover types (agricultural fields or saltcedar stands) discussed in **Impact BIO-3** and **BIO-4**, but much smaller areas would be affected at any one time (20 to 40 acres per year). Soil disturbance associated with clearing and grading would be in topographically low areas, and erosion and sediment runoff would not affect adjacent areas. Impacts on vegetation, wildlife, non-covered sensitive species, and covered species would be similar to those described in the above impact analyses. The new marsh would be colonized by wildlife species adapted to that land cover type. Loss of upland land cover types would be permanent but a *less than significant impact* because the habitat value for the area lost would be

low and the size affected would be small. No loss of sensitive vegetation would occur. Where establishing new marsh occurs adjacent to an existing marsh, impacts on residents of the existing marsh would be minimized through measures in the Conservation Plan implemented to minimize effects on covered species. These measures would also reduce the potential for impacts on vegetation and non-covered species. The value of the habitat created would be equal to or greater than the value of that lost, resulting in replacement or a net gain in habitat value, which would be a *beneficial impact*, and mitigation for impacts of covered activities would be provided as planned.

Summary. The overall impacts on vegetation, wildlife, non-covered sensitive species, and covered species would be *less than significant* in the short term and *beneficial* in the long term by providing marshes mixed within native riparian land cover types (i.e., more vegetation and habitat complexity to support a diversity of native animal species, including sensitive species). Nonetheless, voluntary Implementation Measures, discussed below, would be used to reduce potential, less than significant impacts to non-covered sensitive species.

IMPACTS ASSOCIATED WITH THE ESTABLISHMENT OF BACKWATERS

Impact BIO-6: Clearing, grading, and site maintenance during establishment of backwaters would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife. Covered activities would affect 399 acres of backwater and river land cover types. Backwaters (360 acres) connected to and disconnected from the river or reservoir would be established to provide locations for release of reared covered fish species as part of the Conservation Plan. The backwaters not connected to the river or reservoirs would also be isolated from the non-native fish populations in the river and reservoirs. Water levels would be maintained, and vegetation would be controlled through design (depth) and other means. In some cases, the possibility exists for establishment activities to occur in existing backwaters in order to enlarge the area and increase its habitat values. All such activities would be undertaken using avoidance and minimization measures in the Conservation Plan.

Vegetation. Conversion of agricultural land or saltcedar-dominated areas to backwaters would have *less than significant impacts* on vegetation as described in **Impacts BIO-3 and BIO-4**. Because soil disturbance associated with clearing and grading would be in topographically low areas, erosion and sediment runoff would not affect plants in adjacent areas. The temporary loss or disturbance of riparian or marsh vegetation associated with existing backwaters, however, would represent a short-term, *less than significant impact* to wetlands that is addressed under **Impact BIO-9**. This impact would be more than offset by the increase in habitat value resulting from the creation of backwaters and would require no mitigation. Providing water for maintenance of the backwaters would ensure the continued presence of high value habitat for the aquatic species associated with backwaters.

Common Wildlife. Excavation, vegetation planting, and other establishment activities in areas that were previously agricultural lands or saltcedar-dominated areas would have short-term effects on common wildlife populations currently present that would be *less than significant* as described in **Impacts BIO-3 and BIO-4**. Loss of upland vegetation in areas excavated would be permanent but would result in a *less than significant impact* because the habitat value for the area

lost would be low and the size affected at any one location would be small. Disturbance of existing backwaters during enlargement activities would cause temporary impacts on animal species present. The value of the habitat created would be equal to or greater than the value of that lost, resulting in replacement or a net gain in habitat value, and mitigation for impacts of covered activities would be provided as planned. Creation of backwaters would be a *beneficial impact* for common wildlife that use such areas.

Non-Covered Sensitive Species. Impacts on non-covered sensitive species would generally be *less than significant,* as described under **Impact BIO-3** and **BIO-4** for backwater establishment in agricultural lands or saltcedar-dominated areas, although due to the much smaller size of backwaters to be established, impacts would be lessened. The new backwaters would have *beneficial impacts* as described above for common wildlife. Temporary disturbances to non-covered sensitive species during enlargement of existing backwaters would have the potential for *significant impacts that are mitigable to less than significant* through the implementation of **Mitigation Measure BIO-1**, particularly for birds that require backwater-type habitats, if a substantial number of individuals or breeding were affected. Measures to protect covered species would avoid or minimize impacts on non-covered species in most, but not all, situations. For example, breeding or aggregations of some species may not be avoided if they are not known to be present. The potential for significant impacts would be site-specific and depend on the timing of the work.

Covered Species. Impacts on any covered species present at the backwater establishment sites would be temporary and *less than significant* due to implementation of measures to minimize effects on these species as described in the Conservation Plan. However, if the breeding season or nursery areas of some species, such as fish, cannot be avoided, impacts could be *significant* but offset by the amount of backwater area established so that additional mitigation would not be required. Providing water for the created or enhanced backwater sites would result in a *beneficial impact* to covered species by maintaining the availability of this habitat.

Summary. Overall, long-term impacts on vegetation, common wildlife, non-covered sensitive species, and covered species would be *beneficial* due to implementation of protection measures described in the Conservation Plan and development of habitat diversity (i.e., backwaters within native riparian land cover types). In the short term, impacts of establishing backwaters where small backwaters already exist would have the potential to have *less than significant* or *significant but mitigable to less than significant* impacts on non-covered sensitive species. Voluntary Implementation Measures, discussed below, would be used to reduce potential, less than significant impacts to non-covered sensitive species.

IMPACTS OF MAINTENANCE ACTIVITIES

Impact BIO-7: Maintenance of established habitats would result in the removal of invasive non-native vegetation, alteration of habitat characteristics through changes in local hydrology, and short-term elimination or displacement of resident wildlife. A number of maintenance activities would be necessary to ensure that the established habitats retain their value to covered species. These include irrigation of some cottonwood-willow and honey mesquite habitats, burning in marshes, and removal of saltcedar and giant cane (*Arundo donax*) that invade these areas. Maintenance of infrastructure in converted agricultural lands would also affect species using these areas.

Vegetation. Periodic removal of saltcedar and giant cane as well as burning in marshes would cause temporary loss or disturbance to vegetation in small areas where such activities occur. Removal of non-native invasive species such as saltcedar and giant cane as they colonize the established habitat areas would be *beneficial* to vegetation of the area by helping to maintain the native species composition of the plant community. Flood irrigation of cottonwood-willow areas in spring, early summer, and later in the season, as well as irrigation to maintain moist soil during the southwestern willow flycatcher breeding season (in habitat for that species) could result in long-term alteration in site hydrology. Irrigation to maintain honey mesquite could also cause long-term alteration of the site hydrology. Changes in hydrology would affect plant growth for target species as well as all other species, including non-native weedy species. Irrigation could result in a more dense understory of grasses, herbs, and shrubs depending on the amount and timing of the irrigation as well as the duration and extent of moisture near the soil surface. Impacts on vegetation other than the target tree species could range from *less than significant* to *beneficial*. The irrigation would be *beneficial* for the target species by assisting their growth. Seral stage management for specific plant species and community structure (e.g., burning in marshes and tree trimming or minor amounts of clearing in riparian woodlands) would also cause disturbances at intervals over the long term. These disturbances would be *less than significant* for target plant communities because the disturbances necessary to maintain the seral stage would be of short duration and at intervals with no loss of native plant community. Periodic burning and other management methods to maintain marshes would have intermittent, short-term (generally less than 1 year) *less than significant* impacts on marsh vegetation. These measures would control marsh vegetative growth but would not eliminate it. Vegetation would begin to grow again within one year but would not reach densities that require repeated maintenance for several years.

Common Wildlife. Maintenance activities would result in temporary and intermittent disturbances to wildlife in and adjacent to the areas where such activities occur. Removal of saltcedar and giant cane as well as burning of marsh vegetation would introduce noise and human presence during the removal process. Burning of marsh vegetation would also cause a temporary alteration of the habitat characteristics resulting in more open water and less dense vegetation until the vegetation grows back. Marsh residents (primarily birds) that require dense vegetation cover would be displaced to areas with such cover, while species that use open water would return after the maintenance activities were complete. Some individuals of wildlife species could be lost as a result of maintenance activities, but most would be expected to leave the marsh when it is burned or otherwise manipulated. Irrigation would affect wildlife, particularly reptiles, amphibians, and invertebrates, by altering habitat characteristics to be more favorable for species preferring higher moisture and less favorable for those preferring drier habitats. Changes in understory vegetation could also influence the abundance and species composition of common wildlife species. Maintenance of earthen berms associated with roads, canals, or other infrastructure would periodically disturb these areas and the organisms residing there. Impacts of maintenance activities on common wildlife would generally be *less than significant* in the short term and *beneficial* in the long term, assuming that maintenance activities such as burning would not occur every year. The disturbances associated with maintenance activities would occur in relatively small areas and be of short duration so that few individuals of common species would be affected at any one time. Timing of these activities to minimize impacts on covered species, including breeding, would also minimize effects on

common species. Maintenance would ensure that high value habitat remains for use by a variety of wildlife species.

Non-Covered Sensitive Species. Effects of management activities on non-covered sensitive species would be similar to those described for common wildlife. In addition, marsh management actions implemented in conservation areas within California would be designed to avoid mortality of fully protected species. Impacts of maintenance activities on non-covered sensitive species would be *less than significant* because measures to minimize effects on covered species that could be in the same area would also protect the non-covered species.

Covered Species. Removal of saltcedar and giant cane would have the potential to disturb covered species through noise and human presence as described for wildlife. Periodic burning and other management methods to maintain the marsh would have intermittent, short-term (less than 1 year) impacts on covered species and would maintain habitat preferred by these species. Maintenance activities, other than water level control, would have intermittent effects on species using backwaters. Maintenance activities would have *less than significant impacts* on covered species because all such activities would be planned and timed to avoid or minimize impacts on covered species. This includes avoiding the breeding season for covered species, such as the Yuma clapper rail, to the maximum extent feasible. Managing water levels in marshes for selected species (e.g., Yuma clapper rail and California black rail) would have *beneficial* impacts on those species, as well as other marsh species of plants and animals. Managing water levels would result in little habitat disturbance and would help maintain marsh vegetation and preferred habitat conditions, such as water depth, for covered species.

Summary. Overall, the long-term impacts of maintenance activities would be *less than significant* or *beneficial* for biological resources. Short-term impacts of maintenance activities would be *less than significant* because the actions taken would not have substantial adverse effects on covered species or their habitats due to implementation of measures to minimize or avoid such effects. Take of covered species would be evaluated through monitoring and analysis of the data collected as described in the Conservation Plan. The frequency and extent of maintenance activities would be regulated through adaptive management so that take levels established in the 10(a)(1)(B) permit are not exceeded. These measures would also minimize impacts on other species present. In addition, voluntary Implementation Measures, discussed below, would be used to further reduce potential, less than significant impacts to non-covered sensitive species.

IMPACTS OF POPULATION ENHANCEMENT MEASURES

Impact BIO-8: Population enhancement activities for covered fish and bird species could adversely affect existing individuals or populations of covered or sensitive species. Population enhancement activities include rearing and release of covered fish (bonytail and razorback sucker) and control of predatory non-native aquatic species (primarily fish) before their release. Population enhancement activities for covered birds include installation of nest boxes for cavity nesting birds (e.g., elf owl, gilded flicker, and Gila woodpecker) and control of brown-head cowbird nest parasitism.

Vegetation. Population enhancement for covered fish and bird species would have essentially no impacts on vegetation.

Common Wildlife. Release of covered fish species raised in a hatchery to habitats established for rearing them would alter the ecology of the aquatic habitat through the foraging activities of these fish as well as provide prey for predatory fish, reptiles, and amphibians. The bonytail feeds primarily on insects, while the razorback sucker feeds on the bottom eating vegetation and bottom ooze. Consequently, foraging by the stocked covered fish primarily would affect lower trophic levels. This would cause some competition with the non-native and non-covered native fish that feed on these same resources but would have essentially no effect on the populations of either type of fish through direct predation by the covered species. Terrestrial ecology would also be affected to the extent that the stocked covered fish provide prey for piscivorous (fish-eating) birds. How much benefit the birds receive would depend on the number of fish stocked as well as their susceptibility to predation at each life stage by birds. The benefits are likely to be minor. Establishment of more natural aquatic community interactions would also benefit other native aquatic species (both invertebrates and vertebrates). Removal of non-native piscivorous fish and non-native amphibians before release of the covered fish has the potential to incidentally and adversely affect native (non-covered) aquatic invertebrates, reptiles, amphibians, and fish that are also present in the treatment areas through habitat disturbances, stress, or direct mortality during the non-native removal process. BMPs and all applicable permits would be followed for predator control to minimize such effects, resulting in *less than significant* impacts.

Installation of nest boxes and control of brown-headed cowbird nest parasitism for covered bird species would result in temporary and localized disturbances in wildlife habitat. These disturbances would have *less than significant* impacts on common wildlife due to their intermittent occurrence, limited area of disturbance, and implementation of measures to minimize impacts on covered species that would also protect common wildlife.

Non-Covered Sensitive Species. Several non-covered sensitive bird species prey upon fish and could potentially benefit from foraging on the stocked covered fish species. Those piscivorous bird species that are uncommon to rare visitors would receive negligible benefits while common species (e.g., double-crested cormorant, belted kingfisher) could receive minor benefits. Installation of nest boxes and control of brown-headed cowbird nest parasitism for covered species would cause a temporary disturbance in the habitat. Impacts on non-covered sensitive species would be *less than significant* because the measures to reduce impacts on covered species would also protect non-covered species and the area of disturbance would be small and of short duration.

Covered Species. Establishment of more natural aquatic community interactions would be *beneficial* to the covered species by providing habitat more like that in which they evolved. Although non-native predatory species removal would occur before the covered fish species are stocked, such efforts are unlikely to eradicate all of the non-natives, particularly in riverine or reservoir habitats where isolation of an area for covered species is not feasible. Loss of some stocked covered fish due to predation by non-native species would at least partially reduce the benefits of the stocking. Incidental capture of some individuals of the stocked fish by fishermen angling for non-native game fish would also be an adverse effect on the stocked fish populations. Although loss of stocked covered species to predation by non-natives and to fishermen would have an adverse effect on the stocked fish populations, this would not be an impact of the proposed action. In the most likely case, predator removal prior to stocking

should reduce predation losses, and fishermen are not likely to target these species, which are not prized game fish. Overall, the stocking is expected to *benefit* the covered fish species. Installation of nesting boxes in riparian woodlands and cowbird control activities would result in a temporary disturbance in the habitat due to human presence and noise associated with the activity. Use of avoidance and minimization measures in the Conservation Plan would result in *less than significant* impacts on covered species. These actions would *benefit* the bird species in the long term by increasing nesting habitat and reproductive success.

Summary. Overall, long-term impacts on covered species would be *beneficial*, while short-term impacts resulting from disturbances due to enhancement activities would be *less than significant*. Nonetheless, voluntary Implementation Measures, discussed below, would be used to reduce potential, less than significant impacts to non-covered sensitive species.

IMPACTS ON WETLANDS AND WATERS OF THE U.S.

Impact BIO-9: Native land cover type establishment and maintenance could temporarily affect wetlands and waters of the U.S. To establish habitat mosaics, marsh, backwaters, cottonwood-willow, and honey mesquite land cover may be established or enhanced immediately adjacent to existing wetlands and waters protected under section 404 of the CWA. Enhancement of existing backwaters would require activities within wetlands and waters of the U.S., while expansion of marshes by excavation of immediately adjacent uplands would place activities next to wetlands or waters of the U.S. Consequently, land cover type establishment-related activities (e.g., grading) could result in temporary disturbances to adjacent wetlands and waters and to their associated vegetation and wildlife. Enhancement/enlargement activities in existing backwaters would temporarily disturb wetlands and waters of the U.S. and their associated vegetation and wildlife (see **Impact BIO-6**). Future actions to maintain established marshes and backwaters (e.g., dredging, burning) could have similar impacts on wetlands and waters at intervals (see **Impact BIO-7**). Any activities in wetlands and waters of the U.S. would be conducted in accordance with all applicable permits for such activities on a site-specific basis. Therefore, the temporary impacts associated with backwater enhancement would be *less than significant*.

Summary. Overall, long-term *beneficial impacts* would offset the temporary, *less than significant impacts*.

Implementation Measures

The following Implementation Measures would, to the extent practicable, be employed to avoid and minimize potential impacts on non-covered sensitive species that could be associated with implementation of the LCR MSCP conservation measures. While not required to mitigate any identified significant impacts, these measures would be implemented on a voluntary basis to reduce potentially adverse impacts to non-covered sensitive species resulting from implementation of the Conservation Plan.

IM-1: To the extent practicable, avoid and minimize impacts of implementing the LCR MSCP Conservation Plan on non-covered sensitive species. To the extent practicable, establishment and management of LCR MSCP-created habitats would avoid removal of existing cottonwood-willow stands, honey mesquite bosques, marsh, and backwaters to avoid and

minimize impacts on habitat they provide for sensitive species. Temporary disturbance of sensitive species habitats, however, may be associated with habitat creation and subsequent maintenance activities (e.g., controlled burning in marshes and removal of trees to maintain succession objectives). LCR MSCP conservation measures that could result in such temporary disturbances would, to the extent practicable, be designed and implemented to avoid or minimize the potential for disturbance.

IM-2: To the extent practicable, avoid disturbance to non-covered sensitive species' important habitat areas. Lands under consideration for acquisition as conservation areas would be surveyed to determine if sensitive species habitats (e.g., high density use areas) are present. If present, important habitat areas would be delineated and, to the extent practicable and consistent with LCR MSCP biological goals and objectives, LCR MSCP conservation areas would be designed to avoid removal of the important habitats.

IM-3: To the extent practicable, avoid and minimize disturbance of non-covered sensitive species during the breeding season. To the extent practicable, activities associated with establishment and management of conservation areas would not be implemented during the breeding season of sensitive species that are present in conservation areas to prevent injury or mortality of eggs and young birds unable to avoid these activities.

Mitigation Measures

BIO-1 Conduct site-specific surveys for non-covered sensitive species during selection of land cover type establishment or enhancement (e.g., existing backwaters) areas and, if any are found, then implement measures appropriate for the specific site and species to avoid or minimize impacts to the extent feasible without causing impacts on covered species. These may include measures specified in the Conservation Plan to avoid or minimize potential effects on covered species (e.g., scheduling to avoid breeding times). (*Addresses Impact BIO-6*)

Residual Impacts

Residual impacts of **Impact BIO-6** would be *less than significant* with implementation of **Mitigation Measure BIO-1** since the Conservation Plan contains adequate measures to avoid or minimize impacts on non-covered sensitive species, as well as covered species.

3.4.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented because compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.4.2.4 below), as well as along the LCR. **Impacts BIO-2 through BIO-9** generally apply to this alternative since it is likely that conservation measures similar to those included in the proposed action would be implemented. **Impacts BIO-10 and BIO-11**, discussed in section 3.4.2.4, also would apply because some conservation could occur along the Virgin and Muddy rivers and could affect native fish species. Under this alternative, compliance and permit requirements would be implemented on a case-by-case basis, unlike the proposed action. The expected differences between this alternative and the

proposed action, in addition to those impacts related to native fish along the Virgin and Muddy rivers, are as follows:

- The fund for projects to protect and maintain existing native habitat would not be provided; thus, there likely would be a reduction in the overall availability of habitat for all sensitive species along the LCR due to a loss of habitat that would have been preventable through the funding of pending projects.

- Implementing individual project mitigation programs would not be likely to provide the regional wildfire suppression and law enforcement funding proposed in the Conservation Plan, which would result in less protection for habitat for all sensitive species.

- The absence of coordinated monitoring and adaptive management among individual mitigation programs would create more uncertainty in the success of habitat establishment and maintenance, which would likely reduce the benefits to covered species.

- The increased number and reduced size of mitigation sites that would result from individual projects would have reduced benefits for species due to limitations on site design criteria, such as inadequate patch sizes to meet territorial needs of species, increased edge effects, and inability to develop integrated mosaics of habitat to provide all of the constituent elements of each species' habitat. This primarily would reduce the benefits to the bird species that use the cottonwood-willow and honey mesquite habitat types, but also could affect marsh birds.

- The smaller size of mitigation sites required as mitigation for individual projects would result in limitations on site selection criteria and would likely cause the mitigation to be located in more developed areas where land has been subdivided. Site selection would be focused more on the proximity to the implementing entities' facilities and less on proximity to existing land cover types that provide habitat for covered species or other mitigation sites. This would reduce the benefits provided to the covered species, particularly bird species.

- The establishment of a larger number of smaller-sized mitigation projects would result in increased need for infrastructure (access roads and irrigation pipelines/canals and pump facilities), which would likely cause additional air quality and noise impacts from maintenance and operations, as well as physical disturbances to species from these activities. This would increase adverse impacts on all terrestrial sensitive species.

Mitigation Measures

Mitigation measures would be developed as appropriate in the course of project-specific environmental reviews. If significant impacts are identified, mitigation measures similar to those identified in this EIS/EIR (**Mitigation Measures BIO-1 and BIO-2)** could be implemented. Developing and implementing such mitigation measures is outside the authority of the lead agencies and is beyond the scope of this EIS/EIR.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant impacts to biological resources.

3.4.2.3 Alternative 3: Listed Species Only

Impacts BIO-2 through BIO-9 apply to this alternative. This alternative would provide coverage only for those species listed under the ESA, and would differ from the proposed action in that no honey mesquite and less acreage of cottonwood-willow (4,455 acres) and marsh (382 acres) land cover would need to be established to provide covered species habitat. The ecosystem-wide benefits of establishing these habitats would be incrementally less than those of the proposed Conservation Plan, although still they would still occur. All impact avoidance and minimization measures that are part of the Conservation Plan would apply to this alternative.

Mitigation Measures

Mitigation Measure BIO-1 applies to this alternative.

Residual Impacts

Residual impacts would be *less than significant* since the Conservation Plan contains adequate measures to avoid or minimize impacts on non-covered species, as well as covered species, impacts on native species would be minimized and populations would be retained in the backwaters, and the wetlands disturbed or lost would be replaced at a ratio that offsets the temporal loss.

3.4.2.4 Alternative 4: Off-Site Conservation

As noted in section 3.9, Hydrology, a hydraulic connection exists between flow in the Bill Williams River and groundwater in the alluvium along the river. The establishment of land cover types that provide new habitat for covered species along the Bill Williams River on existing agricultural lands may result in a change in groundwater flow availability for existing land cover types downstream. The extent of change in groundwater flow would be dependent on the amount of water used to establish the new vegetation versus what is currently used for the agricultural operations. As described in section 2.1.4.2, the use of existing appropriative water rights for LCR MSCP conservation projects ensures that the water use is in compliance with Arizona law, under which the Bill Williams River is fully appropriated. Through the use of water from these sources, implementation of the Conservation Plan would not increase the amount of water used from the Bill Williams River. Irrigating newly developed land cover types to provide habitat for covered species in this off-site conservation area could, however, result in a continuation of unquantified adverse impacts on groundwater flow to the existing habitats on the Bill Williams River NWR resulting from the ongoing agricultural operations if the new habitat require a similar amount of water as the ongoing operations.

Impacts BIO-2 through BIO-9 would generally apply to Alternative 4, although the locations of most beneficial and adverse effects would differ. As described in section 2.1.4, Alternative 4

includes the same measures that are part of the proposed action, although habitat establishment and enhancement measures (with the exception of those relating to fish) would occur at locations to be determined along the lower Virgin and Muddy, lower Bill Williams, and lower Gila rivers. These measures would be undertaken in areas that are of low biological value and not likely to be currently occupied by covered species as described in the Conservation Plan. The impacts of implementing components of the Conservation Plan at these locations would be similar to those of the proposed action but may be lower in cases where covered species are not present. Impacts on non-covered sensitive species, however, would likely be similar. Habitat maintenance and certain types of conservation actions would continue along the LCR mainstem as identified in the Conservation Plan.

Impact BIO-10: Land cover type establishment and maintenance activities could result in periodic short-term impacts on sensitive and common native fishes inhabiting the Virgin and Muddy rivers. Land cover type establishment/enhancement- and maintenance-related activities would likely involve operation of equipment in or near channels occupied by sensitive and common native fish. These activities would result in short-term harassment of individuals present in or near construction areas. Operation of equipment to install or improve irrigation-related infrastructure in or near channels could also affect individuals by releasing sediments, temporarily reducing water quality and increasing turbidity. Impacts on non-covered sensitive species, such as the Virgin River spinedace, would depend on the specific location and type of activities conducted for vegetation establishment. These impacts would be *less than significant* because they would be of short duration, would occur infrequently over the term of the LCR MSCP, and would be minimized through implementation of BMPs to minimize effects on water quality and turbidity. In addition, since the Federally listed as endangered Moapa dace, woundfin, and the Virgin River population of the Virgin River chub are not addressed in the LCR MSCP HCP, implementation of conservation measures that could affect these species would require additional ESA compliance. Impacts on those three species would be ensured to remain *less than significant* as a result of the terms and conditions that would be part of the BO(s) issued by the Service.

Impact BIO-11: Construction to establish/enhance native land cover types could result in the long-term loss or degradation of sensitive native fish habitats in the Virgin and Muddy rivers. Sensitive native fish habitats could be lost or degraded if the establishment of land cover types and associated infrastructure results in long-term modification of river channels or flow conditions. If this were to occur, the effects on fish habitat would be a *significant impact but mitigable* through the implementation of **Mitigation Measure BIO-2,** because restoration activities would be sited to avoid impacts to covered species and impacts of restoration activities would not increase impacts of existing baseline conditions (e.g., water diversions). Because the Federally listed as endangered Moapa dace, woundfin, and the Virgin River population of the Virgin River chub are not addressed in the Conservation Plan, implementation of proposed conservation measures that could affect these species would require additional ESA compliance before the actions could be implemented.

Mitigation Measures

Mitigation Measure BIO-1 applies to this alternative.

BIO-2 Design site-specific land cover type establishment plans to avoid and minimize potential effects on sensitive native fish habitats along the Virgin and Muddy rivers. Preparation of the design plans shall be coordinated with and approved by the Service as part of section 7 consultation. If appropriate, design plans shall include measures to rehabilitate any affected habitat. (*Addresses Impact BIO-10*)

Residual Impacts

Residual impacts from **Impact BIO-6** after the implementation of **Mitigation Measure BIO-1** would be *less than significant* since the Conservation Plan contains adequate measures to avoid or minimize impacts on non-covered species, as well as covered species; impacts on native species would be minimized and populations would be retained in the backwaters; and the wetlands disturbed or lost would be replaced at a ratio that offsets the temporal loss. **Mitigation Measure BIO-2** would reduce **Impact BIO-11** so that residual impacts would be *less than significant* because avoidance/minimization measures and rehabilitation of habitat would be part of the ESA consultation, which would ensure that restoration activities would be sited to avoid impacts to covered species and that impacts of restoration activities would not increase impacts of existing baseline conditions (e.g., water diversions).

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3.5 CULTURAL RESOURCES

This section addresses potential impacts to cultural resources from implementation of the proposed Conservation Plan and alternatives. Cultural resources include, but are not limited to, prehistoric and historic sites, districts, buildings, structures, objects, etc., of importance to the study or appreciation of history, archaeology, architecture, other scientific disciplines, and/or that are valued by a cultural group or community.

Impacts may be direct or indirect. Direct impacts are those ground-disturbing activities that are directly associated with the implementation of the proposed action, including vegetation removal, revegetation, and periodic vegetation control, grading and contouring, trenching, dredging, and other land modifications associated with conservation area establishment, upgrading of existing infrastructure, and construction and maintenance of new infrastructure such as above-ground distribution canals, side channels, swales, berms, irrigation systems, and fish production and field facilities. Other elements that can directly affect cultural resources include, for example, construction and use of staging areas, access roads, borrow pits, dredge disposal sites, and installation of barriers, covers, shields and other devices to control erosion and ensure that construction materials, equipment, and contaminants/pollutants do not enter watercourses. Indirect impacts are here defined as bank erosion and other natural land-disturbing processes that may inadvertently result from the functioning of the new and improved conservation areas.

Federal Regulations

Passage of the National Historic Preservation Act (NHPA) in 1966 established the Federal historic preservation program and made it the policy of the Federal government, in partnership with the states, local governments, Indian tribes, and private organizations and individuals, to preserve, protect, and manage cultural resources for "the inspiration and benefit of present and future generations" (16 U.S.C. 470-1, section 2[3]).

Section 106 of the NHPA directs Federal agencies to take into account the effects of their actions on historic properties and to afford the Advisory Council on Historic Preservation an opportunity to comment with respect to the effects of the undertaking. Implementing regulations for section 106 are found at 36 CFR 800, and establish the procedures Federal agencies must follow when assessing the effects of a proposed action on historic properties. The term "historic properties" is defined at 36 CFR 800.16(l)(1) as "….any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register of Historic Places [NRHP]…[and] includes properties of traditional religious importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria."

To be eligible for listing on the NRHP, a cultural resource must be at least 50 years old (although there are exceptions) and must meet one or more of the eligibility criteria set forth at 36 CFR 60.4 which state:

> The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and

> objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons that are significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that have yielded, or may likely yield, information important in prehistory or history.

Cultural resources are evaluated for potential listing on the NRHP with reference to an historic context and associated research questions, in consultation with the SHPO and/or Tribal Historic Preservation Officer, tribes, and other interested organizations and individuals.

Pursuant to Executive Order (EO) 13007 agencies must also consider the effects of their actions on the physical integrity of sacred sites, and access to and ceremonial use of such sites by Indian religious practitioners. EO 13007 defines a "sacred site" as:

> …any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.

EO 13007 directs Federal agencies "…to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions," to accommodate access to and use of such sites by Native American traditional religious practitioners, and to avoid affecting their physical integrity.

Arizona Regulations

Chapter 4.2 of the Arizona Revised Statutes addresses historic preservation issues. While a specific historic preservation compliance process is not identified, the preamble to Article 1 states:

B. It is the intent of the legislature that this state, in cooperation with the political subdivisions of this state, Federal agencies, Indian tribes, and other persons….

2. Provide leadership in the identification and preservation of the prehistoric and historic resources of this state.

3. Administer state owned, administered or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations.

Chapter 4.2, Article 1 goes on to assign responsibility for preservation of historic properties owned and controlled by the agency, to the chief administrator of each agency (section 41-861).

All state agencies are directed to cooperate with the SHPO in developing a program to locate, inventory, and nominate to the Arizona Register of Historic Places all properties under the agency's ownership or control that appear to meet the criteria for inclusion on the register (section 41-862). In the event a direct action or one assisted by a state agency will result in substantial alteration to or destruction of an historic property, state agencies are directed to initiate measures to document the property to the standards established by the state historic preservation officer (section 41-863). And lastly, section 41-864 accords the SHPO 30 days:

> …to review and comment on any plans of a state agency which involve property which is included on or may qualify for inclusion on the Arizona register of historic places, including any construction project, sale, lease, or acquisition of historic properties, to ensure that the prehistorical, historical, architectural or culturally significant values will be preserved or enhanced.

California

Section 15064.5 of the State CEQA Guidelines provides that a project may have a significant environmental effect if it causes "substantial adverse change" in the significance of an historical resource or a unique archaeological resource. Historical resources are defined in State CEQA Guidelines section 15064.5 as any of the following:

(1) A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in the California Register of Historical Resources (Pub. Res. Code §5024.1, Title 14 CCR, section 4850 et seq.).

(2) A resource included in a local register of historical resources, as defined in section 5020.1(k) of the PRC or identified as significant in an historical resource survey meeting the requirements of section 5024.1(g) of the PRC, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

(3) Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code §5024.1, Title 14 CCR, section 4852), including the following:

(A) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(B) is associated with the lives of persons important in our past;

(C) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

(D) has yielded, or may be likely to yield, information important in prehistory or history.

The guidelines specify that a lead agency shall identify potentially feasible measures to mitigate significant adverse changes in the significance of an historical resource. The lead agency shall ensure that any adopted measures to mitigate or avoid significant adverse changes are fully enforceable through permit conditions, agreements, or other measures.

The guidelines specify that if an archaeological site does not meet the criteria for being designated a historical resource, but does meet the definition of a unique archeological resource in section 21083.2 of the PRC, impacts to the site shall also shall be treated or mitigated.

If an archaeological resource is neither a unique archaeological nor an historical resource, the guidelines indicate that effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or EIR, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

Nevada

Nevada Revised Statutes (NRS) Chapter 383 addresses historic preservation and archaeology. NRS 383.021 provided for the establishment of the Office of Historic Preservation (OHP). A specific historic preservation compliance process is not identified. However, NRS 383.121 states:

1. All departments, commissions, boards, and other agencies of the state and its political subdivisions shall cooperate with the office [i.e., OHP] in order to salvage or preserve historic, prehistoric, or paleoenvironmental evidence located on property owned or controlled by the United States, the State of Nevada or its political subdivisions.

2. When any agency of the state or its political subdivisions is preparing or has contracted to excavate or perform work of any kind on property owned or controlled by the United States, the State of Nevada or its political subdivisions which may endanger historic, prehistoric or paleoenvironmental evidence found on the property, or when any artifact, site or other historic or prehistoric evidence is discovered during the course of such excavation or work, the agency or the contractor hired by the agency shall notify the office and cooperate with the office to the fullest extent practicable, within the appropriations available to the agency or political subdivision for that purpose, to preserve or permit study of such evidence before its destruction, displacement, or removal.

3.5.1 Affected Environment

The "area of potential effects" (APE) of an undertaking is defined at 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist." This section goes on to state "the [APE] is influenced by the scale of the undertaking and may be different for different kinds of effects cause [sic] by the undertaking." The APE considered in this EIS/EIR includes the planning area, which extends from the full pool elevation of Lake Mead to the SIB (applicable to Alternatives 1-3), as well as the lower reaches of the Virgin, Muddy, Bill Williams, and Gila rivers, which are addressed as part of Alternative 4. For the purposes of the cultural resources identification and effects evaluation process, three buffer areas were defined around the lakes that extend for a distance of 1 mile to the landward side of the high surface elevation of Lake Mead, along with 0.25-mile buffers extending to the landward side of the high surface water elevation contours of Lakes Mohave and Havasu.

The following discusses the nature and range of cultural resources recorded within the planning area and off-site conservation areas. Areas chosen for conservation area establishment would be selected from one or more of the following categories:

- Up to 30 potentially suitable conservation area sites that have been identified, surveyed, and evaluated by the LCR MSCP. These include 36,500 acres of land initially believed to have potential for successful implementation of conservation measures. These sites encompass lands situated on the historic floodplain of the Colorado River below the first river terrace/scarp;
- Potential off-site conservation areas along the lower reaches of the Virgin, Muddy, Bill Williams, and Gila rivers;
- Available agricultural lands; and
- Other undeveloped areas.

Although any or all of these area types may be selected for Conservation Plan implementation, the following discussion focuses on known and predicted resources within the 30 potential conservation areas because (1) they are located in all reaches of the LCR (Figure 2.1-10 and Table 3.5-1) and thus for programmatic purposes can be considered generally representative of the geographic distribution and range of cultural resource types that may occur within the planning area, and (2) Reclamation has initiated a comprehensive Class I inventory report to characterize these 30 areas in terms of known cultural resources and the nature, location and adequacy of previous cultural resource studies. The focus on gathering and analyzing existing data, as opposed to conducting more intensive Class II (sample) or Class III (100 percent) field surveys, is appropriate given that the locations of specific areas where the conservation measures may be implemented, and the specific details of each project/action that might be undertaken, are not yet known. Given the programmatic character of the LCR MSCP and the fact the LCR MSCP participants will be required to comply with environmental and historic preservation laws and regulations in effect at the time specific projects are planned and implemented, the Class I inventory was determined to be the appropriate study for present needs. The Class I inventory study was initiated in 2000 and is still in draft form and unavailable for public distribution at this time, although the final Class I inventory report will

be submitted to the Arizona, California, and Nevada SHPOs, tribes, and other interested parties for their information and comment.

Table 3.5-1. Concordance Between Potential Conservation Areas within the LCR MSCP Planning Area and Off-Site Areas

Reach Number	*Description*	*Conservation Opportunity Areas (COAs) Covered*
1	Lake Mead full pool surface elevation of 1229′ to Separation Canyon	Upper Lake Mead Lake Mead Lake Mead 1 Mile Buffer
2	Hoover Dam to Davis Dam including Lake Mohave to full pool surface elevation of 647′	Lake Mohave Lake Mohave 0.25 Mile Buffer
3	Davis Dam to Parker Dam including Lake Havasu to full pool surface elevation of 450′	Fort Mojave Topock Lake Havasu Lake Havasu 0.25 Mile Buffer
4	Parker Dam to Adobe Ruin & USBR's Cibola Gauging Station at RM 87.3	North CRIT East CRIT East-Central CRIT West CRIT South CRIT Big Hole North Palo Verde South Palo Verde Cibola Valley Irrigation & Drainage District Palo Verde Oxbow Cibola (northern 75%)
5	USBR's Cibola Gauging Station at RM 87.3 to Imperial Dam	Cibola (southern 25%) North Imperial South Imperial
6	Imperial Dam to the Northerly International Boundary at RM 32.1	Laguna Yuma
7	NIB to SIB	Limitrophe
n/a	Lower Virgin River	Virgin River
n/a	Lower Bill Williams River to Alamo Dam	Bill Williams Planet Ranch
n/a	Lower Gila River	Lower Gila River

Preliminary results of the Class I inventory, however, do allow broad conclusions consistent with the programmatic data needs of this impact assessment. That is, the available data are sufficient to identify the broad range and general location of resources that occur within the planning area and are sufficient to programmatically determine whether the implementation project could have a significant impact on cultural resources that meet criteria for listing on the NRHP, the Arizona Register of Historic Places, the California Register of Historic Places, the Nevada Register of Historic Places, or are otherwise considered unique, important, or significant by other Federal, state or local criteria.

Further details regarding the Class I inventory, its data sources and other background information are provided in Appendix E. Information provided in the draft Class I inventory report serves as the basis of the following discussion.

3.5.1.1 Lower Colorado River

Cultural/Historical Setting

The LCR is now, as it was in the past, a reliable water source capable of supporting lush stands of vegetation and a wide variety of fish, birds, and other wildlife. Valleys and canyons along the course of the river and its tributaries are oases in an otherwise harsh desert, and there is little doubt they have been inhabited since Late Pleistocene times. Generally speaking, archaeological research along the River and its tributaries has been hampered by a lack of stratified sites and sites containing datable materials, and as a result, much of what is known of the sequence and character of the cultural groups that occupied the region during the prehistoric period has been extrapolated from surrounding or more distant areas whose culture histories are better known. Definitive evidence for continuous occupation of the floodplain and rocky canyons along the Colorado River since the Late Pleistocene is lacking, however. Notable exceptions to this general rule include the excavations conducted by Schroeder and others at Willow Beach below Hoover Dam (Baldwin 1948; Harrington 1937; Schroeder 1961), Harrington and Wheeler's work at sites the Muddy and Virgin River valleys prior to their submersion beneath the waters of Lake Mead (as summarized in Shutler 1961), and Lyneis' later work in the same area (e.g., Lyneis 1992). Current understanding of the prehistoric occupation along the LCR and its tributaries is summarized in a number of overviews and project specific reports including Altschul et al. (1994, 2002), Cordell (1984), Ezzo (1994a and b), Ezzo and Altschul (1993), Hoffman (1984), Huber and Ezzo (1995), McGuire and Schiffer (1982), Sterner and Bischoff (1997), Stone (1991), Swartout (1981a and b), Swartout and Drover (1981).

General summaries concerning historic period exploration and settlement of the area include Hague (1978), Schneider and Altschul (2000), Sterner and Bischoff (1997), Stone (1991), and Warren et al. (1981). Tribes with traditional and historical ties to the lower Colorado River and its tributaries under consideration here include: the Southern Paiute, Hualapai, Mohave, Colorado River Indian Tribes, Chemehuevi, Yavapai, Quechan, Cocopah, Hopi, Zuni, and Navajo tribes. Summaries of ethnographic information concerning these and other Southwestern and Great Basin tribes can be found in Ortiz (1983) and D'Azevado (1986), respectively.

Previous Cultural Resource Inventories within the LCR MSCP Planning Area

Examination of the 80+ 7.5' U.S. Geological Survey (USGS) quadrangles covering lands encompassed by the 30 potential conservation areas indicates numerous cultural resource inventories have been conducted around Lakes Mead, Mohave, and Havasu, and along the corridor of the LCR. For the most part, these inventories have been performed in support of the section 106 compliance process and are limited in scope, covering only a small percentage of the total land area encompassed by the potential conservation areas. Survey coverage is generally spotty, with a tendency for recent inventories to be concentrated in the vicinity of developed recreation areas and other facilities around the lakes, and in areas around developed population

centers and recreation areas along the river corridor, with little inventory occurring on the floodplain in intervening areas. While numerous inventories have been conducted in upland areas along the river corridor, Class III (100 percent) inventory of locations on the historic floodplain itself has been extremely limited. Class III inventories in upland areas bordering the historic floodplain of the Colorado River have resulted in the identification of numerous prehistoric sites. In contrast, Class III inventories performed on the historic floodplain seem rarely to result in the identification of prehistoric or historic cultural resources. More detail regarding this issue is provided in the *Previously Recorded Sites Within and Adjacent to the Planning Area* discussion below.

Government Land Office Resources within the Planning Area

The Class I records search included Government Land Office (GLO) township survey plats on file at BLM offices in Arizona, California, and Nevada. GLO township survey plats and surveyors notes frequently make reference to various cultural features present in an area at the time the township was being platted or re-surveyed (some townships in areas along the lower Colorado River were first platted over 100 years ago). GLO township survey plats can thus be a good source of information regarding the kinds of historic period cultural resources that might be present in an area. In some cases, GLO surveyors also noted the presence of prehistoric cultural resources including ruins, petroglyph sites, and "Indian trails."

In excess of 566 GLO resources were identified during the examination of the GLO township survey plat maps. Table 3.5-2 lists the number of GLO resources identified in each of the potential conservation areas. In some cases roads and fences occurred with such high frequency it would have been prohibitively time consuming to individually number and describe them. In these cases researchers assigned a single number to roads or fences that were relatively short in length. In other cases, one or more cultural features on an old township plat was labeled as a cluster or group of houses or other types of structures, making it impossible to derive a count of the specific kinds of resources present at that particular location. As a result of these factors, the GLO resource counts provided in Table 3.5-2 should be taken to reflect the minimum number of GLO resources present within a particular area.

A wide variety of historic features were identified on GLO township plat maps within areas covered by the planning area. Roads/highways (n=198+) are the most frequently noted historic features on the GLO plat maps. Structures used for habitation (shacks, cabins, houses, ranches, camps) occur with the next highest frequency (n=77+), followed by fences (n=59+), fields/cultivated fields/fenced fields and lots (n=46+), mining claims and physical features associated with mining (e.g., mills, shafts, etc.; total n=44+) other types of structures (including sheds, a "pumping pump," wells, windmills, monuments, a pumping plant, a barn, a pipeline, and a bridge; n=29), desert land claims and a forest lien claim (n=25), and ditches (n=21). Other GLO resources noted as occurring within the potential conservation areas include trails (n=17, including 3 noted as "Indian trail"), railroads (n=8, with the Southern Pacific Railroad occurring in at least 3 potential conservation areas thus reducing the actual number of railroads to 5), canals (n=8), corrals (n=7), townsites and resorts (n=6, including St. Thomas, Callville, El Dorado, Doudville, Norton's Landing, and La Paz), telephone and telegraph lines (n=5), military and hay and wood reservations (n=5; actual count is 3 owing to the occurrence of Fort Mohave and its hay and wood reservation in 2 Potential conservation areas; the other military

Table 3.5-2. Summary of Previously Recorded Sites and GLO Resources Within the Potential Conservation Areas within the Planning Area and Off-Site Areas

Reach No.	*COA Name*	*Number of GLO Resources Identified*	*Number of Previously Recorded Sites*
1	Upper Lake Mead	0	22
	Lake Mead (inundated)	58	93
	Lake Mead 1 Mile Buffer	31	245
2	Lake Mohave (inundated)	35	128 (47)*
	Lake Mohave 0.25 Mile Buffer	7	89
3	Fort Mojave	8	34
	Topock	98	18
	Lake Havasu (inundated)	30	7
	Lake Havasu 0.25 Mile Buffer	4	20
4	North CRIT	3	0
	East-Central CRIT	24	5
	West CRIT	17	4
	East CRIT	55	4
	South CRIT	6	0
	Big Hole	1	0
	North Palo Verde	1	7
	South Palo Verde	4	0
	Cibola Valley Irrigation & Drainage District	19	1
	Palo Verde Oxbow	2	6 (0)**
	Cibola	57	17 (5)**
5	North Imperial	15	21 (4)**
	South Imperial	5	20 (1)**
6	Laguna	0	24 (18)**
	Yuma	9	17 (11)**
7	Limitrophe	1	6 (5)**
n/a	Lower Virgin River	4	26
n/a	Bill Williams	22	2
	Planet Ranch	47	4
n/a	Lower Gila River	3	2
All	**Totals for LCR MSCP APE**	**566**	**822 (674)**

*Number in parentheses represents the number of sites that would be present were features within sites assigned separate site status by Baldwin to be grouped into single sites.

**Number in parentheses represents the number of sites within a particular COA following elimination of sites for which no information is available, and Imperial County GLO point plots, which are better treated as GLO resources, not known site locations.

feature is Old Fort Callville, now submerged beneath the waters of Lake Mead), ferries (n=3, including Gregg's and Bonelli's and one unnamed), salt mines (n=2), a cemetery (at El Dorado which was moved to Nelson's Landing prior to the inundation of El Dorado by the rising waters of Lake Mohave); and 6 natural features (including a named rock/outcrop, seeps, springs, and hot springs).

Sites Listed on the NRHP Within or in Close Proximity to the Planning Area

During the course of the Class I records search the National Register Information System was queried to determine if any sites listed on the NRHP fall within or in close proximity to the planning area. A total of eight sites were found listed on the register (see Table 3.5-3). Two of these, Pueblo Grande de Nevada (26CK7; better known as "Lost City") and Hoover Dam (which has been designated a National Historic Landmark), fall within the Lake Mead and Lake Mead 1 Mile Buffer Potential conservation areas. Lost City is located on lands managed by Reclamation and the NPS, while Hoover Dam is operated and maintained by Reclamation. Two other sites, the Willow Beach Gaging Station and the Homestake Mine (26CK3126) are located in the Lake Mojave 0.25 Mile Buffer conservation opportunity area on lands managed by the NPS. The Ripley Intaglios are located on the east side of the Colorado River about 10 miles south of Blythe (Holmlund 1993). The site is located on the first terrace overlooking the historic floodplain of the Colorado River, so is situated adjacent to but not within the APE of the Conservation Plan. The Ripley Intaglios are individually listed, but also contribute to a larger thematic nomination encompassing many of the ground figure groups located along the lower reaches of the Colorado and Gila rivers. The Ripley Intaglios themselves are located on Reclamation withdrawn lands and lands administered by the BLM Yuma Field Office (BLMYFO). The Martinez Lake/Fisher Landing Site (AZ X:3:13) is a large prehistoric site located in an elevated position on a knoll near the eastern bank of the Colorado River. The land on which the site is located is administered by the BLMYFO. The Ocean to Ocean Bridge was the first highway bridge constructed across the Colorado River. Constructed in 1915 by the Office of Indian Affairs, the bridge served as the river crossing for Highway 80 in Yuma, Arizona. The area surrounding Yuma Crossing and Associated Sites has been designated a National Historic Landmark. The Landmark boundaries straddle the Colorado River taking in the area surrounding the Quartermaster Depot and the Yuma Territorial Prison on the south, and the St. Thomas Yuma Indian Mission on the north. Lands within the Landmark boundaries south of the river are administered by Arizona State Parks and the City of Yuma, while lands to the north of the river are managed by the Fort Yuma Quechan Tribe.

Previously Recorded Sites Within and Adjacent to the Planning Area

A majority of the site data received from the various repositories contacted during the records search is best considered "legacy data." Legacy data is here defined as information collected by professionals and amateurs that, in general, do not meet current Federal, state, or professional standards for site recording. As a result, many site forms lack basic descriptive data, and most do not have accurate data regarding the NRHP eligibility of the resource. Even in those cases where the recorder included an eligibility recommendation on the site form or in the body of the report, there is no indication in repository records whether or not the Federal agency, and

Table 3.5-3. Historic Properties Listed on the NRHP that Fall Within or Immediately Adjacent to the Planning Area

State	*County*	*COA Name*	*USGS Quad*	*Property Name*	*Managing Agency*
NV	Clark	Lake Mead & Lake Mead Buffer	Overton, Overton Beach, Valley of Fire East	Pueblo Grande de Nevada/Lost City/26CK7	NPS/ Reclamation
AZ/NV	Mohave/Clark	Lake Mead Buffer	Hoover Dam	Hoover Dam National Historic Landmark	Reclamation
AZ	Mohave	Lake Mohave Buffer	Willow Beach	Willow Beach Gaging Station	NPS
NV	Clark	Lake Mohave Buffer	Davis Dam	Homestake Mine/26CK3126	NPS
AZ	La Paz/Yuma	South CRIT & Big Hole	Mule Wash	Ripley Intaglios	BLMYFO
AZ	Yuma	South Imperial	Imperial Reservoir	Martinez Lake/Fisher Landing/AZ X:3:13	BLMYFO
AZ/CA	Yuma/Imperial	Yuma	Yuma East	Ocean to Ocean Bridge	NRHP states "Local"
AZ/CA	Yuma/Imperial	Yuma	Yuma East	Yuma Crossing & Associated Sites National Historic Landmark	AZ State Parks/City of Yuma/Fort Yuma Quechan Tribe

subsequently the SHPO or the Keeper of the Register, concurred with the recommendation. As a result, there is no way to state with any certainty how many sites located within or in proximity to the planning area have been found eligible or potentially eligible for listing on the NRHP.

The criteria used to define what is and what is not a site have changed through time. In the early days of section 106 compliance surveys, scatters of 2-3 artifacts were often recorded as sites and assigned permanent state site numbers. Today, such scatters would be considered isolated occurrences and would not be entered into repository records with permanent site numbers. To determine how many sites listed in the LCR MSCP database might actually be isolated artifacts or isolated occurrences would be prohibitively time consuming, thus for the purpose of this analysis it is assumed all resources listed in the database represent sites, with the exceptions described in the following paragraph. Southeast Information Center records for Imperial County contain numerous site forms for linear features that appear in the surveyors' notes accompanying the original GLO township plat maps. These linear "sites" are commonly plotted as a point along a township grid line and are only cursorily described on the site form with a phrase from the surveyor's notes (e.g., "cross trail bearing north and south"). Since there is nothing in the Imperial County site records indicating any field reconnaissance has ever been performed to confirm the presence of physical remains of cultural features at the plotted

locations, these "sites," like the GLO resources discussed above, are best viewed as being suggestive of the kinds of historic features that might be present in the planning area.

A total of 822 previously recorded sites appear in the LCR MSCP site database (Table 3.5-2). If sites for which no data is available and Imperial County GLO point plot data are eliminated, the total number of sites falls to 755. The actual number of sites present is even somewhat lower than this. Many of the sites in the Lake Mohave and Lake Mohave 0.25 Mile Buffer potential conservation opportunity areas were recorded by Baldwin (1943, 1948) prior to construction of Davis Dam. Field observations made by Reclamation and NPS cultural program staff regarding several sites recorded by Baldwin indicate he assigned separate site status to individual features within larger sites. If one treats Baldwin's site clusters as single sites, rather than several individual sites as they appear in the record, the number of sites in the Lake Mohave 0.25 Mile Buffer conservation opportunity area is reduced from 128 to 47, thus decreasing the total number of sites in the Conservation Plan APE as a whole to 674.

Some general observations can be made with respect to the kinds of sites located within or adjacent to the potential conservation areas, and how these are distributed across the landscape. Lithic scatters, and lithic and ceramic scatters, have been recorded in virtually all the conservation areas. Large concentrations of heat-altered rock believed to represent mescal/agave roasting features appear in the records for only the Upper Lake Mead, Virgin River, and Lake Mead One Mile Buffer potential conservation areas. Rock rings, rock alignments, cleared circles and trails are common features in many of the potential conservation areas and are found in isolation or as features within larger sites. Rock shelters exhibiting evidence of human occupation have been recorded in the Upper Lake Mead, Virgin River, Lake Mead and Lake Mead One Mile Buffer, and Lake Mohave and Lake Mohave 0.25 Mile Buffer potential conservation areas where there are rock formations conducive to shelter formation. Petroglyph sites have been recorded in the Lake Mohave, Topock, Lake Havasu, and Planet Ranch potential conservation areas; sites with pictographs occur only in the Upper Lake Mead area. Ground stone quarrying and manufacturing sites occur only in the records for the Fort Mojave area. Sites containing intaglios (also called geoglyphs, ground figures, and gravel features in the records) have been recorded in proximity to the Fort Mojave, Topock, Lake Havasu 0.25 Mile Buffer, and Cibola potential conservation areas.

Historic site types recorded within and in proximity to the potential conservation areas include ruins of adobe and wood houses, rock cabins, tent pads, survey markers, mineral prospects, claim cairns, a mill, railroad grades, wagon roads, and trash dumps. Numerous historic period sites occur in the vicinity of Hoover Dam that are associated with the construction and operation of the dam. The vast majority of the historic period sites recorded in the South Imperial, Laguna, Yuma, Limitrophe, and lower Gila River potential conservation areas are irrigation facilities associated with the historic Yuma Irrigation Project and the Gila Project irrigation systems. Overall, historic period site distribution is relatively random, with sites appearing in a variety of environmental and geomorphological contexts.

As noted above, LCR MSCP project and site data are still in the process of being evaluated. As a result, it is not possible at this time to provide generalized statements concerning the distribution of sites in the vicinity of Lakes Mead, Mohave, and Havasu. The following discussion thus focuses on general observations concerning the distribution of prehistoric sites

along the Colorado River corridor. Careful examination of site location maps accompanying the LCR MSCP Class I draft report indicates while a significant number of prehistoric sites have been recorded on terraces and ridges in upland areas immediately adjacent to and overlooking the historic floodplain, very few prehistoric sites have been recorded on the historic floodplain proper. Where prehistoric sites have been documented on the floodplain they are described as occurring on geomorphological features such as sand dunes, ridges of very low relief, and low knolls, that are slightly elevated above floodplain sediments.

Lack of extensive Class III inventory coverage on areas of the historic floodplain of the Colorado River is a likely explanation for the low numbers of documented prehistoric and historic sites on the historic floodplain. However, the results of recent research done in the vicinity of Yuma, Arizona, suggest an alternative explanation that is worthy of further testing in other areas along the river. Examination of historic maps during archival work conducted in association with a series of cultural resource inventories near Yuma (i.e., Bischoff et al. 1998; Huber et al. 1998a and 1998b; Sterner and Bischoff 1998), indicated the river altered its course several times between the 1840s and 1950s, in one case meandering 2 miles across its floodplain. Evaluation of geomorphological test trenches placed on the floodplain in areas behind the modern levees consistently revealed the presence of sedimentary deposits characteristic of a high energy fluvial environment (Sterner and Bischoff 1998; Huber et al. 1998a and 1998b). Sediments laid down under high energy fluvial conditions are extremely unlikely to contain in situ cultural remains. Inventory of several parcels on the historic floodplain of the Colorado River was also revealing. Only recent trash was found on parcels located inside the levee system, while the earliest cultural materials identified on parcels outside but in close proximity to the levees, post-dated levee construction. Prehistoric cultural remains recorded during the inventories were confined to elevations on the first terrace above the historic floodplain. The results of these inventories suggest there should be few prehistoric or historic sites on the historic floodplain of the Colorado River that will pre-date the construction of Hoover, Davis, and Parker Dams, and/or local levee systems. The applicability of the results of the Yuma inventories to other areas along the river remains to be tested.

Various authors (e.g., Stone 1991) have suggested the low frequency of occurrence of sites on the historic floodplain of the Colorado River might also be explainable by their burial. Recent monitoring of trenching operations associated with construction of the North Baja Pipeline across the river and downstream from Ehrenberg, Arizona, resulted in the discovery of a number of subsurface lenses of charcoal and ash associated with lithic and ceramic artifacts. Preliminary examination of these deposits by a geomorphologist suggests they are associated with surfaces representing the first terrace above the historic floodplain that have been buried as a result of colluvial and sedimentary depositional processes (personal communication, R. M. Apple 2002).

It is also possible many sites that may have been located on the historic floodplain of the Colorado River have been destroyed by historic period development. Descriptions of the few prehistoric sites that have been recorded on the historic floodplain suggest such sites are relatively small, artifact densities are low, and cultural remains are restricted to surface contexts, thus they would be extremely susceptible to destruction by activities associated with urban development and intensive agriculture.

In summary, the draft Class I inventory suggests the following:

- Most areas have not been completely surveyed according to modern standards.
- Nonetheless, a wide range of prehistoric and historic resources are known or predicted to occur within the planning area. Many site types are non-randomly distributed, reflecting geographic variations in settlement and subsistence patterns.
- Many sites are poorly documented because they were recorded before modern standards were the norm or because they were recorded from archival (GLO) sources and their existence has not been verified by field surveys.
- The GLO data, therefore, are best considered as suggestive of the types of historic resources that might be present within the planning area.
- Most intensive inventories have been conducted in upland areas adjacent to the potential conservation areas located in the historic floodplain. These inventories have located numerous prehistoric sites, particularly on terraces adjacent to but above the floodplain.
- In contrast, few intensive inventories have been conducted on the historic floodplain and these have located few prehistoric or historic cultural resources.
- Existing data indicate that the low frequency of cultural resources found on the historic floodplain within the potential conservations areas is probably due to multiple factors:
  - In some places natural movements of the river channels probably have destroyed most resources that predate the early to mid-twentieth-Century construction of the Hoover, Davis, and Parker Dams and/or local levee systems.
  - In some areas geomorphic processes have buried first terraces and the archaeological sites located on them.
  - In some places, sites have been destroyed by historic and modern period development.

Traditional Cultural Property Identification: Consultations with Tribes

As the lead Federal agency for environmental compliance activities associated with this action, Reclamation initiated government-to-government consultation with tribes early in the planning process. Letters were sent to tribal leaders, and tribal natural resource and cultural resource specialists explaining the Conservation Plan. The purpose of the Conservation Plan was explained, and the tribes on whose reservations activities might be implemented (i.e. the Hualapai, Fort Mojave Indian Tribe, CRIT, the Chemehuevi Tribe, the Fort Yuma Quechan Tribe, and the Cocopah Indian Community) were invited to become partners in the effort. Several meetings were later held with leaders of these tribes during which tribal representatives were able to express their general concerns and interests in the project. In November 2000, Reclamation sent a certified letter to tribal leaders and tribal cultural resource specialists requesting information concerning traditional cultural properties (TCPs) that might be present in the potential conservation areas. This letter was sent to the following tribes and communities:

Chemehuevi Tribe	Hualapai Tribe
Cocopah Indian Community	Kaibab Paiute Tribe
Colorado River Indian Tribes	Las Vegas Paiute Tribe
Fort McDowell Mohave-Apache Community	Moapa Paiute Tribe
Fort Mojave Indian Tribe	Navajo Nation
Fort Yuma Quechan Tribe	Paiute Tribe of Utah
Gila River Indian Community	Pueblo of Zuni
Havasupai Tribe	Yavapai Tribe
Hopi Tribe	

Reclamation also sent the same letter to several interested parties including the Las Vegas Indian Center, the Pahrump Paiute Tribe, the Shivwits Band of Paiute, and the Southern Paiute Consortium. Reclamation and representatives from Archaeological Consulting Services Ltd. followed up the November 2000 letter with phone calls to tribal leaders and tribal cultural resource specialists. All tribal representatives declined to provide information concerning TCPs and sacred sites that might be located within the Potential conservation areas, indicating whether or not to disclose such information was better considered when more was known concerning where specific projects would be located and what the potential impacts might be.

As part of the background research for the North Baja Pipeline Project Kirkish et al. (2000) prepared a general overview of the kinds of cultural resources typically of general concern to tribes in southern California. Such resources include: geoglyphs, trails, white quartz, "vision quest" and "prayer circles," rock art (petroglyphs and pictographs), cleared circles, "spirit breaks" and "deflectors," and cairns or shrines. For more information concerning the importance of these kinds of resources the reader is referred to Ezzo and Altschul (1993), Kirkish et al. (2000), and Schnieder and Altschul (2000).

3.5.1.2 Muddy River/Moapa Valley and Virgin River

These river valleys are generally known to be sensitive for cultural resources. Table 3.5-2 indicates that four GLO resources have been documented from archival sources and 26 sites have been recorded in the off-site conservation area.

3.5.1.3 Bill Williams River

This river valley is likely sensitive for cultural resources, although few resources have been actually recorded so far. Table 3.5-2 indicates that 69 GLO resources have been documented in the Bill Williams/Planet Ranch areas from archival sources, while field survey has resulted in the recordation of six sites within the off-site conservation areas. The low numbers of recorded sites could reflect the lack of intensive survey or specific characteristics of the off-site conservation areas.

3.5.1.4 *Lower Gila River*

The Gila River is generally considered sensitive for cultural resources, although few resources have been documented in the specific location selected for off-site conservation. Table 3.5-2 indicates that three GLO resources have been documented from archival sources and field surveys have recorded two sites in the off-site conservation area.

3.5.2 Environmental Consequences

Significance Criteria

In accordance with 36 CFR 800 (a)(1), an adverse effect to a historic property eligible for inclusion in the NRHP is found when "…an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify that property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association." In accordance with CEQA, an impact on cultural resources would be considered significant if it adversely affects a resource listed in or eligible for listing in the NRHP, state registers, or is otherwise considered a unique, important or significant resource under relevant cultural resource laws, guidelines, and regulations. In general, a project may have an adverse effect on a cultural resource if the resource would be physically damaged or altered, would be isolated from the context considered significant, or would be affected by project elements that would be out of character with the significant property or its setting.

The American Indian Religious Freedom Act of 1978 establishes that it is the policy of the Federal government to "protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the(ir) traditional religions…." EO 13007 elaborates and strengthens the Act and directs Federal agencies to avoid adversely affecting "sacred sites." Title 36 CFR 800 addresses the consideration of Native Americans and other interested parties in the process of evaluating impacts on cultural resources. Specific impacts that would be considered adverse and significant are determined in consultation with such parties. For present purposes, any action that could disturb or destroy archaeological sites, biological habitats, topographic features or other properties associated with Native American religious ceremonies would be considered adverse and significant.

3.5.2.1 *Alternative 1: Proposed Conservation Plan*

Impacts

Prior to implementing specific projects, LCR MSCP participants would be required to comply with the environmental compliance and historic preservation laws and regulations in effect at the time. Current laws and regulations require agencies to identify cultural resources and to evaluate these for potential listing on Federal and state registers in consultation with the SHPOs, tribes, and other interested organizations and individuals. Agencies are further required to assess the effects of an undertaking on those properties found eligible for listing on the NRHP, and to mitigate, in so far as is possible, adverse effects to those properties if they can not be avoided through project redesign or by other means.

Impact CULT-1: Disturbance of the ground surface could directly or indirectly disturb or destroy significant archaeological or historical resources, particularly in undeveloped or previously undisturbed areas. A number of the activities proposed for implementation in the Conservation Plan could result in adverse effects to historic properties if such are present in the area of a planned conservation project. Controlled burns to remove undesirable vegetation can result in the destruction of perishable items (e.g., basketry, arrow and dart shafts, textiles, historic wooden structures, corrals, fences, etc.) that might be preserved in sites, and can cause lithics, ceramics, and the faces of rock art panels to spall. Burning can also result in physical and chemical changes in some classes of artifacts that could prevent the use of some analytical techniques, such as thermoluminescence to date ceramics. Vegetation removal using mechanical means can result in the destruction of the integrity of both surface and subsurface cultural deposits. Dredging areas that have not been previously dredged could result in the destruction of buried cultural deposits, if such exist, and/or burial of sites at dredge spoil disposal locations. Ground disturbing activities such as excavation of new channels, ditches, and shallow swales, creation of terraces and benches, and contouring and leveling areas for plantings, construction of water control structures, development of new access roads, etc., all have the potential to destroy surface and subsurface cultural deposits if any exist in the area of a project. Construction and use of access roads, staging areas, and other ancillary facilities associated with construction and operations can also affect cultural resources in potential conservation areas and other project areas.

The potential for cultural resource impacts in agricultural areas would be similar to those in undeveloped areas, although the number of significant sites that might be affected might be lower due to prior disturbance from plowing, contouring, disking, and other agricultural practices that disturb the ground surface. Such disturbances can destroy or reduce the integrity and information potential of some (but not all) types of sites.

This impact would be *significant but mitigable to less than significant* with implementation of **Mitigation Measure CULT-1**.

Impact CULT-2: Cultural resources may be affected by unauthorized artifact collection during construction or by a lack of awareness of cultural resource mitigation measures on the part of construction personnel. Construction workers may collect artifacts or unintentionally damage or destroy cultural resources unless they have a working knowledge of the nature and importance of cultural resources, laws preventing vandalism and artifact theft. This impact would be *significant but mitigable to less than significant* with implementation of **Mitigation Measure CULT-1**.

Mitigation Measures

CULT-1: One or more of the following mitigation measures shall be implemented (*Addresses Impacts Cult-1 and Cult-2*)

1. Consult with the appropriate SHPO(s), tribes, and other interested parties, perform archival research, interview informants, and conduct cultural resource inventories during site-specific environmental review to identify any cultural resources that may be affected. Consult with geologists, geomorphologists, and/or geophysicists to determine if there are areas that may contain buried cultural deposits and to determine the

appropriate methods/techniques for locating these. Implement subsurface exploration activities as a part of the inventory and identification program.

2. Evaluate all identified cultural resources for potential listing on the NRHP or state or local registers with respect to applicable criteria and appropriate historic themes, research questions, and data requirements as identified in regional, local, and/or project specific historic contexts.
3. Modify project design, if feasible, to avoid cultural resources found eligible for listing on the national, state, or local registers.
4. When required (i.e., in California), consult with the SHPO, tribes, and other interested parties to develop and implement, prior to construction, a "Testing and Evaluation Plan" if "potentially significant" archaeological sites cannot be avoided through project redesign.
5. If an archaeological site eligible for listing on the national, state, or local registers of historic places cannot be avoided through project redesign, in consultation with the appropriate SHPO, tribes, and other interested parties, develop and implement a Data Recovery Plan. If the eligible property is a building or structure, consult with the appropriate SHPO and other interested parties, and document the resource to the agreed to standards.
6. Develop a Cultural Resources Construction Monitoring Plan prior to construction if ground disturbance would occur within any areas of potential archaeological sensitivity.
7. In the event of an unanticipated cultural resource discovery during construction, re-direct construction to other areas until the discovery has been documented by a qualified archaeologist and its potential significance evaluated in terms of applicable criteria. Resources considered significant would be avoided or subject to a testing and evaluation program and/or a data recovery program as described above.
8. If the project has the potential to discover or otherwise result in the excavation of Native American cultural items on Federal or tribal lands, then the appropriate Federal agency or agencies will initiate consultation with any known lineal descendants and relevant Indian tribes as per the Native American Graves Protection and Repatriation Act (NAGPRA). Consultation would identify, among other things, procedures that would be followed in the event that project-related activities resulted in the excavation or discovery of Native American human remains on Federal or tribal lands. If cultural resources or human remains were discovered on non-Federal or non-tribal lands, state and local laws would be followed.
9. Procedures that would be identified under item 8, above, would be incorporated into all archaeological testing and date recovery plans and the Cultural Resources Construction Monitoring Plan as appropriate.

Residual Impacts

Residual impacts would be *less than significant* because implementation of the mitigation measures noted above would ensure compliance with all regulatory requirements and the avoidance or recovery of significant cultural resources.

3.5.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented because compliance with the ESA still would be required for the covered actions, although some conservation could occur in the off-site conservation areas (as described in section 3.5.2.4 below), as well as along the LCR. **Impacts CULT-1 and CULT-2** apply to this alternative, although the smaller size of the floodplains on the tributaries could limit the potential for agencies to redesign projects to avoid impacts to historic properties; thus the probability that such properties might be affected could potentially increase to the extent that conservation were implemented in the off-site conservation areas. It is estimated that the no action alternative would develop fewer acres of conservation area than the proposed action, which would result in proportionately fewer cultural resource impacts. However, since the no action alternative would result in increased need for infrastructure, additional impacts to cultural impacts would result from the construction of these facilities. Thus, overall cultural resource impacts would be similar to those under the proposed action.

Mitigation Measures

Mitigation measures would be developed as appropriate in the course of project-specific environmental reviews. If significant impacts are identified, mitigation measures similar to those identified in this EIS/EIR (**Mitigation Measure Cult-1)** could be implemented. Developing and implementing such mitigation measures is outside the authority of the lead agencies and is beyond the scope of this EIS/EIR.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant impacts to cultural resources.

3.5.2.3 Alternative 3: Listed Species Only

Impacts CULT-1 and CULT-2 apply to this alternative. The same types of impacts would occur as described for the proposed action, but the overall magnitude would be lessened since a smaller amount of conservation area would be established.

Mitigation Measures

Mitigation Measure CULT-1 applies to this alternative.

Residual Impacts

Residual impacts would be *less than significant* because implementation of the mitigation measures noted above would ensure compliance with all regulatory requirement and the avoidance or recovery of significant cultural resources.

3.5.2.4 Alternative 4: Off-Site Conservation

Impacts CULT-1 and CULT-2 apply to this alternative. This alternative would contain the same elements as the proposed action (i.e., the number of acres subject to ground disturbing

activities is the same), except that establishment of upland land cover types and the establishment of marsh would be focused on the lower reaches of the Virgin, Muddy, Bill Williams, and Gila rivers. The 360 acres of backwater establishment would still occur within the planning area. Impacts of implementing this alternative generally would be similar to those of the proposed Conservation Plan, although the smaller size of the floodplains on the tributaries could limit the potential for agencies to redesign projects to avoid impacts to historic properties; thus the probability that such properties might be affected could potentially increase under this alternative.

Mitigation Measures

Mitigation Measure CULT-1 applies to this alternative.

Residual Impacts

Residual impacts would be *less than significant* because implementation of the mitigation measures noted above would ensure compliance with all regulatory requirements and the avoidance or recovery of significant cultural resources.

3.6 ENERGY AND DEPLETABLE RESOURCES

A detailed analysis of energy and depletable resources was not performed because the proposed action and alternatives would have minimal impacts on these resources. Diesel fuel would be required during construction and to operate some of the water pumps used for irrigation. Electrical power would be required at the two potential field facilities and to operate other irrigation pumps. The amounts of diesel fuel and electricity that would be required would be minor and not require an expansion of existing supplies.

Hydroelectric power would not be adversely affected by the proposed action and alternatives because irrigation water for those sites that use Colorado River water would be released seasonally, as it is for agricultural uses. Because it is likely that a number of the conservation area establishment sites would be located on agricultural land using the agricultural land's water entitlement, it is likely that the timing and magnitude of water releases would be similar to those that currently exist. Moreover, only a small amount of water would be required for irrigation of the conservation area establishment sites in relation to the total amount of water released for consumptive use on the LCR (about 48,800 af compared to the 7.5 maf total annual release). (The actual release of water from Lake Mead in a given year is approximately 9.2 maf because of water delivered to Mexico). Most hydroelectric power is produced at Hoover, Parker, and Davis dams, and even if no agricultural land were used, this amount would represent a negligible change to the dams' operations. The 2003 Annual Operating Plan signed by the Secretary of the Interior, for example, shows an annual release of between 9,575,000 af and 9,305,000 af from Hoover Dam during calendar year 2003, depending on whether a Full Domestic Surplus or Normal determination is made. This would result in the production of 4.136 million kWh. The proposed action and alternatives, even under worst-case conditions, would result in a less than 0.5 percent reduction in the amount of water released through Hoover Dam to generate hydroelectric power.

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3.7 ENVIRONMENTAL JUSTICE

This section addresses the potential for the proposed action and alternatives to create disproportionate impacts on minority and low-income populations. The Public Involvement Program (PIP) for the LCR MSCP provides opportunities for members of the low-income and minority communities that could be affected by the proposed action to participate in the LCR MSCP planning efforts. These efforts are described in section 7.2.

In 1994, the president issued Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-income Populations. The objectives of the EO include developing Federal agency implementation strategies, identifying minority and low-income populations where proposed Federal actions could have disproportionately high and adverse human health and environmental impacts, and encouraging the participation of minority and low-income populations in the NEPA process.

Minority populations include all persons identified by the Census of Population and Housing to be of Hispanic or Latino origin, regardless of race, as well as non-Hispanic persons who are Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander.

Low-income populations are those that fall within the annual statistical poverty thresholds from the Bureau of the Census "Current Population Reports, Series P-60 on Income and Poverty." For the purposes of this analysis, low-income populations are defined as persons living below the poverty level ($17,463 for a family of four with two children in 2000, adjusted based on household size and number of children), as reported by the Census (2000). The Census Bureau uses a set of money income thresholds that vary by family size and composition to detect who is poor. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as being "below the poverty level." The percentage of low-income persons is calculated as the percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a slightly lower number than the total population since it excludes institutionalized persons, persons in military group quarters and in college dormitories, and unrelated individuals under 15 years old.

3.7.1 Affected Environment

The planning area and the off-site locations are located within a large geographic region encompassing all or portions of seven counties, including portions of three California counties, portions of three counties in Arizona, and a portion of Clark County, Nevada. Two types of data must be reviewed to evaluate environmental justice effects: minority populations and income levels. Information on population, demographic characteristics, and income for the seven counties in 2000 is provided in Table 3.7-1 below.

Of the seven counties, Imperial County has the largest percentage of minority residents and the highest percentage of the population living below the poverty level, at approximately 80 percent and 23 percent, respectively. Mohave County has the lowest percentage of minority residents and the smallest percentage of the population living below the poverty level, at

approximately 16 percent and 14 percent respectively. The other four counties have minority and poverty populations falling within the range identified for these two counties.

Table 3.7-1. Total Population, Minority Population and Population Living Below Poverty in the Affected Counties, 2000

County	*Total Population*	*Minority Population*	*Percent Minority*	*Population Living Below Poverty Level*	*Percent of Population Living Below Poverty Level*
La Paz, AZ	19,715	7,154	36.3	3,798	19.6
Mohave, AZ	155,032	24,745	16.0	21,252	13.9
Yuma, AZ	160,026	88,896	55.6	29,670	19.2
Imperial, CA	142,361	113,872	80.0	29,681	22.6
Riverside, CA	1,545,387	758,069	49.1	214,084	14.2
San Bernardino, CA	1,709,434	960,210	56.2	263,412	15.8
Clark, NV	1,375,765	548,423	39.9	145,855	10.8
Total	**5,107,720**	**2,501,369**	**49.0**	**707,752**	**13.9**

Portions of the area potentially affected by the proposed action and alternatives also consist of tribal lands associated with the Fort Mojave Indian Reservation; CRIT; and the Chemehuevi, Quechan (Fort Yuma Indian Reservation), Hualapai, Havasupai, and Cocopah Indian Tribes. Figure 1.1-1 identifies the locations of tribal lands.

Population and income data also were collected for the four specific areas within the counties that could be directly affected by construction related to the project: the LCR planning area, and the three off-site conservation areas located along the Muddy and Virgin rivers, Bill Williams River, and lower Gila River (see Table 3.7-2).

Table 3.7-2. Total Population, Minority Population and Population Living Below the Poverty Level in the LCR Planning Area and Off-Site Locations, 2000

Affected Environment	*Counties Included*	*Total Population*	*Minority Population*	*Percent Minority*	*Population Living Below Poverty Level*	*Percent Population Living Below Poverty Level*
Planning Area	La Paz, Mohave, Yuma, Imperial, Riverside, San Bernardino, Clark	105,756	60,491	57.2	22,330	21.1
Muddy and Virgin Rivers	Clark	4,656	567	12.2	353	7.6
Bill Williams River	La Paz, Mohave	713	86	12.1	77	10.8
Lower Gila River	Yuma	2,576	1,108	43.0	464	18.1
Source: U.S. Department of Commerce, Census Bureau 2000.						

Based on a GIS analysis of the census block groups within each of these four areas, and assuming that populations are equally distributed within a particular census block group, populations were prorated for subsections within block groups. The total population, minority population, and persons living below poverty level were then estimated for each area. It is noted that communities located in proximity to these four areas (e.g., Blythe, Bullhead City, Parker, Needles, and Wellton) could also be affected by the proposed action; however, it would be speculative in this programmatic analysis to attempt to identify which specific locations would be affected. Additional evaluation would be performed once specific projects were identified. Projects located on tribal lands also might require additional analysis. In addition, because workers may travel some distance to agricultural sites for work, the demographic and economic characteristics of the four areas discussed below are provided as general indicators only and are not intended to suggest that persons residing outside of these areas could not be affected.

3.7.1.1 Lower Colorado River

The planning area is the largest and most populated of the four areas considered, with a year 2000 population of approximately 105,756. Of this total, approximately 57 percent of the population is minority, and approximately 21 percent of the population lives below the poverty level. Compared to the three off-site locations, this area has a substantially higher percentage of both minorities and persons living below the poverty level.

3.7.1.2 Muddy River/Moapa Valley and Virgin River

The Muddy River/Moapa Valley and Virgin River off-site conservation area is located entirely within Clark County. The year 2000 population was approximately 4,656. Of this total, approximately 12 percent of the population is minority, and approximately 8 percent of the population lives below the poverty level.

3.7.1.3 Bill Williams River

The Bill Williams River off-site conservation area is located within La Paz and Mohave counties. The year 2000 population was approximately 713. Of this total, approximately 12 percent of the population is minority, and approximately 11 percent of the population lives below the poverty level.

3.7.1.4 Lower Gila River

The lower Gila River off-site conservation area is located entirely within Yuma County. It had a year 2000 population of approximately 2,576. Of this total, approximately 43 percent of the population is minority, and approximately 18 percent of the population lives below the poverty level.

3.7.2 Environmental Consequences

Significance Criteria

The analysis of environmental justice impacts is required by EO 12898 and must be evaluated in NEPA documents. NEPA does not require the use of significance criteria. This analysis

considers whether the impacts of the proposed action and alternatives would disproportionately affect minority or low-income populations.

3.7.2.1 Alternative 1: Proposed Conservation Plan

Methodology

The air quality, hazards (increased vectors), noise, and socioeconomic analyses in Chapter 3 were reviewed to determine whether they identified impacts to human populations and are used as the basis for the environmental justice analysis. To provide data for a determination of disproportionate impacts, the demographics of the planning area were compared to the combined demographics of the seven counties containing the planning area, referred to as the Community of Comparison (or COC) (see Tables 3.7-1 and 3.7-2). Likewise, the demographics of each of the three off-site areas were compared to the county or counties (the COC) containing each off-site area. The likelihood of agricultural jobs to be held by minority and low income workers also was considered.

Impacts

The increase in riparian and backwater areas could result in an increase in vectors. Vectors, such as mosquitoes, are attracted to pools of water, such as ponds and backwaters, as well as riparian vegetation. The amount of conservation area containing these land cover types that would be established, however, is small in relation to the overall size of the planning area. Moreover, the siting criteria for conservation sites include consideration of the likelihood for mosquitoes produced on a site to become a vector control or nuisance problem based on proximity to urban areas and mosquito production potential. The Conservation Plan includes other measures to minimize potential impacts from vectors, including coordinating the design and management of conservation areas with local appropriate health officials; incorporating, to the extent practicable, design, and management concepts to help reduce the likelihood that conservation areas do not produce mosquitoes in numbers that could cause public health or nuisance concerns; and providing conservation area access to mosquito abatement district officials to monitor mosquito populations. The proposed action also would result in an increase in fish and bird populations that eat insects. Given the measures included in the Conservation Plan to minimize impacts from vectors, an increase in vectors would not create disproportionate impacts to minority and low-income populations.

Impact EJ-1. Significant, short-term air quality impacts from construction activities and prescribed burns in or near agricultural areas could result in disproportionate impacts to minority and low-income populations. Construction and prescribed burn activities would result in emissions that could significantly affect air quality (i.e., the development of the largest projects and prescribed burns would produce fugitive dust emissions that could exceed an ambient 24-hour PM_{10} standard, and air emissions from proposed conservation area establishment activities and facility construction could exceed the MDAQMD daily NO_x or PM_{10} emission significance thresholds; refer to **Impacts AQ-2, AQ-3**, and **AQ-4** for additional detail). Construction activities would be temporary and would take place in agricultural or undeveloped areas that are not densely populated (urban areas would be avoided as part of the vector control management for the proposed action). Air emissions disperse, however, and it is

possible that construction and burn-related emissions could have the potential to have an impact on isolated residences and workers that are close to the affected area.

The population in the planning area is 57.2 percent minority, compared to 49.0 percent minority in the COC. Also, the population in the planning area is 21.1 percent low-income compared to 13.9 percent low-income in the COC. Based on these two comparisons and because the percentage of minority and low-income populations is meaningfully higher in the planning area than the COC, there is the potential for disproportionate impacts to minority and low-income populations from significant, short-term air emissions.

Impact EJ-2. Noise from construction and pumps that exceeded local standards could disproportionately affect minority and low-income populations. As noted above, construction activities would take place in agricultural or undeveloped areas that are not densely populated. However, in some areas, construction-related noise would have the potential to have an adverse effect on isolated residences or populations that are close to the construction area, disproportionately affecting minority populations and low-income populations (refer to **Impact NOI-1** for additional detail). Additionally, as described under **Impact NOI-2,** pumps located near noise-sensitive receptors could cause a substantial increase in ambient noise levels or exceed regulatory thresholds. Because the percentage of minority and low-income populations is meaningfully higher in the planning area than the COC, there is the potential for disproportionate impacts to minority and low-income populations from significant short-term and long-term noise.

Impact EJ-3: If agricultural land were converted to conservation areas, the loss of agricultural jobs would disproportionately affect minority and low-income populations. The potential conversion of agricultural land to conservation areas under the proposed Conservation Plan would result in the loss of agricultural jobs. It is estimated that, on average, there would be a reduction of just under 30 workers for every 1,000 acres of farmland that is taken out of agricultural use. If, as a worst-case scenario, all 8,132 acres of conservation area established under the proposed action were from conversion of actively farmed agricultural land, an average of approximately 244 agricultural jobs could be lost. Although losses of this magnitude represent extremely small shares (less than 1 percent) of the total employment in individual counties, they would represent a larger share of agricultural employment and could substantially affect individual communities. Agricultural jobs typically are held by a higher percentage of minority and low-income individuals than are represented by the county populations as a whole; moreover the population in the planning area consists of a higher percentage of minority and low-income individuals than the COC. Thus, the loss of agricultural jobs would have a disproportionate effect on minority and low-income populations.

Mitigation Measures

Implement **Mitigation Measures AQ-1** and **AQ-2.** (*Addresses Impact EJ-1*)

Implement **Mitigation Measures NOI-1** and **NOI-2.** (*Addresses Impact EJ-2*)

EJ-1 Reclamation shall work with local jurisdictions and/or growers to ensure that agricultural workers are notified as soon as possible of the potential for a loss of jobs once specific project locations have been identified. Reclamation will encourage the

local jurisdictions and/or growers to provide timely information and assistance to agricultural workers regarding the availability of alternative employment. (*Addresses Impact EJ-3*)

Residual Impacts

The implementation of **Mitigation Measure AQ-1** would reduce fugitive dust emissions from project activities. The exact site sizes, locations, and construction methods are not known; thus, even with mitigation, the emissions from the development of the largest projects may still exceed the significance criteria considered in **Impacts AQ-2** and **AQ-4**. Therefore, residual impacts of PM_{10} emissions from the development of the largest projects would be *potentially significant* and would have a potentially disproportionate impact on minority and low-income populations as described under **Impact EJ-1**. The implementation of **Mitigation Measure AQ-2** would reduce combustive emissions from prescribed burns; however, mitigated burn emissions could be sufficiently substantial to contribute to an exceedance of an ambient 24-hour PM_{10} standard. Therefore, residual impacts associated with the largest prescribed burns under **Impact AQ-3** would be *potentially significant* and would have potentially disproportionate impacts on minority populations and low-income populations as described under **Impact EJ-1**. No additional mitigation measures were identified for these residual disproportionate impacts; however, it is noted that once specific project locations are known, the demographics of potentially affected populations may differ from those of the planning area as a whole.

The implementation of **Mitigation Measures NOI-1 and NOI-2** would mitigate disproportionate noise impacts identified under **Impact EJ-2** since noise levels would be reduced to meet regulatory standards or to avoid substantially increasing the ambient noise levels.

The implementation of **Mitigation Measure EJ-1** would minimize potential environmental justice impacts by providing advance notice of the loss of agricultural jobs to affected workers and by encouraging local jurisdictions and/or growers to provide timely information and assistance to agricultural workers regarding the availability of alternative employment.

3.7.2.2 Alternative 2: No Action Alternative

Impacts

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented because compliance with the ESA still would be required for the covered actions, although some conservation could occur in the off-site conservation areas (as described in section 3.7.2.4 below), as well as along the LCR. **Impacts EJ-1, EJ-2, and EJ-3** apply to this alternative, although **Impacts EJ-1** and **EJ-2** apply only to conservation in the planning area, along the LCR. Air quality and noise impacts in the off-site conservation areas would not have disproportionate effects on minority or low-income populations because the percentages of these populations are lower in the affected areas than in the general population represented by the COC for each location. To the extent that the agencies undertaking the covered actions proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species would not be included. This would likely result in the

establishment of less conservation area than under the proposed action. Proportionately fewer environmental justice impacts would occur since less agricultural land would be converted to other land cover types and therefore fewer jobs would be lost (assuming a worst-case scenario that all conservation areas would be established on agricultural land). The same types of impacts would occur as described for the proposed action, but the overall magnitude could be lessened because a smaller amount of conservation area would be established.

Mitigation Measures

Mitigation measures would be developed as appropriate in the course of project-specific environmental reviews. If significant impacts were identified, mitigation measure similar to those identified in this EIS/EIR (**Mitigation Measures AQ-1** and **AQ-2, NOI-1** and **NOI-2,** and **EJ-1)** could be implemented. Developing and implementing such mitigation measures is outside the authority of the lead agencies and is beyond the scope of this EIS/EIR.

Residual Impacts

As described above, the exact site sizes and locations and construction methods are not known; thus, even with mitigation identified in **Mitigation Measures AQ-1** and **AQ-2**, the emissions from the development of the largest projects may still exceed the significance criteria considered in **Impacts AQ-2** and **AQ-4**. Therefore, residual impacts of PM_{10} emissions from the development of the largest projects would be *potentially significant* and would have potentially disproportionate impacts on minority populations and low-income populations as described under **Impact EJ-1.** The implementation of **Mitigation Measure AQ-2** would reduce combustive emissions from prescribed burns; however, mitigated burn emissions could be sufficiently substantial to contribute to an exceedance of an ambient 24-hour PM_{10} standard. Therefore, residual impacts associated with the largest prescribed burns under **Impact AQ-3** would be *potentially significant* and would have potentially disproportionate impacts on minority populations and low-income populations as described under **Impact EJ-1**. No additional mitigation measures were identified for these residual disproportionate impacts; however, it is noted that once specific project locations are known, the demographics of potentially affected populations may differ from those of the planning area as a whole.

The implementation of **Mitigation Measures NOI-1** and **NOI-2** would mitigate disproportionate noise impacts identified under **Impact EJ-2** since noise levels would be reduced to meet regulatory standards or to avoid substantially increasing the ambient noise levels.

The implementation of **Mitigation Measure EJ-1** would minimize potential environmental justice impacts by providing advance notice of the loss of agricultural jobs to affected workers and by encouraging local jurisdictions and/or growers to provide timely information and assistance to agricultural workers regarding the availability of alternative employment.

3.7.2.3 *Alternative 3: Listed Species Only*

Impacts

Impacts EJ-1, EJ-2, and EJ-3 apply to this alternative, although a smaller amount of conservation area would be developed than under the proposed action. Proportionately fewer environmental justice impacts would occur since less agricultural land would be converted to other land cover types and therefore fewer jobs would be lost (assuming a worst-case scenario that all conservation areas would be established on agricultural land). The same types of impacts would occur as described for the proposed action, but the overall magnitude could be lessened because a smaller amount of conservation area would be established.

Mitigation Measures

Mitigation Measures AQ-1, AQ-2, NOI-1, NOI-2, and EJ-1 apply to this alternative.

Residual Impacts

The implementation of **Mitigation Measure AQ-1** would reduce fugitive dust emissions from project activities. The exact site sizes, locations, and construction methods are not known; thus, even with mitigation, the emissions from the development of the largest projects may still exceed the significance criteria considered in **Impacts AQ-2** and **AQ-4**. Therefore, residual impacts of PM_{10} emissions from the development of the largest projects would be *potentially significant* and would have a potentially disproportionate impact on minority and low-income populations as described under **Impact EJ-1**. The implementation of **Mitigation Measure AQ-2** would reduce combustive emissions from prescribed burns; however, mitigated burn emissions could be sufficiently substantial to contribute to an exceedance of an ambient 24-hour PM_{10} standard. Therefore, residual impacts associated with the largest prescribed burns under **Impact AQ-3** would be *potentially significant* and would have potentially disproportionate impacts on minority populations and low-income populations as described under **Impact EJ-1**. No additional mitigation measures were identified for these residual disproportionate impacts; however, it is noted that once specific project locations are known, the demographics of potentially affected populations may differ from those of the planning area as a whole.

The implementation of **Mitigation Measures NOI-1** and **NOI-2** would mitigate disproportionate noise impacts identified under **Impact EJ-2** because noise levels would be reduced to meet regulatory standards or to avoid substantially increasing the ambient noise levels.

The implementation of **Mitigation Measure EJ-1** would minimize potential environmental justice impacts by providing advance notice of the loss of agricultural jobs to affected workers and by encouraging local jurisdictions and/or growers to provide timely information and assistance to agricultural workers regarding the availability of alternative employment.

3.7.2.4 *Alternative 4: Off-Site Conservation*

Impacts

Air quality and noise impacts in the off-site conservation areas would not have disproportionate effects on minority or low-income populations because the percentages of these populations are lower in the affected areas than in the general population represented by the COC for each location. The estimated population in the Muddy and Virgin rivers off-site location is 12.2 percent minority and 7.6 percent low-income, compared to 39.2 percent minority and 10.8 percent low-income in Clark County, the COC. The estimated population in the Bill Williams River off-site location is 12.1 percent minority and 10.8 percent low-income, compared to 18.3 percent minority and 14.3 percent low-income in La Paz and Mohave counties, the COC. The estimated population in the Lower Gila River off-site location is 43 percent minority and 18.1 percent low-income, compared to 55.6 percent minority and 19.2 percent low-income in Clark County, the COC.

Impacts EJ-1 and **EJ-2** apply to this alternative but only in relation to the 360 acres of backwaters that would be established along the LCR. Thus, the potential for these impacts would be greatly reduced in comparison to the proposed action.

Impact EJ-3 applies to this alternative. As noted in section 3.2, Agricultural Resources, all of the off-site locations contain agricultural land. Since the same amount of conservation area would be established under this alternative, overall impacts would be as characterized for the proposed action. Backwaters would continue to be established in the planning area; thus, impacts associated with this component of the Conservation Plan would be identical to those of the proposed action. Other impacts associated with the loss of agricultural jobs from conservation area establishment would occur in slightly different areas than under the proposed action.

Mitigation Measures

Mitigation Measure EJ-1 applies to this alternative.

Residual Impacts

The implementation of **Mitigation Measure EJ-1** would minimize potential environmental justice impacts by providing advance notice of the loss of agricultural jobs to affected workers and by encouraging local jurisdictions and/or growers to provide timely information and assistance to agricultural workers regarding the availability of alternative employment.

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3.8 HAZARDS AND HAZARDOUS MATERIALS

This section addresses hazardous materials, vectors, wildland fires, and the potential for bird-aircraft strikes.

3.8.1 Affected Environment

3.8.1.1 Lower Colorado River

Hazardous Materials

A material is considered hazardous if it appears on a list of hazardous materials prepared by a Federal, state, or local agency, and/or if it has characteristics defined as hazardous by such an agency. Chemical and physical properties cause a substance to be considered hazardous, including the properties of toxicity, ignitability, corrosivity, and reactivity. These properties are defined in CCR, Title 22, sections 66261.20-66261.24.

A variety of hazardous materials potentially are present throughout the project area. Industries and other entities use many types of hazardous materials, such as fuels and solvents. Numerous fuels, chemicals, and other hazardous materials are also transported via roadways and railways. At typical construction sites, materials that could be considered hazardous include fuels, motor oil, grease, various lubricants, solvents, soldering equipment, and glues. Additionally, excavation may expose buried hazardous materials resulting from prior use of the site or adjacent property. A substantial portion of the area affected by the proposed project is used for agricultural purposes (refer to section 3.2, Agricultural Resources, for additional detail). Above-ground petroleum storage tanks and pesticide storage facilities are present in many locations and increase the risk of human exposure to potentially hazardous substances. Additionally, storage tanks may leak petroleum products into the soil, where they could migrate to water supplies. Pesticides and fertilizers used for agricultural operations may accumulate in the soil and may over time contaminate surface water and groundwater supplies.

Vectors

This section discusses the prevalence and distribution of vector populations in the project area. The term "vector" is used to denote a carrier of disease organisms. The vector may be purely mechanical, as exemplified by houseflies spreading enteric organisms, or biological, wherein the disease organism multiplies or undergoes change within the vector, as exemplified by the development of encephalitic viruses in mosquitoes. Nuisance organisms are also addressed with the understanding that they are not generally considered disease carriers but do present nuisance effects to humans and domestic animal populations.

Mosquitoes are the primary vectors of concern because they are not only annoying pests, but some are known carriers of human and animal diseases. The presence of standing water provides an ideal breeding environment for mosquitoes. Most adults remain close to their point of origin, but their traveling ability is heavily dependent on physical phenomena such as wind. Some mosquitoes feed on mammalian and other animal hosts, while others feed on fruits and plant nectars. Within the LCR region, encephalitic viruses such as the West Nile virus (WNV), Western equine encephalitis (WEE), and St. Louis encephalitis (SLE), spread by the mosquito

vector *Culex tarsalis* are the most important arboviruses of concern, although dengue fever also may be present.

Mosquitoes become infected with WNV when they feed on infected birds that have high levels of the virus in their blood. WNV was first detected in the United States in the fall of 1999 in New York City. Since 1999, more than 4,000 cases of infection with WNV have been detected in 44 states, including California. Numerous local agencies throughout California routinely conduct surveillance and control of mosquitoes and the diseases they transmit. In 2000, the statewide surveillance program added WNV to the list of diseases monitored. In 2002, WNV was detected for the first time in California in a single human case in Los Angeles (California Department of Health Services [CADHS] 2002). A second human case was discovered in California in October 2003, in Imperial County (University of California at Davis 2003). Evidence of WNV activity has been found in almost all the counties in Arizona (Arizona Department of Health Services [ADHS] 2003a). As of October 2003, two human cases of WNV were discovered in both Arizona (Graham and Pima counties) and in Nevada (Washoe and Nye counties) (Centers for Disease Control [CDC] 2003a and USGS 2003e).

WEE is an important cause of encephalitis in horses and humans, mainly in western parts of the United States and Canada. WEE is carried principally by the *Culex tarsalis* species of mosquito that is associated with irrigated agriculture and stream drainages. Surveillance efforts in Arizona in 2002 detected the WEE virus in 14 out of 28 mosquito tested pools (Yuma County-10, Pinal County-2, Maricopa County-1, and Mohave County-1) (ADHS 2003). As of April 2003, no cases of WEE have otherwise been detected in Arizona. No human cases of WEE have been detected in Nevada (CDC 2001a). Two human cases of WEE were found in California in 1986 and none since then (CDC 2001a).

In the United States, the leading cause of epidemic flaviviral encephalitis is SLE virus. SLE is the most common mosquito-transmitted human pathogen in the United States, and is distributed throughout the lower 48 states. During the summer season, SLE virus is maintained in a mosquito-bird-mosquito cycle. In the western United States, *Culex tarsalis* and *Culex pipiens* are the principal vectors. Surveillance efforts in Arizona in 2002 detected the SLE virus in 14 out of 28 mosquito tested pools (Yuma County-9, Maricopa County-2, Pima County-2, and Pinal County-1) (ADHS 2003). Two human cases of SLE were reported in Maricopa County in 2002 (ADHS 2003). One human case of SLE was reported in California in 1995 (CDC 2001b), and no other cases have been reported to date (CADHS 2003). In 2003, one human case of SLE has been detected in Clark County, Nevada (Clark County Health District 2003). There has never been a human outbreak of SLE in Utah (Utah County Online 2002).

Since 2001, five human cases of dengue fever have been detected in California. Two of those were detected in 2003, one in Alameda County and one in Riverside County (CADHS 2003). Two cases of dengue fever (one confirmed and one presumptive) were reported in 2002 in Coconino County, Arizona (ADHS 2003).

Wildfires

On average, at least one fire occurs every three years that will burn at least 1,000 acres along the LCR, and approximately 95 percent of all wildfires in this area are caused by humans (personal communication, J. Swett 2003). The risk from wildfires along the LCR has increased since the

completion of Hoover Dam in 1935 because suppression of annual flood events has limited the ability of native plant communities to regenerate and has created a system where wildfire has become the major disturbance influencing riparian stand development along the river.

Fire management along the LCR primarily is the responsibility of three Department of Interior agencies: the BLM, BIA, and the Service. In 1989, the Colorado River Zone (CRZ) was established as an interagency dispatch in order to facilitate fire suppression activities along the LCR using the closest resources available. The CRZ enabled these three agencies to eliminate duplication of personnel and equipment needed to support relatively small programs. Additionally, these agencies signed an interagency agreement forming the Lower Colorado River Wildland Fire Management Group (LCR Fire Management Group) in January 1999. This group has entered into agreements with the State of Arizona and San Bernardino, Imperial, and Riverside counties to mutually provide wildland fire fighting resources to assist in both initial attack and extended attack situations along the river. State and local fire offices can be staffed up or additional equipment can be supplied to the local entities. Currently, local fire organizations do not participate in fire suppression along the LCR.

Prescribed burns, which are intentionally set fires, may be used to suppress active fires, to reduce fuel loads, clear vegetation, or to establish or enhance habitat. Prescribed burns have been used by the LCR Fire Management Group as a fire suppression technology along the LCR (personal communication, J. Swett 2003) and have been used by the Service to establish suitable habitat conditions for particular species. Five such prescribed burns took place along the LCR from 2000 to 2003, at Lake Havasu NWR, Mittry Lake, and Imperial NWR (personal communication, D. Repass 2003). Prescribed burns also are commonly used by farmers to clear fields. For example, approximately 11,490 acres of agricultural land were burned within the MDAQMD[1] in 2002 (MDAQMD 2002). Of those acres, approximately 7,000 were burned by the California Department of Forestry and Fire Protection personnel within the city of Blythe in Riverside County (MDAQMD 2002).

Bird-Aircraft Strike Hazards

Bird-Aircraft Strike Hazards (BASH) can result in damage to aircraft and potentially the loss of human life. Approximately 95 percent of BASH incidents occur below 2,000 feet above ground level (AGL); 70 percent of these occur below 500 feet AGL (Murton and Wright 1968). More recent unpublished studies confirm these findings (U.S. Navy 1999). The species involved in BASH incidents are generally the common species that occur near airfields. Large, slow-flying birds such as raptors (hawks and owls); large wading birds (herons, egrets, and ibis); gulls; and waterfowl (ducks and geese) are more likely to be hit, and also are more likely to do substantial damage to aircraft due to their mass.

Waterfowl often congregate at or near ponds and other water bodies. Smaller birds that often form large flocks (for example, European starling, blackbirds, and some shorebirds) can pose a threat to aircraft and aircrews. Even a single small bird can cause significant damage to an airplane; a flock makes collisions more likely and damage more severe. Resident adult birds

1 The MDAQMD encompasses the desert portion of northern San Bernardino County, as well as the Palo Verde Valley in Riverside County.

may learn to avoid planes, but young birds and migrants may be more prone to collision (Blokpoel 1976).

The joint-use airfield shared by the Marine Corps Air Station and Yuma International Airport (MCAS Yuma/YIA) is the one most likely to be affected by the proposed action because its Accident Potential Zone extends over the lower Gila River near its confluence with the LCR, which is in the planning area.

3.8.1.2 Muddy River/Moapa Valley and Virgin River

The discussions of hazardous materials, vectors, and wildfires in section 3.8.1.1 are generally applicable to this off-site location. No airports are located in the immediate vicinity of these rivers. Reclamation and the Las Vegas BLM field office are responsible for fire suppression efforts along the Virgin and Muddy rivers.

3.8.1.3 Bill Williams River

The discussions of hazardous materials, vectors, and wildfires in section 3.8.1.1 are generally applicable to this off-site location. No airports are located in the immediate vicinity of these rivers. Fire management practices for the Bill Williams River region are as described for the LCR, and are the responsibility of the LCR Fire Management Group.

3.8.1.4 Lower Gila River

The discussions of hazardous materials, vectors, and wildfires in section 3.8.1.1 are generally applicable to this off-site location. The Accident Potential Zone for the MCAS Yuma/YIA is not within the boundary of this conservation area, nor are any other airports. The Arizona State Land Department and BLM share primary responsibility for fire management on the lower Gila River, with the exception of the small municipalities located along the river.

3.8.2 Environmental Consequences

Significance Criteria

The proposed action would result in significant impacts if it would result in any of the following:

- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions associated with operations and/or maintenance;
- result in conditions that would lead to a substantially increased population of disease or nuisance vectors;
- result in a substantially increased risk of wildland fires; or
- be located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport or a private airstrip, and result in a safety hazard.

3.8.2.1 Alternative 1: Proposed Conservation Plan

Hazardous Materials

Impact HAZ-1: The use of pesticides, lubricants, fuels, and other hazardous materials during construction, operations, and maintenance could result in localized spills, which could create a hazard to the environment. During construction and some maintenance activities, heavy equipment and vehicles would be present in the project area. Most of this equipment requires a number of petroleum products such as fuel, hydraulic fluids, and lubricants for effective operation. Fuel replenishment would be required daily for most of the heavy equipment. Lubricant and hydraulic fluid changes and replenishment would be required less frequently. Typically, service trucks would deliver these types of fluids on site and perform the necessary fuel and oil transfers. Diesel fuel also would be used to operate some irrigation pumps, and refueling would be required periodically. The risk of small fuel or oil spills is considered likely. Accidental spills would result in a *less than significant* impact to public health and the environment because the spills would be small and localized, most construction would be located in unpopulated areas, and BMPs would be implemented to minimize the potential for accidents to occur (refer to section 3.0 for examples of typical BMPs). All spills would be cleaned up in accordance with permit conditions.

Vectors

Impact HAZ-2: The increase in riparian and backwater areas could result in an increase in vectors. Vectors, such as mosquitoes, are attracted to pools of water, such as ponds and backwaters, as well as riparian vegetation. The amount of aquatic land cover type that would be established and that would be suitable as vector habitat, however, is small in relation to the overall size of the planning area. The Conservation Plan would result in the establishment of 5,940 acres of cottonwood-willow, 1,320 acres of honey mesquite, 512 acres of marsh, and 360 acres of backwaters. For purposes of comparison, the LCR MSCP HCP indicates that approximately 126,000 acres of woody riparian vegetation and 12,000 acres of marsh are present in the planning area, and a backwater study of Reaches 3, 4, 5, and part of 6 identified 461 backwaters, with 7,911 acres of open water [GEO/Graphics 2000). Moreover, the siting criteria for conservation sites include consideration of the likelihood for mosquitoes on a site to become a vector control or nuisance problem based on proximity to urban areas and mosquito production potential. The Conservation Plan includes an integrated pest management approach that would minimize potential impacts from vectors, including coordinating the design and management of conservation areas with appropriate health officials; incorporating, to the extent practicable, design, and management concepts to help reduce the likelihood that conservation areas do not produce mosquitoes in numbers that could cause public health or nuisance concerns; and providing access to conservation areas to appropriate health officials to monitor mosquito populations. The proposed action also would result in an increase in fish and bird populations that eat insects. Impacts would be *less than significant* because the proposed action would not lead to a substantially increased population of disease or nuisance vectors.

Wildfires

Impact HAZ-3: Construction activities could cause wildfires. The fuel tanks on board some of the equipment used for construction activities contain fuel volumes ranging from 100 to 500

gallons. Accidental ignition could result in a fire, which, depending on the location, could spread. All such equipment is required to have fire suppression equipment on board or at the work site. The risk of a vehicle fire is considered unlikely, and the impact would be *less than significant* because it would not result in a substantially increased risk of wildfire.

Impact HAZ-4: Fire used as a construction and maintenance tool could escape control and become a wildland fire. Prescribed burns could be used to establish marshland approximately every 7-8 years. A less likely use of fire is to clear existing vegetation or, alternatively, to burn vegetation removed by mechanical methods. The impact would be *less than significant* because fires would be conducted by experienced personnel in accordance with established practices; therefore, the risk of wildland fires would not be substantially increased.

Bird-Aircraft Strike Hazards

Impact HAZ-5: Conservation area establishment actions implemented within an Accident Potential Zone of an airport or near a private airstrip could cause a comparatively minor increase in bird populations. Conservation actions could either increase or decrease local concentrations of birds, depending on initial site conditions and the type of land cover type establishment that would be implemented. For example, agricultural fields can attract large flocks of starlings, and in such cases, conversion to cottonwood-willow may actually reduce the number of birds in the air where they could pose a risk to aircraft. Conversely, the establishment of marsh or open-water areas in existing desert scrub would probably increase the numbers of certain types of birds, especially waterfowl, relative to existing agricultural conditions. Within an Accident Potential Zone of an airport or near a private landing strip, an increase in the overall number of birds would be a *less than significant impact* to bird-airstrike hazards since construction associated with the Conservation Plan would comply with FAA guidelines, only a small amount of terrestrial land cover types and backwaters would be established in comparison with that which already exists (refer to the discussion under Impact **HAZ-2** above), and it would not be concentrated in one location. In particular, the MCAS Yuma/YIA already is adjacent to the lower Gila River, which contains riparian forest and marshes that already supports a variety of bird species, and the establishment of a portion of the backwaters in this area would not appreciably increase the risk of bird-airstrikes.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.8.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered actions, although some conservation could occur in the off-site conservation areas (as described in section 3.8.2.4 below), as well as along the LCR. **Impacts**

HAZ-1 through HAZ-5 apply to this alternative, although **Impact HAZ-5** would not apply to conservation implemented in the off-site conservation areas since none of these areas are located within the Accident Potential Zone of an airport or near private airstrips. To the extent that the agencies undertaking the covered actions proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species will not be included. This would also likely result in a smaller amount of conservation area being established. The same types of impacts would occur as described for the proposed action, but the magnitude of some impacts would differ.

A smaller amount of conservation area would be established under this alternative than under the proposed action, but more, smaller mitigation sites would be developed, requiring more infrastructure (access roads and irrigation pipelines/canals and pump facilities). Additionally, since each individual project would establish its own mitigation sites, it is likely that more maintenance and storage facilities would be required. Thus, the chance of hazardous releases could increase in comparison to the proposed action. There also is a greater likelihood that the conservation sites would be located close to developed areas, increasing risks to the public from accidental releases of hazardous materials. The impacts generally would be as described under **Impact HAZ-1**, but the potential for the impacts to occur would be slightly greater than under the proposed action.

As described above under **Impact HAZ-2**, aquatic land cover type establishment could result in an increase in vectors. A smaller amount of conservation area would be created, resulting in less potential for such an increase to occur. There is a greater likelihood that the conservation sites would be located close to developed areas, however, increasing risks to the public from vector. Additionally, in the absence of a comprehensive Conservation Plan, it is not known whether an integrated pest management plan would be implemented. Impacts associated with vectors could be greater than for the proposed action.

The no action alternative would not include the unified approach to wildfire suppression that would occur under the proposed action. Thus, impacts associated with **Impact HAZ-3** would be considered greater under this alternative.

Impacts HAZ-4 and HAZ-5 would be similar to the proposed action, although since a smaller amount of conservation area would be created, the risks would decrease proportionately.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.8.2.3 Alternative 3: Listed Species Only

Impacts

Impacts HAZ-1 through HAZ-5 apply to this alternative. The same types of impacts would occur as described for the proposed action, but the overall magnitude would be lessened since a smaller amount of conservation area establishment would occur.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.8.2.4 Alternative 4: Off-Site Conservation

Impacts

Impacts HAZ-1 through HAZ-4 apply to this alternative. The key difference between this alternative and the proposed action is that the conservation measures would be implemented at different locations, with the exception of conservation measures directly related to fish including backwater creation, which would be implemented in the planning area, as described for the proposed action. **Impact HAZ-5** would not apply to this alternative since none of the off-site conservation areas are located within the Accident Potential Zone of an airport or near private airstrips.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.9 HYDROLOGY AND WATER QUALITY

This section addresses potential changes to surface water, groundwater, and water quality from construction and operations.

3.9.1 Affected Environment

3.9.1.1 Lower Colorado River

Surface Water

The LCR has a wide variation in annual inflows of source waters, which is typical of river systems within semi-arid and arid climate zones. Historically, this natural variation resulted in wide variations in annual river flows. However, the development of dams and other facilities significantly modified this natural variation by storing water for controlled releases. Facilities on the river are operated primarily for flood control, water supply, and hydropower production. Agricultural, urban, and power generation demands and the associated dam releases to meet these demands lead to daily and monthly variations in flows. The volume and flow in the river affects water levels (stage), surface area, and salinity levels (USBR 2000b).

The Colorado River in its entirety is approximately 1,400 miles long. The proposed action has the potential to affect the hydrology from the full pool elevation of Lake Mead (approximately at Separation Canyon [RM 450] to the SIB [RM 0]). The river flow is highly variable from year to year. For example, the natural flow at the Lees Ferry gaging station has varied annually from 5 maf to 24 maf (USBR 2000b) (Figure 3.9-1). These flows show significant annual variability; however, the average trend over the past 40 years closely approximates the 15 maf total apportionment for the Upper and Lower Basin states. The Upper and Lower basins of the Colorado River are shown on Figure 3.9-2.

The size of the watershed and variability of the natural hydrologic system make managing the Colorado River a challenge. To better control and utilize waters of the Colorado River multiple dams, power plants, and diversion structures have been constructed, some dating as far back as 1860. Currently, the overall system has ten major reservoirs that provide an aggregate of approximately 60 maf of active storage.

Dams in the Lower Basin include Hoover, Davis, Parker, Headgate Rock, Palo Verde Diversion Dam, Imperial, and Laguna. Morelos Diversion Dam, located just below the NIB is the last dam on the Colorado River. It is the operation of these dams and reservoirs, particularly Hoover Dam and Lake Mead, that determines the existing hydrology in the Lower Basin.

River stage (water levels) depends on the volume of water moving through the river at any particular location and point in time. Dam releases are made by Reclamation according to operational policies. In addition to the daily variations in river stage, there are seasonal and annual variations due to rainfall and reservoir releases. For example, the difference between maximum and minimum monthly stage for an individual month from October 1988 to September 1999 ranged from 0.11 to 7.09 feet. Monthly flows throughout the same time period varied from 100 kaf to 1 maf. The comparison of water levels to daily or annual water volumes indicates that volumes may vary widely.

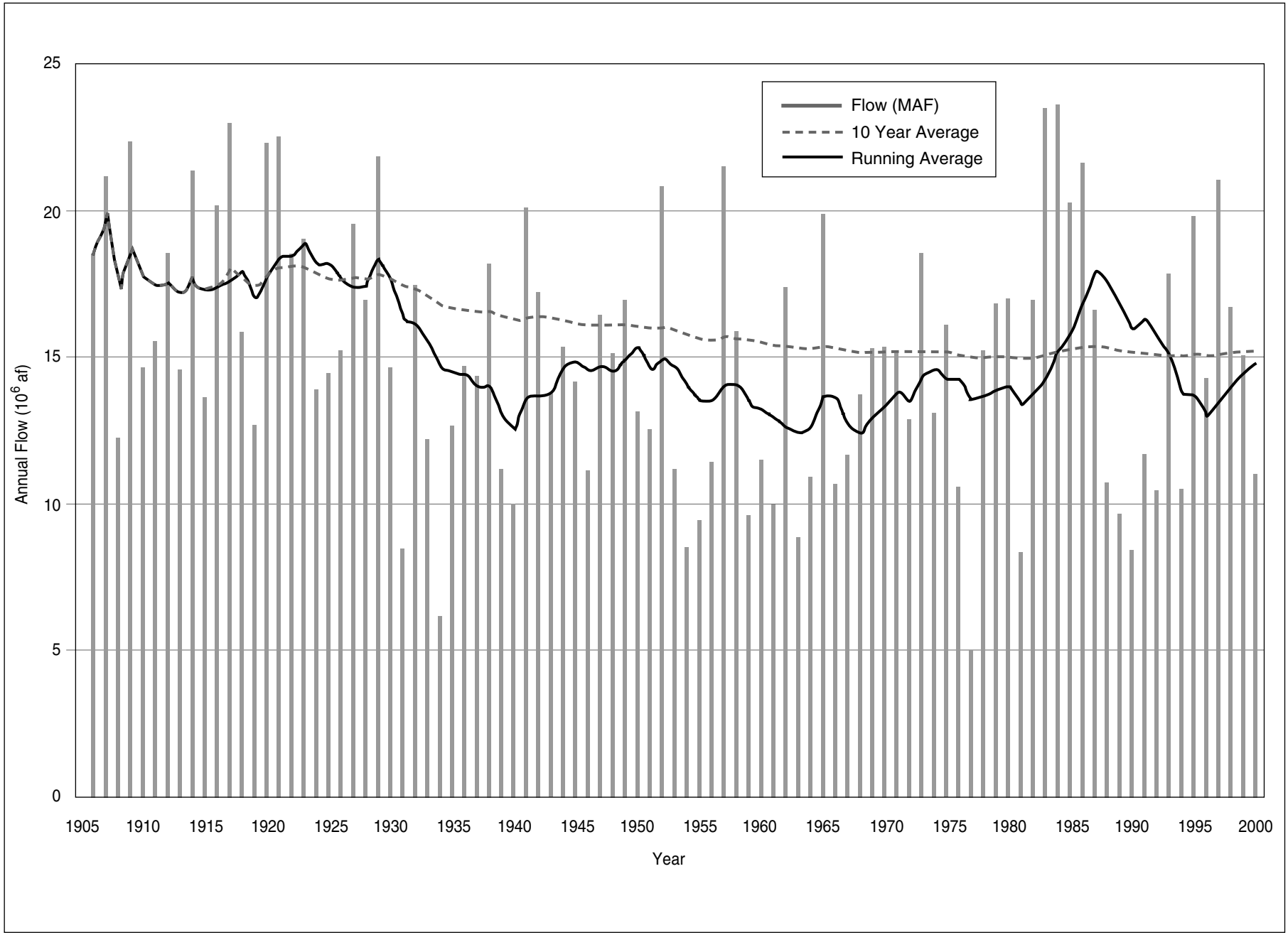

Figure 3.9-1. Natural Flows at Lees Ferry

Figure 3.9-2. Upper and Lower Basins of the Colorado River

There are a few lakes off the mainstem of the Colorado River that are affected by flow and surface elevations of the river. Cibola Lake, which is part of the Cibola NWR, has inlet and outlet control structures to maintain desired lake levels. Three Fingers Lake also has inlet and outlet control structures. Topock Marsh is also a regulated lake. Other lakes such as Adobe, Martinez, and Ferguson Lakes have no flow control structures, and water levels are dependent on levels of the river or reservoirs on the river.

Flooding on the LCR generally consists of two types of floods: large regional floods and localized floods. Large regional floods generally result from unusually high levels of snowmelt in the Upper Basin or in the Gila River watershed, resulting in basin-wide or regional increases in runoff. Localized floods result from localized, short-term flow increases from rainfall, including short-term winter rains, and summer thunderstorms, which can be intense over short periods. Operation of the facilities along the river is designed to maximize the storage of water for irrigation and water supply uses, and to provide flood control protection of downstream areas. Therefore, flood flows, which potentially "waste" water beyond the ability of local users to beneficially use it, are minimized. However, the ability to capture large flows downstream of Hoover Dam is limited due to the operation of Lake Mead and Lake Mohave and the limited storage capacity of other downstream reservoirs.

REACH 1

Glen Canyon Dam, which creates Lake Powell, is operated to make a minimum release of 8.23 maf annually, although releases can be greater.

Hoover Dam and Lake Mead are operated with the following three main priorities: (1) river regulation, improvement of navigation, and flood control; (2) irrigation and domestic uses, including the satisfaction of Present Perfected Rights (PPRs); and (3) electrical power production. The regulations set forth two primary flood control operations: (1) reserved floodwater space within Lake Mead, and (2) releases based on forecasted runoff. Lake Mead's uppermost 1.5 maf of storage capacity, between elevations 1219.6 and 1229 feet above msl, is allocated exclusively to control floods. Additional flood control space is required through the period August 1 through January 1. Normal space-building releases to create and maintain flood control space from August 1 to January 1 are limited to a maximum of 28,000 cfs. Between January 1 and July 31 flood control releases are based on forecasted inflow and can exceed 28,000 cfs.

Lake Mead provides the majority of the storage capacity for the Lower Basin. From 1980 to 2000 annual Lake Mead elevation ranged from 1,170 to 1,220 feet msl, a variation of 50 feet. The average annual elevation from 1990 to 1999 was 1,191 feet msl. Over a period of 3 years, from 2000 to 2003, Lake Mead elevations dropped more than 60 feet as a result of sustained drought in the western United States (NASA Earth Observatory 2003). In addition to flood control space, flood control releases are required when forecasted inflow exceeds probable available storage space at Lake Mead and Lake Powell, and allowable space in other Upper Basin reservoirs. This includes accounting for projected bank storage and evaporation losses at both lakes, plus net withdrawals from Lake Mead by water users. Releases are made in steps meant to retain power generation capacity and to protect the downstream river area.

Unless flood control releases are necessary, Hoover Dam is operated to meet downstream water demands, including the release of water for consumptive use by the Lower Division States plus the United States' obligation under the 1944 Water Treaty. Within these operations, Hoover Dam releases are managed on an hourly basis to maximize the value of generated power by providing peaking during high-demand periods. This results in fluctuating flows through Hoover Dam that can range from 1,000 cfs to 49,000 cfs. The upper value is the maximum flow-through capacity through the power plant at Hoover Dam (49,000 cfs). However, because these flows enter Lake Mohave downstream, the affected zone of fluctuation is only a few miles.

The close proximity of Lake Mohave to Hoover Dam effectively dampens the short-term fluctuations below Hoover Dam. Since 1980, annual releases from Lake Mead have varied from a low of 7.4 maf to a high of 21.4 maf. Daily releases can vary by more than 22,000 cfs. Since 1980, within any given non-flood year, flows through Hoover Dam have ranged from 750 cfs to 27,000 cfs.

Lake Mead is the primary water supply diversion point for the State of Nevada. About 90 percent of the state's 0.3 maf apportionment is diverted 5 miles northwest of Hoover Dam at SNWA's Saddle Island facilities. The minimum Lake Mead water level necessary to operate the pumping units at SNWA's original intake facility is 1,050 feet msl. SNWA recently constructed a second pumping plant and the minimum Lake Mead water level required to operate this unit is 1,000 feet msl. The new SNWA intake provides only a portion of the capacity required by SNWA to meet its Colorado River water supply needs. Therefore, the intake elevation of SNWA's original pumping plant is critical to its ability to divert its full Colorado River water entitlement.

In addition to SNWA's diversion, Basic Water Company also diverts water from Lake Mead at Saddle Island for use in the Henderson, Nevada area for industrial and domestic purposes.

Related to power generation and water supply, there are several "key" Lake Mead water surface elevations. The first elevation is 1,083 feet msl, the minimum elevation for the effective generation of power. The second elevation is 1,050 feet msl, the minimum elevation required for the operation of SNWA's original intake facility. The final elevation is 1,000 feet msl, the elevation required for operation of SNWA's second intake. Historic Lake Mead low water levels have dropped to the minimum rated power elevation of 1,083 feet msl during two periods (1954 to 1957 and 1965 to 1966). The highest historical Lake Mead water surface elevation of approximately 1,225.6 feet msl occurred once, in 1983.

REACHES 2 AND 3

Reach 2 of the planning area encompasses the land and waters within the historic floodplain between Hoover Dam and Davis Dam. Reach 3 extends from Davis Dam to Parker Dam. Major features between Hoover Dam and Parker Dam include Davis Dam, Havasu NWR and the Bill Williams River. Immediately downstream of Hoover Dam, river flows consist almost entirely of water released from Lake Mead. Between Davis and Parker dams minor gains in the river come from tributaries such as the Bill Williams River, groundwater discharge, and return flows from agriculture.

Daily and hourly releases from Hoover Dam reflect the short-term demands of Colorado River water users having diversions located downstream, storage management in Lake Mohave and Lake Havasu, and power production at Hoover, Davis, and Parker dams. Reclamation combines the total estimated water releases of Davis Dam and the target Lake Mohave elevation to determine the monthly amount of water required downstream of Hoover Dam. This monthly release is formulated into a monthly energy figure for Hoover Dam. The monthly energy figure is used by the Western Area Power Administration to meet the daily energy requirements of the electric service customers.

The primary purpose of Davis Dam is to re-regulate Hoover Dam releases to meet downstream needs and aid the annual delivery of 1.5 maf to Mexico. Releases at Davis Dam are scheduled on a daily basis to meet the water demands downstream and Lake Havasu storage management. The hourly release profile is determined by the electric service customer requirements, the current downstream river needs, and upstream Lake Mohave requirements. Since 1980, annual release from Davis Dam has varied from a low of 7.3 maf to a high of 21.7 maf (USBR 2000d).

Parker Dam's primary purpose is to provide reservoir storage from which water can be diverted into the Colorado River Aqueduct (CRA) and the Central Arizona Project (CAP) Aqueduct. The CRA delivers water to metropolitan Los Angeles and San Diego areas. The CAP delivers water to cities, industries, Indian communities, and agricultural areas in central and southern Arizona, including the Phoenix and Tucson areas. Parker Dam also has a power plant function and may provide a minimal amount of flood control, capturing and delaying flash floods into the river from tributaries below Davis Dam. Parker also re-regulates water released from the Hoover and Davis power plants, thus regulating river flow for downstream irrigators. Releases at Parker Dam are scheduled on a daily basis to meet the short-term demands of Colorado River water users located downstream. The hourly release profile is determined by the electric service customer requirements.

REACHES 4 AND 5

Major features between Parker and Imperial dams include Headgate Rock Dam and CRIT Diversion, Palo Verde Diversion Dam, and Cibola and Imperial NWRs. This stretch of the river is designated as Reaches 4 and 5. Reach 4 extends from below Parker Dam to the Cibola Gage; Reach 5 extends from the Cibola Gage to Imperial Dam.

Flows between Parker Dam and Palo Verde Diversion Dam result primarily from releases from Parker Dam. Since 1980, annual releases from Parker Dam have ranged from a low of 5.5 maf to a high of 20.5 maf. These releases are adjusted daily to meet the water demands of downstream users unless flood control releases are being made. These releases are further regulated within the day to maximize power generation. Within a given month, daily releases can vary by more than 11,000 cfs. Since 1980, within any given non-flood year, flows through Parker Dam on a daily basis have ranged from approximately 1,500 cfs (with a minimum of 30 cfs during an emergency situation) to approximately 19,500 cfs.

Annual surface water flow in the river, measured just downstream from Parker Dam, averaged approximately 9.0 maf for the period from 1935 to 1999, but varied from a maximum of approximately 20.5 maf to a minimum of approximately 5.5 maf (USGS 2003d). Annual median

flow in the river over this same time period was approximately 7.3 maf (USGS 2003d). From 1990 to 1999, annual flow averaged 7.4 maf downstream from Parker Dam, and annual medial flow was 7.2 maf (USGS 2003d). The overall effect of diversions, local surface inflows, evapotranspiration, and groundwater recharge, is a decrease in flow between Parker and Imperial dams. Long-term average annual flow just upstream of Imperial Dam from 1935 to 1999 was approximately 8.1 maf (USGS 2003d). From 1990 to 1999, the average annual flow just upstream of Imperial Dam was 6.2 maf (USGS 2003d).

Palo Verde Diversion Dam is the intake for California's PVID. Flows between Palo Verde Diversion Dam and Imperial Dam are set by downstream demands and required deliveries to Mexico. Imperial Dam is the diversion point for the All American Canal (AAC), Yuma Main Canal, and the Gila Gravity Main Canal. The AAC delivers to California's Yuma Project Reservation Division, the Imperial Irrigation District (IID), and the Coachella Valley Water District. The Yuma Main Canal delivers to Arizona's Yuma Project, while the Gila Gravity Main Canal delivers to Arizona's Gila and Wellton-Mohawk projects.

The surface water levels in the Parker to Imperial dams reach of the Colorado River have daily variations, with a higher volume usually released from the reservoirs during the day. Just downstream of Parker Dam, the typical daily variation is about 5 feet in the summer when irrigation demand is high. In winter the daily variation in surface water levels is reduced to about 2.5 feet due to lower irrigation demand and a more consistent demand in general. By the time water reaches Imperial Dam, fluctuation is dampened to approximately 0.5 feet by the channel storage and daily variations in river surface water levels (USBR and IID 1994).

REACH 6

Reach 6 extends from Imperial Dam to the NIB. The major feature from Imperial Dam to the NIB is Laguna Dam. The Gila River enters the Colorado River system in this reach.

REACH 7

Reach 7 of the LCR extends from the NIB to the SIB, a distance of 23.1 miles that forms the boundary between Arizona (United States) and Baja California (Mexico). The major feature in this reach is Morelos Diversion Dam, located just downstream of the NIB. Mexico diverts the majority of its Colorado River water supply at Morelos Diversion Dam. Flows in this reach of the river vary. At times the lower part of this reach is dry. Cohen and Henges-Jeck (2000) reported average total flows in this reach of 22,000 af in non-flood years and 2,120,000 af in flood years. These flows are the result of seepage from Morelos Diversion Dam, flow releases from Morelos Diversion Dam (flood flows and excess water not diverted by Mexico), irrigation return flows from Mexico, canal wasteways in the United States, and groundwater accumulation from both the United States and Mexico.

THE REPUBLIC OF MEXICO

The 1944 Water Treaty provides Mexico with a right to receive 1.5 mafy plus 0.2 maf of surplus water, when available. Mexico received 1.7 maf in compliance with the treaty in both 1999 and 2000 (USBR 1999). The two governments through the International Boundary and Water Commission (IBWC) jointly administer the terms of the 1944 Water Treaty relating to the Colorado River. The operations are performed in collaboration with Reclamation. The

deliveries to Mexico are jointly monitored by the IBWC to ensure compliance with the treaty allotment and schedules.

Groundwater

The Colorado River is in hydraulic connection with the groundwater in the underlying alluvium. Depending on river stage and groundwater elevations, the river can receive inflows from the aquifer, or it can provide recharge to the aquifer. The hydraulic connection results in groundwater levels that, at least in part, reflect the stage of the Colorado River.

Groundwater pumped from the underlying alluvium is considered Colorado River water and is accounted for under each states' apportionment. This includes groundwater pumped from the LCR floodplain and from certain wells on the alluvial slopes outside the floodplain. Reclamation, in association with the U.S. Geological Survey (USGS), has developed a method to identify wells outside of the floodplain that yield water that would be replaced by water from the Colorado River. This method has resulted in the development of an "accounting surface," or area where groundwater extractions are considered Colorado River water.

Studies using near-river (within 400 feet) observation wells in the Yuma area that were conducted in the 1970s showed the influence of river surface water levels on near-river groundwater elevations in an area irrigated with surface-diverted Colorado River water. The Yuma area near-river groundwater level changes in response to river level changes are considered to be representative of the groundwater response in the valleys below Parker Dam because of similar geohydrology. It is estimated that for every unit drop in river surface water levels, groundwater under irrigated fields closest to the river will drop by half a unit. In a non-irrigated reach, groundwater elevation drop is assumed to be equal to the river drop (USBR 2000d). Near-river groundwater elevations above Parker Dam may show differing responses to changes in river surface water levels.

NEVADA

Groundwater basins proximal to the river and within the accounting surface include those in the Las Vegas Wash Valley, other small drainages adjacent to Lake Mead, the smaller washes and drainages adjacent to Lake Mohave, and those in the areas of Laughlin and the Fort Mojave Indian Reservation. These basins are generally small in size and are bounded by zones of non-water bearing rock.

CALIFORNIA

Groundwater basins proximal to the river and within the accounting surface include portions of the Needles Valley, the Chemehuevi Valley, the Arch Creek and Vidal Wash area, the Big Wash and Slaughter Wash areas just north of the Palo Verde Valley, the Palo Verde Valley, Chuckwalla Valley, the Cibola Valley, Senator Wash, and the Yuma Valley. With the exception of the Yuma Valley, these basins are generally small in size and are bounded by zones of non-water bearing rock. For most of the basins, designated beneficial uses include municipal, industrial, and agricultural uses.

ARIZONA

Groundwater basins proximal to the river and within the accounting surface include the smaller washes and drainages adjacent to Lake Mead and Lake Mohave, portions of the Mohave Valley and Sacramento Wash, the smaller washes and drainages adjacent to Lake Havasu, portions of the Cactus Plain and the area around Parker, the Parker Valley, the Palo Verde Valley, Cibola Valley, the Yuma Valley, and the South Gila Valley. With the exception of the Yuma Valley, these basins are generally small in size and are bounded by zones of non-water bearing rock.

Water Quality

SURFACE AND GROUNDWATER CONSTITUENTS OF CONCERN

Salinity. The main water quality concerns for the lower portion of the Colorado River are associated with salinity and total dissolved solids (TDS)[1]. Factors influencing salinity levels include regional geology, salinity levels in tributaries and other inflow sources, drainage from irrigation system return flows, municipal discharge, and concentration of salts due to evaporation and other losses. Approximately 47 percent of the salinity in the Colorado River System is from natural sources (U.S. Department of the Interior [DOI] 1999). The remaining 53 percent is due to human activities including agricultural runoff, as well as industrial and municipal sources. The river increases in salinity from its headwaters to its mouth.

In 1974, the Colorado River Basin Salinity Control Act was enacted with the purposes of (1) resolving salinity issues associated with 1944 Water Treaty deliveries; and (2) creating a salinity control program within the United States portion of the Colorado River Basin to meet objectives and standards set by the CWA. The Federal/state salinity control program under Title II of the Salinity Control Act is designed to maintain flow-weighted average annual salinity at or below the adopted numeric criteria. The program is not intended to counteract short-term salinity variations due to the highly variable flows caused by natural factors (DOI 2001).

The Colorado River Basin Salinity Control Forum reviews the water quality standards for the Colorado River every three years and makes revisions to accommodate changes occurring in the Basin. The most recent review was in 2002. At each triennial review, the current and future water uses are analyzed for their impact on the salinity of the Colorado River. An implementation plan is developed, which includes adequate salinity control projects to assure compliance with the numeric criteria. In selecting a project, considerable weight is given to the relative cost-effectiveness of the project. Environmental feasibility is also considered.

Salinity is a Federal issue below Imperial Dam. Per United States Section, IBWC (USIBWC) Minute 242 of the 1944 Water Treaty, the United States must deliver water to Mexico at the NIB with an average annual salinity concentration no greater than 115 parts per million (ppm) (equivalent to 115 milligrams per liter [mg/L]) +/- 30 ppm (30 mg/L) over the average annual salinity concentration of the river at Imperial Dam.

1 TDS is a measure of the total amount of minerals, organic matter, and nutrients that are dissolved in water. The dissolved solids concentration commonly is called the water's salinity and is classified as follows: fresh, 0-1,000 milligrams/Liter (mg/L); slightly saline, 1,000-3,000 mg/L; moderately saline, 3,000-10,000 mg/L; very saline, 10,000-35,000 mg/L; and briny, more than 35,000 mg/L.

Selenium. Selenium in the Colorado River naturally originates from shale sediment deposits along river tributaries. Within the river system, Lake Powell has the highest annual loading of dissolved selenium, and the majority of selenium is thought to come from above Lake Powell. Selenium loads drop within Lake Powell and drop again as the Colorado River passes through downstream reservoirs. Due to this decline, it does not appear that selenium is added to the system in the Lower Basin (DOI 1999). Research indicates that there are no local sources of selenium within the LCR basin, and, unlike in the Upper Basin, use of water for agricultural purposes along the LCR does not contribute to selenium increases (Radtke, et al. 1988). Selenium levels in biota of the Lower Basin have been found to equal or exceed the guideline for reproductive impairment of biota (Radtke, et al. 1988). Based on a recent study, selenium appears to be a constituent of concern in the LCR aquatic system, and continued selenium loading to the LCR could severely affect important components of the ecosystem (Radtke, et al. 1988).

Perchlorate. Ammonium perchlorate, the most common form of perchlorate contamination, is manufactured for use as an oxygen-adding component in solid propellant for rockets, missiles, and fireworks (EPA 1999, 2001). Perchlorate contamination in surface waters has been given increasing scrutiny due to potential health effects on human thyroid function (EPA 1999, 2001). There is currently no Federal National Primary Drinking Water Regulation for perchlorate. Perchlorate is on the EPA's Safe Drinking Water Act's Contaminant Candidate List as of 1998 (EPA 1999, 2001) and the EPA has established 1 part per billion (ppb) as the provisional reference dose for adults (EPA 1999, 2001; CADHS 2001).

Perchlorate has been detected in the water of the Colorado River and Lake Mead. Perchlorate concentrations have ranged from less than 4 ppb to 17 ppb at the SNWA's water intake at Lake Mead (EPA 1999, SNWA 2003b). The EPA identified two facilities in Henderson, Nevada that manufactured ammonium perchlorate and were found to have released perchlorate to groundwater. Kerr-McGee Chemical Company, the Nevada Department of Environmental Protection (NDEP) and Reclamation are working together to intercept a major surface flow of perchlorate-laden water along Las Vegas Wash. This program is ongoing and has significantly reduced the amount of perchlorate entering the Las Vegas Wash, Lake Mead, and the Colorado River. This remediation program will continue into the future and will continue to reduce perchlorate contamination in groundwater and in Colorado River water in Lake Mead and downstream (USBR 2000b).

Chromium 6. A plume of the chemical chromium-6 in groundwater near Needles, thought to be related to Pacific Gas and Electric operations in the area, has been observed moving toward the Colorado River (Coachella Valley Desert Sun 2003). Affected parties and the Colorado River RWQCB are currently exploring containment and cleanup options.

DESIGNATED IMPAIRED RIVER SEGMENTS AND WATER BODIES

Under section 303(d) of the CWA, the states and EPA identify "impaired" stream segments and water bodies where constituent concentrations impair the designated beneficial uses of the water body. Additional human activities within the segments, or that may directly or indirectly affect these segments, may result in further impairment. The states and EPA work together to develop a Total Maximum Daily Load (TMDL) for the segment, and set up a timeframe for

reducing concentrations of the constituents and bringing the impaired water body back to attainment.

Several stream segments within the project area are currently impaired for some beneficial uses as a result of elevated constituent concentrations, including the following:

- The Las Vegas Wash, which is tributary to Lake Mead and carries the drainage for all of the Las Vegas metropolitan area to Lake Mead. The wash is currently impaired as a result of high ammonia and phosphorus concentrations, and iron and total suspended solids (TSS) are also being investigated as impairments to beneficial uses.
- The Colorado River between Hoover Dam and Lake Mohave, which has elevated pH levels. However, since the adoption of the 2002 303(d) List, the State of Nevada has updated its pH criteria and these areas are meeting the revised criteria (personal communication, R. Paul 2003). It is anticipated that these area will be reevaluated and removed from the 303(d) List as part of the 2004 303(d) List revisions (EPA 2003a).
- The Palo Verde Outfall Drain, which carries runoff from PVID to the Colorado River. Pathogenic bacteria from natural background sources and dysfunctional septic systems have resulted in the loss of beneficial uses of this water body (CRWQCB 2003).

The complete listing of impaired stream segments is presented in Table 3.9-1. Information included in this table provides a complete overview of constituents of concern in the potentially affected water bodies. However, the concentration and total load of these constituents of concern would not be affected by the Conservation Plan because the constituents of concern are primarily a result of urban, agricultural, and mining activities. The Conservation Plan would not increase or otherwise affect urban, agricultural, and mining activities in the planning area.

3.9.1.2 Muddy River/Moapa Valley and Virgin River

Surface Water

The Muddy River is a perennial river fed by the Muddy Springs in southern Nevada and flows into Lake Mead. The majority of the flow currently is used for agriculture and power generation (SNWA 2003a). The drainage area of the river is large, but due to soil conditions and rainfall patterns, only a small portion of the overall basin contributes directly to surface runoff (USGS 2003a). Near Moapa, the Muddy River recently exhibited a daily average flow of 30 cfs, part of a long-term downward trend from an average of 50 cfs in 1950 (USGS; period 1950-2000). Peak flows reached great than 1,000 cfs, while minimum flows were near 20 cfs.

The Virgin River originates in southwestern Utah, flows through the northwestern corner of Arizona and into Nevada where it joins the Colorado River at Lake Mead. Virgin River water is used for both domestic and agricultural uses. Stream flows in the lower Virgin River are frequently at or near zero, with an upper range of greater than 7,000 cfs occasionally exhibited. The normal range of measured flows tops out near 2,000 cfs, however.

1 **Table 3.9-1. Impaired Water Bodies in the Project Area**

Water Body	*Constituent(s) of Concern*	*Source*	*Proposed TMDL Completion*
CALIFORNIA			
Palo Verde Outfall Drain	Pathogens	Unknown	2003
ARIZONA [1]			
Virgin River	Fecal coliform and turbidity	Not identified	Not developed
Alamo Lake	Sulfide, pH, DO, and mercury	Assumed to be mining wastes	Not developed
Painted Rock Lake (Borrow Pit)	Fecal coliform, DO, and pesticides	Not identified	Not developed
NEVADA			
Las Vegas Wash – Telephone Line Road to Lake Mead	Total ammonia, total phosphorus, total iron, total suspended solids	Effluent discharges, nonpoint source runoff	TMDLs exist for ammonia and phosphorus; others not developed
Colorado River – Lake Mohave inlet to California state line	pH	Not identified	Not developed
Colorado River – Hoover Dam to Lake Mohave inlet	pH	Not identified	Not developed
Muddy River – Source to Glendale [2]	Total iron, total phosphorus, and temperature	Not identified	Not developed
Muddy River – Glendale to Lake Mead	Total boron, total iron, and temperature	Not identified	Not developed
Virgin River – Mesquite to Lake Mead	Total boron, total iron, total phosphorus, and temperature	Not identified	Draft in review – date uncertain
Virgin River – Stateline to Mesquite [2]	Total boron, total iron, total phosphorus, total nitrogen, and temperature,	Not identified	Not developed

Sources: State Water Resources Control Board (SWRCB) 2003, ADEQ 2002, Colorado RWQCB 2003, NDEP 2003

1 Impaired segments in Arizona are identified in the Lake Mead watershed, Bill Williams River watershed and the lower Gila River watershed, upstream from areas being evaluated as alternatives to the proposed action, that do not directly affect the mainstem Colorado River or occur within the riverine segments being evaluated as alternative conservation area establishment sites.

2 Some impaired segments in Nevada are identified in the Lake Mead watershed upstream from areas being evaluated as alternatives to the proposed action, that do not directly affect the mainstem Colorado River or occur within the riverine segments being evaluated as alternative conservation area establishment sites.

Groundwater

The surface water and groundwater basins designated along the Muddy and Virgin rivers in Nevada are part of Nevada's Hydrographic Region 13 (the Colorado River Basin hydrographic region). Both the Muddy River Springs/lower Moapa Valley and Virgin River Valley basins are classified as "designated[2]" for depleted groundwater conditions.

Water Quality

The Muddy River is designated as impaired under section 303(d) of the CWA over its entire length (see Table 3.9-1). The river is designated from its source to Glendale (13.63 miles) as impaired for iron (total), temperature, and total phosphorous. The TMDLs identified for this portion of the river have a priority of 3 (lowest). From Glendale to Lake Mead (25.07 miles) the river is listed for boron (total), iron (total), and temperature; iron and temperature were added in 2002. The TMDLs identified for this portion of the river have a priority of 3.

The reach of the Virgin River in Nevada from Mesquite to Lake Mead (25.75 miles) is designated as impaired under section 303(d) of the CWA for boron (total), iron (total), temperature, and total phosphorous; iron and temperature were added in 2002 (see Table 3.9-1). The TMDLs identified for this portion of the river have a priority of 3, with the exception of the boron, which has a priority of 1 (highest). From the Stateline to Mesquite (4.5 miles) the river is listed for boron (total), iron (total), temperature, and total nitrogen. The TMDLs identified for this portion of the river have a priority of 3, with the exception of the boron, which has a priority of 1. A Draft TMDL has been developed for boron (NDEP 2003a).

A portion of the Virgin River in Arizona is designated as impaired under section 303(d) of the CWA for turbidity and fecal coliform (see Table 3.9-1).

3.9.1.3 Bill Williams River

Surface Water

The Bill Williams basin consists of approximately 3,200 square miles. The Bill Williams River was historically a perennial stream, but flows in the river are now primarily dependent on the operation of Alamo Dam or on local precipitation. The Bill Williams River watershed area below Alamo Dam consists primarily of BLM and State of Arizona-owned lands, with a small percentage of private ownership. Many historic mining discharge permits have been granted in this watershed area.

2 "Designated" groundwater basins are basins where permitted ground water rights approach or exceed the estimated average annual recharge and the water resources are being depleted or require additional administration. Under such conditions, a state's water officials will so designate a groundwater basin and, in the interest of public welfare, declare preferred uses (e.g., municipal and industrial, domestic, agriculture, etc.). For Nevada, in the interest of public welfare, the Nevada State Engineer, Division of Water Resources, Department of Conservation and Natural Resources, is authorized by statute (Nevada Revised Statute 534.120) and directed to designate a groundwater basin and declare preferred uses within such designated basin. The State Engineer has additional authority in the administration of the water resources within a designated groundwater basin.

Flows in the Bill Williams River are controlled primarily by releases from Alamo Dam. From 1988 to September 2002, the timeframe of daily stream flow data, flows were most frequently measured as zero (USGS 2003b). Some periodic daily average flows greater than 6,000 cfs were observed (USGS 2003b), probably as a result of local rainfall.

Groundwater

A hydraulic connection exists between flow in the Bill Williams River and groundwater in the alluvium along the river (ADWR 2003a). Short-term water level rises and declines of as much as 30 feet have been reported by well owners along the river. These fluctuations correlate with water releases at Alamo Dam.

Groundwater in the Bill Williams basin occurs in younger alluvial deposits, in basin-fill, and in fractured and porous volcanic rocks. The amount of water stored and extracted in each of these units varies, but the basin-fill contains the largest volume of stored water and is the primary water-bearing unit (ADWR 2003a). Recharge to the basin-fill results from stream flow infiltration and precipitation along the mountain fronts (ADWR 2003a).

Water Quality

There are no waters in the watershed below Alamo Dam that are listed on the section 303(d) CWA list. Alamo Lake, the source water for the Bill Williams River behind Alamo Dam, is currently under investigation for pH, DO, sulfide, and mercury. The impairment from mercury is possibly from mining activities in the watershed, and an investigation is in progress with ongoing sampling. There are no approved listings or implementation plans for this water body (ADEQ 2002). There are several riverine segments in the watershed above the lake that are impaired for various water quality attributes.

Water quality within the basin-fill is generally suitable for irrigation uses (ADWR 2003a).

3.9.1.4 Lower Gila River

Surface Water

The lower Gila River is ephemeral and flows only in response to precipitation events or water releases from upstream dams (ADWR 2003c). Prior to the construction of the Coolidge Dam, natural or unimpaired flow in the lower portion of the Gila River was intermittent (i.e., the river flowed for a few months or more, but did not flow year-round) (ADWR 2003c). Painted Rock Dam provides flood control on the lower Gila River. However, due the limited storage capacity on the river, this facility is not able to capture and or significantly moderate the large flood flow events (such as in the 1993 floods). Irrigation return flow from the Wellton-Mohawk Irrigation and Drainage District seeps into the Gila River channel near Dome, Arizona. This influx of water supports flow from Dome to the confluence with the Colorado River (ADWR 2003c).

Upstream of Dome, the river exhibits essentially no flow. Localized rainfall accounts for periodic daily average flows of up to 1,000 cfs. The area experienced significant flooding in 1993 following unusually prolonged rainfall. At the USGS gage near Dome, recorded daily

mean flows exceeded 10,000 cfs on 83 days throughout the year, and exceeded 20,000 cfs on 27 days throughout the year (USGS 2003c). Peak flows in 1993 exceeded 28,000 cfs (USGS 2003c).

Groundwater

Groundwater in the lower Gila basin occurs in both the floodplain alluvium and the basin-fill. In the western part of the lower Gila basin (from approximately Dateland to Dome), groundwater development has occurred predominately in the streambed alluvium in the Gila River floodplain aquifer (ADWR 2003b). The primary water-bearing areas of the floodplain aquifer are the upper sandy unit and the lower gravel unit (ADWR 2003b). Groundwater in the floodplain aquifer is at a shallow depth and is unconfined. Groundwater development outside the Gila River floodplain is minimal and most of the wells outside the floodplain have low yields (ADWR 2003b).

Due to excessive recharge that resulted from the application of imported Colorado River water, a network of wells began pumping excess groundwater into drainage canals to lower shallow groundwater levels in the early 1960s (ADWR 2003b). These drainage canals discharge into the Colorado River at various points, or into Mexico. Since the early 1960s, groundwater pumpage in the western part of the basin has been primarily for drainage of excess irrigation water.

Water Quality

Painted Rock Lake (Borrow Pit) is designated as impaired under the section 303(d) of the CWA for DO, fecal coliform, and pesticides (see Table 3.9-1). Groundwater quality can vary substantially depending on the location within the basin, but in general, groundwater quality is poor in the Gila River floodplain due to high TDS concentrations (ADWR 2003b). Groundwater quality in the valleys and plains away from the Gila River floodplain is marginal to suitable, and TDS concentrations are generally lower than those observed in the floodplain.

3.9.2 Environmental Consequences

Significance Criteria

The proposed action would have a significant impact to water resources if it would:

- violate (or cause the violation of) any water quality standards or waste discharge requirement;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge or flow to the extent that it would not support existing land uses that rely on groundwater or planned uses for which permits have been granted;
- substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; or

- place within a 100-year flood hazard area structures which would impede or redirect flood flows.

3.9.2.1 Alternative 1: Proposed Conservation Plan

Impacts

The proposed action would require a water supply of approximately 57,400 af of water per year, or approximately 0.7 percent of the average annual water use within the Lower Basin from 1990 to 2001. As noted, in section 2.1.1.4, the legal structure governing the Colorado River would ensure that the proposed action would not increase the amount of water used in the Lower Basin beyond existing entitlements. The geographic scope of the proposed action would ensure that Colorado River water used as part of its implementation would be used within the historic floodplain of the LCR. The use of this water would not affect the water surface elevation of the LCR because it would be water that otherwise would be used for another purpose and would be diverted from the same general location. Moreover, the amount of water used would be small in comparison with the amount of water used within the Lower Basin and thus would not appreciably alter the water surface elevation even if it were not already being used for other purposes.

Conservation area establishment activities may require the construction of two field facilities, which would consist of a small, prefabricated steel building that would serve as an office and an equipment yard. They likely would be constructed on bare ground or at an already developed and graded site, and would require several acres at most. Fish rearing facilities also could be required. These structures would not be placed in areas where flood flows would be impeded or interrupted.

Conservation area establishment activities would require grading of both undeveloped and agricultural sites to provide suitable elevations for establishing habitat and to create access roads in some locations. Mounds and depressions would be created in order to provide micro-topographic diversity and simulate historic conditions. Backwaters also would be established and could result in the alteration of streams or rivers. None of these actions would substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.

The application of Colorado River water to conservation areas would not adversely affect local or regional groundwater levels or groundwater quality. Local groundwater levels may rise as a result of the periodic application of surface water to develop or maintain habitat, but the increase would be minor and temporary. The use of groundwater for irrigation purposes would be based on compliance with legal requirements for this use, so that there would be no adverse effect to groundwater resources. Moreover, water would not be applied to patches of established habitat in sufficient quantities to increase regional groundwater levels, particularly since they would be established in dispersed locations along the river, and irrigation would be required only at certain times of the year. Herbicides and pesticides would be applied periodically, but this would not affect groundwater quality since they would be applied in accordance with established requirements in the same manner as existing agricultural uses and would not be extensively used; it is likely that they would be applied in lesser quantities than used at existing agricultural sites that could be converted to other land cover types.

The use of Colorado River water as part of the proposed action would not adversely affect water quality except as discussed under **Impacts HYDRO-2** and **HYDRO-3** below. The potential for accidental releases of hazardous materials, which could have a minor, short-term, and localized effect on water quality, are addressed in section 3.8, Hazards and Hazardous Materials.

Impact HYDRO-1: Habitat establishment activities could result in erosion-induced siltation. Construction activities would include such actions as clearing vegetation, grading, excavating, dredging, stockpiling soil, construction/modification of supply canals, berm construction, and swale construction. Each of these activities could result in increased localized soil erosion and associated sedimentation of the Colorado River or backwaters. Less clearing and grading would be required if agricultural land were used instead of undeveloped land; erosion-induced siltation could occur, however, just to a lesser extent. The use of standard BMPs has been included as part of the proposed action (refer to section 3.0 for examples of typical BMPs), and could include constructing temporary pollution control measures such as silt fences and the application of straw and seed, minimizing the area to be cleared and graded to the extent possible, and installing barriers around stockpiled soil. Thus, with implementation of these BMPs, construction would not substantially alter the existing drainage pattern of the site in a manner that would result in substantial erosion or siltation on- or off-site. Impacts would be *less than significant.*

Impact HYDRO-2: Habitat establishment could have a short-term, adverse effect to water quality if irrigation resulted in the release of pesticides, salts, or other contaminants. This impact could occur if sites selected for the establishment of conservation areas contained contaminated soils. The release of herbicides and pesticides would be most likely to occur on sites that were previously used for agricultural activities. Increases in selenium levels in the LCR are not likely to be affected by irrigation of restoration sites due to the low levels of selenium in the soils. The release of other contaminants could occur on both undeveloped and developed sites. This, however, is highly dependent on the specific past history and other characteristics of the site and the type of conservation action implemented. In particular, the potency of many pesticides could have been reduced by naturally occurring physical and biological processes prior to their release by conservation actions. A number of other factors would further reduce the severity of potential impacts. Releases would be distributed throughout the planning area over the 20- to 30-year construction period. Further, once in the Colorado River, such releases would be diluted by the substantial flows ranging from more than 8 mafy in Reach 2 to 1.5 mafy in Reach 6. Impacts would be *less than significant.*

Salt leaching may be required on some sites prior to revegetation (primarily those sites that are not located on existing agricultural lands). This may require several applications of water throughout one or more growing seasons in order to create appropriate soil conditions. Because salt leaching would be a temporary activity and the amount of additional salts added to the Colorado River from this activity would be minor, impacts would be *less than significant*.

Impact HYDRO-3: Water quality in created or restored backwaters and marshes could be affected by increasing concentrations of various naturally occurring and man-made chemicals, including perchlorate, selenium, Chromium 6, and other dissolved salts (both in the soil and the water column) that result from evaporation of water. The proposed action includes the establishment of 360 acres of backwaters and 512 acres of marsh. The degree of

connectivity to groundwater or the river would influence the extent to which salt or selenium concentrations increase. Marshes and backwaters with direct connection to the river do not tend to concentrate salts because the water flows through these systems, while those isolated from the river are more prone to salt concentrations due to high evaporation rates. High salinities reduce the water quality for both aquatic animals and plants and affect the composition of the community. The concentration of salts in water from isolated marshes and backwaters would not be not likely to reach the river unless water from these areas were pumped out as part of a "freshening" action. The amount of water returned to the river in this way would be small relative to the total flow, and the affected water would be diluted. Impacts to water quality would be *less than significant*.

Marshes and backwaters with direct connection to the river tend to have higher selenium levels than isolated marshes and backwaters. This is likely due to the inflow of selenium-bearing water to these areas, where it is available for capture in the organic sediments to move into the food chain. Isolated marshes and backwaters receive their water filtered through the ground, and it is believed this filtration removes selenium before the water reaches the marsh or backwater. Further investigations on this phenomenon are ongoing. High selenium levels have been implicated in reproductive failure in birds and fish, and these effects may be more likely to appear in connected marshes and backwaters than those isolated from the river. New, isolated marshes and backwaters are not likely to experience significant increases in selenium over time, or be a source of selenium concentration in the river. Impacts to water quality would be *less than significant*.

Impact HYDRO-4: Conservation area establishment would result in a long-term improvement to water quality if agricultural land were used. The conversion of agricultural land to riparian land cover types would lessen the input of nutrients and agricultural chemicals to the river, improving water quality and aquatic habitat conditions. The establishment of riparian vegetation along an expanded portion of the river would provide increased shading, water filtration, and nutrient and pollutant uptake, improving water quality and aquatic habitat conditions downstream. This impact would be *beneficial*.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.9.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.9.2.4 below), as well as along the LCR. **Impacts HYDRO-1** through **HYDRO-4** apply to Alternative 2, as does the discussion of water surface elevation, flooding, groundwater, and water quality impacts from accidental spills in section

3.9.2.1. Water quality impacts associated with marsh creation along the lower Virgin, Muddy, and Bill Williams rivers would differ somewhat from those of the proposed action because different constituents of concern are present. Impacts would be *less than significant*, though, as described under **Impact HYDRO-3**. To the extent that the agencies undertaking the covered activities proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species would not be included. This would likely result in a smaller amount of conservation area being established and proportionately lessened impacts related to erosion-induced siltation and water quality from irrigation (**Impacts HYDRO-1** and **HYDRO-2**). It is likely that the amount of backwaters created would be similar to the proposed action since they provide habitat for listed species; thus, impacts associated with their creation would be as described for the proposed action (**Impact HYDRO-3**). The long-term improvement to water quality (**Impact HYDRO-4**) would be somewhat lessened under this alternative since less agricultural land would be converted to conservation areas under the worst-case scenario.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.9.2.3 Alternative 3: Listed Species Only

Impacts HYDRO-1 through HYDRO-4 generally apply to Alternative 3, as does the discussion of water surface elevation, flooding, groundwater, and water quality impacts from accidental spills in section 3.9.2.1. This alternative would result in a smaller amount of conservation area being established and proportionately lessened impacts related to erosion-induced siltation and water quality from irrigation (**Impacts HYDRO-1** and **HYDRO-2**). The amount of backwaters created would be as described for the proposed action; thus, impacts associated with their creation would be as described for the proposed action (**Impact HYDRO-3**). The long-term improvement to water quality (**Impact HYDRO-4**) would be somewhat lessened under this alternative since less agricultural land would be converted to conservation areas under the worst-case scenario.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.9.2.4 *Alternative 4: Off-Site Conservation*

As noted above, a hydraulic connection exists between flow in the Bill Williams River and groundwater in the alluvium along the river. The establishment of new habitat along the Bill Williams River on existing agricultural lands may result in an unquantified change in groundwater flow and availability for existing habitats downstream. The extent of change in groundwater flow would be dependent on the amount of water used to establish the new vegetation versus what is currently used for the agricultural operations. As described in section 2.1.4.2, LCR MSCP parties would obtain Bill Williams River water for implementing the Conservation Plan projects from various sources in accordance with Arizona law and in coordination with the Arizona parties to the LCR MSCP whose water rights may be affected by the use. The legal structure governing water rights within Arizona would ensure that the use of water under the proposed action would not increase the amount of Bill Williams River water used beyond existing apportionments. Through the use of water from these sources, implementation of the Conservation Plan would not increase the amount of water used from the Bill Williams River. Irrigating new habitat in this off-site conservation area could, however, result in a continuation of unquantified adverse impacts to groundwater flow to the existing habitats on Bill Williams River NWR resulting from the ongoing agricultural operations if the new habitat requires a similar amount of water as the ongoing operations. This would not result in an adverse impact to groundwater resources.

Impacts HYDRO-1, HYDRO-2, and HYDRO-4 generally apply to this alternative, as does the discussion of water surface elevation, flooding, groundwater, and water quality impacts from accidental spills in section 3.9.2.1. These impacts would be the same as described for the proposed action (*less than significant* or *beneficial*) since the same overall amount of conservation area would be established. Impacts from the establishment of cottonwood-willow, honey mesquite, and marsh would occur along the Muddy/Virgin, Bill Williams, and lower Gila rivers. **Impact HYDRO-3** also generally applies to this alternative. Water quality impacts associated with backwater development would be as described under **Impact HYDRO-3** because backwaters would continue to be established in the planning area. Water quality impacts associated with marsh establishment would be similar to those described under **Impact HYDRO-3,** although different constituents of concern are present along the Virgin, Muddy, and Bill Williams rivers (e.g., boron, iron, phosphorous, total nitrogen, and possibly mercury). As described under **Impact HYDRO-3**, for connected marshes, the extent of concentration of chemicals relative to the flow of the river is not likely to be significant. For isolated marshes, salts and selenium in those areas would not reach the river unless water from the area was pumped out as part of a "freshening" action. The amount of water involved relative to the flow of the river is small and the affected water would be diluted. Impacts to water quality would be *less than significant*.

Conservation area establishment would not affect the specific water quality parameters identified as impairing the use of the Muddy and Virgin rivers or Alamo Lake (refer to Table 3.9-1); thus, no additional water quality impacts would occur in these areas.

Along the lower Gila River, the proposed action could use groundwater as a water supply, but because the amount of water required is small, it would result in very minor, localized increases in the salinity of irrigation return water infiltrating to the local groundwater. Historic high

groundwater levels have led to the installation of extensive dewatering networks in the region, and groundwater levels are closely controlled so that agriculture is not affected. The establishment of conservation areas along the lower Gila River would not exacerbate these high groundwater levels because the amount of water required would be small, and thus, water would not be applied to patches of established vegetation in sufficient quantities to increase regional groundwater levels. Additionally, conservation sites would be established in different locations along the river and irrigation would be required only at certain times of the year.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

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3.10 INDIAN TRUST ASSETS

Implementation of the proposed action and alternatives has the potential to create both direct and indirect impacts to ITAs. ITAs are "….'legal interests' in 'assets' held in 'trust' by the Federal government for Federally recognized Indian tribes or individual Indians" (USBR 1994). All Federal bureaus and agencies are responsible for protecting ITAs from adverse impacts resulting from their programs and activities. Each Federal bureau or agency, in cooperation with potentially affected tribe(s), must inventory and evaluate assets, and then mitigate or compensate for adverse impacts to the asset. While most ITAs are located on reservation lands, they can also be located off-reservation. Examples of ITAs include, but are not limited to, land; minerals; rights to hunt, fish, and gather; and water rights (USBR 2000d). The following section describes ITAs that might potentially be impacted by actions taken by Federal agencies as a result of implementing the proposed action and alternatives.

3.10.1 Affected Environment

3.10.1.1 Lower Colorado River

Land

The Phoenix Area Office of the BIA was contacted in June 2000 to determine the types of ITAs that might be affected by actions associated with implementation of the Conservation Plan. Six Indian reservations are located within or immediately adjacent to the planning area. The six reservations are the Hualapai Indian Reservation, the Fort Mojave Indian Reservation, the Colorado River Indian Reservation, the Chemehuevi Indian Reservation, the Fort Yuma Indian Reservation, and the Cocopah Indian Reservation.

Reservation lands are not the only lands held in trust for tribes and individual Indians. Small areas of land known as "allotments" were granted to individual Indians in the period after 1887 following passage of the Dawes Act. Allotments were granted to individual Indians living both on and off Indian reservations and ranged in size from a few to several hundreds of acres. The size of the allotment varied from reservation to reservation according to the date the allotments were patented. On many reservations in the United States, after the Indian population had been allotted land, the land that was not allotted was sold to non-Indians. This was not the case on reservations located in the Southwest. In some parts of the United States, Indians were accorded the right to sell their allotments after a prescribed period of time, usually 20+ years, but again, this generally did not occur for members of tribes in the Southwest (Weiss and Maas 1992).

Allotments were granted to individual tribal members on the Colorado River Indian Reservation and the Fort Yuma Indian Reservation. On the Colorado River Indian Reservation, allotments were granted to individual tribal members between 1904 and 1940. The first allotments on this reservation were limited to 5-acre parcels. Later allotments were 10 acres in size and even later, tribal members could receive up to 80 acres (Tiller 1996). Allotted lands on the Colorado River Indian Reservation are located near Parker, Arizona, and in areas to the southwest.

On the Fort Yuma Indian Reservation, 10-acre allotments were granted to individual tribal members in 1912, and the trust patents were approved in 1914 (Bee 1981). There are numerous (over 100) allotments in the southeastern portion of the Fort Yuma Indian Reservation, beginning at a point just north of the Colorado River and extending northward for some distance. Allotments in this area vary from 3-4 contiguous parcels, up to a maximum of 7 contiguous parcels.

Ownership of allotments on the Colorado River Indian Reservation and the Fort Yuma Indian Reservation has passed to the heirs of the original allottees, with as many as 20-30 individuals having heirship rights to each allotment. If an activity associated with the Conservation Plan were to be planned for an area on either of these reservations where an allotment was present, the Federal agency, in cooperation with the tribe, would need to identify, notify, and obtain permission to use the land from each of the allotment heirs, and provide appropriate compensation for that use to the heirs and the tribe.

Tribes have the right to assign land on their reservations for farming, grazing, home sites, tribal economic developments, business ventures, cemeteries, and other purposes. Lands can be assigned or leased to tribal members and non-tribal members. Records of these assignments and/or leases are maintained by the issuing tribe.

Water Rights

Tribal rights to Colorado River water are, at least partially, based on the 1908 *Winters v. United States* decision and have been further specified in the 1964 United States Supreme Court Decree in *Arizona v. California* and supplemental Decrees issued by the Court in 1979 and 1984. Five of the six tribes with reservation lands located within or bordering the planning area possess present perfected Federal reserved rights to Colorado River water. These tribes are the Fort Mojave Indian Tribe, the Chemehuevi Tribe, the CRIT, the Fort Yuma Quechan Tribe, and the Cocopah Indian Tribe. Taken together, these five tribes have present perfected Federal reserved rights to 920,718 AFY of Colorado River water.

The Fort Mojave Indian Reservation is located on the Colorado River near the point where the boundaries of Arizona, California, and Nevada meet. The tribe has reservation land in, and possesses present perfected Federal reserved water rights to Colorado River water in all three states, as specified in the Decree in *Arizona v. California* and the supplemental Decrees of 1979 and 1984. The tribe has rights to 129,767 AFY of Colorado River water, including 103,535 AFY in Arizona, 13,698 AFY in California, and 12,534 AFY in Nevada (USBR 2000d).

The Chemehuevi Indian Reservation is located in southern California on plateau lands near the western shoreline of Lake Havasu. Pursuant to the Decree in *Arizona v. California* and the supplemental Decrees of 1979 and 1984, the tribe possesses present perfected Federal reserved water rights to 11,340 AFY of Colorado River water (USBR 2000d).

The CRIT Reservation is located in southwestern Arizona and southeastern California, south of Parker, Arizona. In accordance with the Decree in *Arizona v. California* and the supplemental Decrees of 1979 and 1984, the CRIT possess present perfected Federal reserved water rights to 717,148 AFY of Colorado River water, including 662,402 AFY in Arizona and 54,746 AFY in California (USBR 2000d).

The Fort Yuma Indian Reservation is located in southwestern Arizona and southeastern California north and west of Yuma, Arizona. Water for the tribe is diverted from the Colorado River at Imperial Dam and is delivered through the Yuma Project Reservation Division-Indian Unit. The tribe also has small uses at homestead sites south of Yuma. Pursuant to the Decree in *Arizona v. California* and the supplemental Decrees of 1979 and 1984, the Fort Yuma Quechan Tribe possesses present perfected Federal reserved water rights to 51,616 AFY of Colorado River water (USBR 2000d).

The Cocopah Indian Reservation is located in southwestern Arizona, south of Yuma. The Cocopah Indian Tribe possesses present perfected Federal reserved water rights to 10,847 AFY of Colorado River water. The AFY figure cited here includes only that water diverted directly from the Colorado River at Imperial Dam. In addition to these rights, the tribe has numerous well permits that allow the tribe to pump groundwater from aquifers that may be connected to the Colorado River within the boundaries of the United States (USBR 2000d).

Hydroelectric Power Generation and Distribution

Headgate Rock Dam and Powerplant is owned and operated by the BIA. BIA supplies energy generated at the Headgate Rock Powerplant to the CRIT and other Indian tribes. WAPA markets any excess power produced at Headgate Rock on the open market (USBR 2002).

Cultural Resources

Tribes with traditional ties to lands included within the planning area include the Southern Paiute, Hualapai, Mohave, Chemehuevi, CRIT, Yavapai, Quechan, Cocopah, Hopi, Zuni, and Navajo tribes. As described in section 3.5, hundreds of cultural resources have been identified and documented on lands in the planning area. Many of these cultural resources sites were subsequently destroyed by dam construction and the filling of Lakes Mead, Mohave, and Havasu, and other agricultural, urban, and recreational developments. Federal agencies must treat cultural resources located on reservations as ITAs if the affected tribe requests that the resources be considered ITAs.

Biological Resources

The planning area contains habitat for sensitive fish and wildlife species, especially in riparian woodlands, backwaters, and marshes located along the Colorado River and its tributaries. A substantial portion of this habitat is located on reservation lands along the Colorado River (USBR 2002). Some members of the Hualapai, Mohave, Chemehuevi, CRIT, Quechan, and Cocopah tribes still collect a variety of native plants, which are utilized for food, medicinal, and ceremonial purposes, and in traditional craft production (e.g., basketry). Although no traditional gathering locales have been identified to date by any of the tribes, it is likely such areas exist both on and off reservation lands in the planning area.

3.10.1.2 Muddy River/Moapa Valley and Virgin River

No tribal lands are located in this off-site conservation area, and no ITAs are present.

3.10.1.3 Bill Williams River

No tribal lands are located in this off-site conservation area, and no ITAs are present.

3.10.1.4 Lower Gila River

No tribal lands are located in this off-site conservation area, and no ITAs are present.

3.10.2 Environmental Consequences

Significance Criteria

The analysis of impacts to ITAs is required by NEPA, which does not require the use of significance criteria. This analysis addresses whether the proposed action and alternatives would have the potential to create impacts to all classes of ITAs.

3.10.2.1 Alternative 1: Proposed Conservation Plan

Impacts

Impact ITA-1: Implementing conservation measures on tribal land could result in changes to all classes of ITAs. A number of tribes are LCR MSCP participants. Nonetheless, locating a conservation area establishment project on tribal land could result in the long-term dedication of that land for this purpose and limit other tribal uses during the span of the permit. Water would be needed for a variety of activities identified in the Conservation Plan. If tribal water rights were developed in support of planned conservation activities, this could result in the long-term dedication/lease of those rights for maintenance of those conservation projects, rather than for some other purpose that might be of economic and social benefit to the tribe. The United States, as trustee for tribal water rights, is committed to protecting these rights. Any action taken to implement the LCR MSCP Conservation Plan would not and cannot modify these decreed water rights in any manner.

Some conservation projects would require electricity to power pumps. If these projects were to be located in an area where it was possible to draw power from the Headgate Rock Powerplant, it is possible less power from this facility would be available to tribes for other purposes. As noted in section 3.5, implementation of the Conservation Plan could result in adverse effects to historic properties (ITAs) if they are present in the area of a proposed conservation project. Potential impacts to cultural resources would be addressed in accordance with historic preservation laws and regulations in effect at the time a project was being planned. Some activities associated with implementing the Conservation Plan would result in the re-establishment of native vegetation, which would be considered a beneficial effect. These same activities could, however, impact locations where other native plants are growing that are used for food, ceremonial, and medicinal purposes, and for the production of traditional craft items so careful avoidance planning would be required.

No activity associated with implementation of the Conservation Plan would be initiated on tribal land without the full cooperation and express permission of the tribe on whose land that activity might occur. LCR MSCP participants and the affected tribe would work cooperatively

to identify and resolve potential impacts to ITAs. Appropriate mitigation and/or compensation measures would be identified, negotiated, and memorialized in agreement form, thus resulting in no effect or no adverse effect to the identified ITA(s). If LCR MSCP participants and the tribe were unable to reach agreement on how best to resolve effects, the LCR MSCP activity would not be implemented on the reservation and there would be no effect to ITAs.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur.

Residual Impacts

The Conservation Plan represents a comprehensive, coordinated program that would be implemented over the course of 50 years. Implementation of this alternative would afford LCR MSCP participants and tribes the opportunity to develop agreements for conservation area establishment on reservation lands that would be programmatic in character, which could decrease the likelihood for impacts to occur to ITAs. With programmatic, or project-specific, agreements in place, there would be no effect or no adverse effect to ITAs. If it were not possible to reach agreement on appropriate mitigation, the proposed conservation measures would not be implemented on reservation land, and there would be no effect to ITAs.

3.10.2.2 Alternative 2: No Action Alternative

Impacts

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered activities on a case-by-case basis, although some conservation could occur in the off-site conservation areas (as described in section 3.10.2.4 below), as well as along the LCR. **Impact ITA-1** generally applies to Alternative 2, although some differences would occur. No tribal lands or ITAs are present in any of the off-site conservation areas; thus, no impacts to ITAs would occur if conservation were implemented in the off-site conservation areas. Additionally, some of the elements of the proposed action are unlikely to be implemented, including the establishment of a fund to support projects for maintaining and/or enhancing existing land cover types that provide habitat for covered species in the planning area. Under the proposed action, this money would be available to fund tribal projects that maintain/enhance these habitats on reservation lands, and the absence of the fund would remove this potential benefit to ITAs. To the extent that the agencies undertaking the covered activities proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species would not be included. This would also likely result in a smaller amount of conservation area being established, which generally would result in proportionately fewer impacts to ITAs.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.10.2.3 Alternative 3: Listed Species Only

Impacts

Impact ITA-1 applies to Alternative 3. Alternative 3 would develop fewer acres of conservation area (41 percent less) than the proposed action, which generally would result in proportionately fewer opportunities for conservation measures to be implemented on tribal land, and lessened impacts to ITAs.

No activity associated with Alternative 3 would be initiated on tribal land without the full cooperation and expressed permission of the tribe on whose land that activity might occur. The LCR MSCP participants and the affected tribes would work cooperatively to identify and resolve potential impacts to ITAs. Appropriate mitigation and/or compensation measures would be identified, negotiated, and memorialized in agreement form, thus resulting in no effect or no adverse effect to the identified ITAs. If the LCR MSCP participants and the tribe were unable to reach agreement on how best to resolve effects, the conservation measures would not be implemented on the reservation and there would be no effect to ITAs.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur.

Residual Impacts

The Conservation Plan that would be implemented under Alternative 3 represents a comprehensive, coordinated program that would be implemented over the course of 50 years. Implementation of this alternative would afford LCR MSCP participants and tribes the opportunity to develop agreements for conservation area development on reservation lands that would be programmatic in character, which could decrease the likelihood for impacts to occur to ITAs. With programmatic, or project-specific, agreements in place, there would be no effect or no adverse effect to ITAs. If it were not possible to reach agreement on appropriate mitigation, the conservation measures would not be implemented on reservation land, and there would be no effect to ITAs.

3.10.2.4 Alternative 4: Off-Site Conservation

Impacts

No tribal lands or ITAs are present in any of the off-site conservation areas; thus, no impacts would occur if this alternative were implemented, beyond those potentially occurring in the planning area if backwaters were constructed on tribal lands. The potential for impacts to ITAs would be greatly lessened under this alternative in comparison to Alternatives 1 and 3, since a maximum of 360 acres of land could be affected.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur.

Residual Impacts

The Conservation Plan represents a comprehensive coordinated program that would be implemented over the course of 50 years. Implementation of this alternative would afford LCR MSCP participants and tribes the opportunity to develop agreements for conservation area development on reservation lands that would be programmatic in character, which could decrease the likelihood for impacts to occur to ITAs. With programmatic, or project-specific, agreements in place, there would be no effect or no adverse effect to ITAs. If it were not possible to reach agreement on appropriate mitigation, the LCR MSCP activity would not be implemented on reservation land and there would be no effect to ITAs.

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3.11 LAND USE

This section addresses land use compatibility issues, as well as potential conflicts with zoning and land use plans and policies, including other habitat conservation plans. State and Federal agencies are not subject to local land use and zoning regulations, but they do take these into consideration and cooperate with local agencies to avoid conflicts to the extent feasible. Additionally, NEPA requires the discussion of possible conflicts between the proposed action and Federal, state, regional, local, or tribal land use plans, policies, or controls for the area. Approaches to resolving these conflicts also must be identified (40 CFR 1502.16[c]; Forty Questions no. 23). The State CEQA Guidelines, section 15125c, also specify that an EIR should discuss any inconsistencies between the proposed project and applicable general plans and regional plans.

3.11.1 Affected Environment

This section provides an overview of the existing land uses and zoning within the proposed Conservation Plan boundary and the off-site alternative conservation areas and draws on the respective General/Comprehensive plans, zoning ordinances, and zoning maps for each affected jurisdiction. Note that for planning purposes, local jurisdictions may have assigned zoning/land use designations to lands outside their direct planning authority, such as Federal or state-managed lands. A more detailed discussion of agricultural and recreational resources is included in sections 3.2 and 3.15, respectively.

Land uses along the LCR and the off-site alternative conservation areas are under the jurisdiction of a number of agencies, including La Paz, Mohave, and Yuma counties in Arizona; Imperial, Riverside, and San Bernardino counties in California; and Clark County, Nevada. In addition, there are a number of incorporated cities in the vicinity, including Bullhead City, Lake Havasu City, Parker, San Luis, Somerton, and Yuma, Arizona; Blythe, and Needles, California; and Laughlin, Nevada. Several Indian reservations are located along the LCR, as well, including those of the Chemehuevi, Cocopah, CRIT, Fort Mojave, Fort Yuma-Quechan, and the Hualapai. Indian tribes are sovereign nations and reservation lands are not subject to local land use controls. A number of Federal agencies manage land along the LCR, including the Service, NPS, BLM, and the Department of Defense. Other land is under the jurisdiction of individual states.

3.11.1.1 Existing Land Uses

Lower Colorado River

REACH 1

Reach 1 is predominantly composed of the Lake Mead NRA, the Hualapai Indian Reservation, and Grand Canyon National Park. The recreation areas are owned and managed by the NPS. Land use in this reach is primarily recreational.

REACH 2

Reach 2 is composed mainly of the Lake Mead NRA, including Lake Mohave. The recreation areas are owned and managed by the NPS. Land use is primarily recreational.

REACH 3

Reach 3 includes the Fort Mojave and Chemehuevi Indian reservations (approximately 29,000 acres of Reach 3 are tribal land), the Havasu and Bill Williams River NWRs (approximately 21,000 acres of Reach 3 are owned by the Service), and incorporated, urbanized areas, such as Bullhead City, Lake Havasu City, Laughlin, and Needles (approximately 24,000 acres are controlled by local jurisdictions). This reach also includes areas used for recreational purposes, such as hiking, hunting, off-highway vehicle (OHV) use, and rockhounding; and agricultural uses and undeveloped open space (primarily in Mohave County).

REACH 4

Reach 4 contains large quantities of agricultural land both in Riverside County and on the CRIT Reservation. Agricultural and open space areas are also present in Imperial County and surrounding the city of Blythe. Additionally, the Cibola NWR and Parker Strip Recreation Area are within this reach. Urbanized areas include the city of Blythe and the Town of Parker. The majority of Reach 4 is tribal land (approximately 146,000 acres) and by local jurisdictions (approximately 109,000 acres).

REACH 5

This reach includes the Imperial NWR, Picacho SRA, and Martinez Lake. Limited agricultural uses presently exist to the west of Martinez Lake. The majority of the land in Reach 5 is managed by the Service (approximately 11,000 acres).

REACH 6

Reach 6 is predominantly agricultural, with scattered areas of urban and developed areas, particularly concentrated around the Yuma area. The Fort Yuma-Quechan Reservation is located within Reach 6 and is largely an agricultural community. The Mittry Lake Wildlife Area is also located in Reach 6. The majority of the land within this reach is tribal land (approximately 11,000 acres), local jurisdictions (approximately 37,000 acres), and the BLM (approximately 9,000 acres).

REACH 7

The predominant land use in Reach 7 is agricultural, with pockets of urban and developed areas, particularly in the northern portion near Yuma. The Cocopah Indian Reservation is located within this reach. Some undeveloped riparian areas border the LCR. The majority of the land in Reach 7 is governed by local jurisdictions (approximately 58,000 acres).

Muddy River/Moapa Valley and Virgin River

Land uses within the Muddy River/Moapa Valley and Virgin River area include agricultural and generally undeveloped rural areas. Additionally, the NDOW's Overton Wildlife Management Area is located within this off-site conservation area and allows for a variety of recreational uses.

Bill Williams River

Land uses within the Bill Williams River off-site conservation area includes the Bill Williams River NWR, agricultural uses, and a portion of Alamo Lake State Park and Alamo Wildlife Area. Most of this area is undeveloped.

Lower Gila River

Agricultural land uses, BLM lands, and Department of Defense lands are in the lower Gila River area. Additionally, the lower Gila River area contains recreational land uses in the Mohawk Valley and Tacna Marsh areas. Scattered towns are present in this area, but urban development is limited.

3.11.1.2 Zoning and Land Use Designations

The agricultural and undeveloped areas along the LCR are zoned for a variety of uses by their respective jurisdictions, although most are zoned for some type of agricultural, low-density/rural residential, open space, or resource conservation use. Areas zoned for commercial, industrial, and more intensive residential uses are generally concentrated near developed areas. [1]

Along the Muddy River/Moapa Valley and Virgin River, lands are zoned primarily for open space, rural residential, and agricultural uses. The Bill Williams River off-site conservation area primarily is zoned agricultural residential and recreational residential uses. The lower Gila River is zoned for rural uses, including agriculture and open space preservation.

3.11.1.3 General and Comprehensive Plans

Each local jurisdiction in the planning area has prepared a general or comprehensive plan to guide development. Each includes policies intended to minimize impacts of development on a variety of environmental resources. Elements typically include land use, housing, circulation/ transportation, open space, conservation, recreation, noise, and safety. Additionally, management plans may be developed for tribal, state, and Federal lands.

[1] La Paz County zoning maps are being revised to obtain consistency with the County's first Comprehensive Plan, which is currently being developed. Therefore, land use designations and accurate zoning information for La Paz County are pending at this time and are not included in the generalized discussion above.

3.11.1.4 Other Conservation Plans

Clark County Multiple Species Habitat Conservation Plan

Clark County, Nevada, has prepared an MSHCP to conserve a wide variety of species and their habitats throughout the county. The area included in the Clark County MSHCP overlaps with that of the proposed Conservation Plan in the portions of Reaches 1 through 3 located in Clark County. The Service has issued a 30-year permit authorizing the incidental take of the listed species covered by the plan. The MSHCP identifies those actions necessary to maintain the viability of natural habitats in the county for approximately 232 species residing in those habitats. While the MSHCP addresses all 232 species, it proposes that 79 of the species that are currently listed be covered by a section 10(a)(1)(B) permit and that prelisting agreements be developed for those species that are not listed. Another 103 species are identified as evaluation species. Among the 79 covered species are the southwestern willow flycatcher (*Empidonax traillii extimus)*, Mojave desert tortoise (*Gopherus agassizii*), and blue diamond cholla (*Opuntia whipplei* var. *multigeniculata)*.

Northern and Eastern Colorado Desert Coordinated Management Plan

The planning area for the BLM's Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) covers 5.5 million acres in the southeastern California Desert (including lands in San Bernardino, Riverside, and Imperial counties). The northeastern boundary of the planning area is near Needles and travels south just west of the LCR area through Blythe down to the NIB. The western planning area boundary extends to Indio, California. The plan primarily covers lands adjacent to the LCR planning area; however, portions are within the LCR planning area, e.g., near Needles in Reach 3 and in the southern portion of Reach 4. The goal of the plan is to manage species and their habitats on Federal lands administered by the BLM, Joshua Tree National Park, and the U.S. Marine Corps Chocolate Mountains Aerial Gunnery Range. Specific goals include recovery of the desert tortoise, a listed threatened species under both the ESA and the CESA, and conservation of a variety of other species and their habitats.

3.11.2 Environmental Consequences

Significance Criteria

The proposed action would have a significant environmental impact if it would result in any of the following:

- physically divide an established community;
- conflict with existing land uses;
- conflict with any applicable land use plan, policy, or regulation of any agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect; or
- conflict with any applicable habitat conservation plan or natural community conservation plan.

3.11.2.1 Alternative 1: Proposed Conservation Plan

Impacts

The proposed Conservation Plan would not physically divide an established community because conservation area establishment would be implemented on undeveloped or agricultural land and directed away from populated, developed areas. The proposed action would not impede the implementation of the other conservation plans in the general planning area, and it would directly support the Clark County MSHCP by providing $10,000 per year until 2030 to its Rare Plant Workgroup to support implementation of planned, but unfunded, species conservation measures for the threecorner milkvetch and sticky buckwheat.

The implementation of conservation measures on Federal or state lands would not conflict with any management plans because they would occur only in cooperation with the managing agency and its goals and objectives. Conversations with local planners and review of local land use ordinances indicated that conservation area establishment generally would be considered a permitted use in the undeveloped and agricultural areas where it would occur (personal communications, C. Pulsipher, T. Anthony, S. Mayes-Atkinson, P. Clark, D. Petritz, G. Gallagher, M. Spriggs, F. Villegas, J. Heuberger, and S. Martinez 2003; Imperial County 1998). However, the zoning of each potential conservation project site would be reviewed to minimize any potential conflicts with the plans and policies of local jurisdictions prior to site selection. Additionally, implementation of the mitigation measures identified in this EIS/EIR would minimize the potential for conflicts with policies of local jurisdictions adopted for the purpose of avoiding or mitigating an environmental effect.

Undeveloped lands within the planning area that provide suitable components of habitat for covered species may experience an increase in the population of covered species as a result of dispersal from the conservation areas. Limited areas with suitable habitat in the planning area are available, however, and it is likely that covered species already are present in such areas. Therefore, an increase in the population of covered species would not require changes to land management activities. It is important to note that only increases in populations of covered species that are protected under the ESA or specific state law could affect land management activities. Although the LCR MSCP participants are requesting incidental take coverage for a number of species not listed under the ESA, that coverage does not come into effect unless or until the species is listed. There is no requirement for coverage for incidental take for any unlisted species by any agency or individual within the planning area. Thus, use of any lands outside the conservation areas by covered, but unlisted species, would not require management changes.

Conservation areas would, as needed, incorporate buffer areas to minimize the potential effects of existing land uses and other activities that may be associated with adjacent lands that could adversely affect the ecological functions associated with established land cover types. Moreover, they would be designed to minimize the need for buffers by locating, juxtaposing, and managing established habitats in a manner that would minimize the effect of activities/events that may occur on adjacent lands. The need for buffer lands would be determined based on the site-specific needs identified for each conservation area. Nonetheless, specific, potential conflicts with existing adjacent land uses have been identified in the

agricultural resources and noise analyses (sections 3.2 and 3.12, respectively). These impacts are identified below.

- **Impact AG-3: Runoff from established conservation areas could alter the slopes of adjoining laser-leveled fields.** This impact would be *significant but mitigable to less than significant* through the implementation of **Mitigation Measure AG-1**.
- **Impact AG-4: Covered species attracted to established conservation areas could disperse to other lands within the planning area.** Impacts would be *less than significant*.
- **Impact NOI-1: Construction activities could cause a temporary, substantial increase in ambient noise levels that could exceed local standards if construction occurred in proximity to noise-sensitive receptors.** This impact would be *significant but mitigable to less than significant* through the implementation of **Mitigation Measure NOI-1**.
- **Impact NOI-2: Pumps located near noise-sensitive receptors could cause a substantial increase in ambient noise levels or exceed regulatory thresholds**. This impact would be *significant but mitigable to less than significant* through the implementation of **Mitigation Measure NOI-2**.

Mitigation Measures

No mitigation measures specific to land use are required. The implementation of **Mitigation Measures AG-1, NOI-1,** and **NOI-2** would minimize potential conflicts with nearby land uses.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant impacts to agricultural resources and noise.

3.11.2.2 Alternative 2: No Action Alternative

Impacts

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.11.2.4 below), as well as along the LCR. The discussion of the proposed action's impacts generally applies to Alternative 2. It is not known, however, if buffer zones would be established or if conservation areas would be sited or managed in a manner that would minimize the effect of implementing the conservation measures on adjacent lands. To the extent that the agencies undertaking the covered activities proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species would not be included. This would also likely result in a smaller amount of conservation area being established. The same types of impacts would occur as described for the proposed action, but the overall magnitude would be lessened since a smaller amount of conservation area establishment would occur.

Mitigation Measures

No mitigation measures specific to land use impacts are required. Mitigation measures would be developed as appropriate in the course of project-specific environmental reviews. The implementation of measures such as **Mitigation Measures AG-1, NOI-1,** and **NOI-2** would minimize potential conflicts with nearby land uses. Developing and implementing such mitigation measures is outside the authority of the lead agencies and is beyond the scope of this EIS/EIR.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant land use impacts.

3.11.2.3 Alternative 3: Listed Species Only

Impacts

The discussion of the proposed action's impacts applies to Alternative 3. The same types of impacts would occur as described for the proposed action, but the overall magnitude would be lessened since a smaller amount of conservation area establishment would occur.

Mitigation Measures

No mitigation measures specific to land use are required. The implementation of **Mitigation Measures AG-1, NOI-1,** and **NOI-2** would minimize potential conflicts with nearby land uses.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant land use impacts.

3.11.2.4 Alternative 4: Off-Site Conservation

Impacts

The discussion of the proposed action's impacts applies to Alternative 4. The only difference between this alternative and the proposed action is that the conservation measures would be implemented at different locations (the Muddy/Virgin, Bill Williams, and lower Gila rivers), with the exception of conservation measures directly related to fish, including backwater creation, which would be implemented in the planning area. Conversations with local planners indicated that conservation area establishment generally would be considered a permitted use in the undeveloped and agricultural areas where it would occur (personal communications, C. Pulsipher, B. Delmar, B. Hopkins, and G. Gallagher 2003).

Mitigation Measures

No mitigation measures specific to land use are required. The implementation of **Mitigation Measures AG-1, NOI-1,** and **NOI-2** would minimize potential conflicts with nearby land uses.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant land use impacts.

3.12 NOISE

This section addresses noise from potential sources related to the implementation of the Conservation Plan, including noise impacts from construction activities and long-term operational noise from pumps.

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. Several noise measurement scales are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities.

There are several methods of characterizing sound. The most common is the A-weighted sound level, or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 3.12-1. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

Because the sensitivity to noise increases during the evening and at night—excessive noise interferes with the ability to sleep—24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Community Noise Equivalent Level (CNEL) is a measure of the cumulative noise exposure in a community, with a 5-dB penalty added to evening (7:00 P.M. to 10:00 P.M.) and a 10-dB addition to nocturnal (10:00 P.M. to 7:00 A.M.) noise levels. The Day/Night Average Sound Level (L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this 3-hour period are grouped into the daytime period.

Noise Regulations

Land use compatibility with differing noise levels is regulated at the local level, although the Federal government has established suggested land use compatibility criteria for different noise zones (Federal Interagency Committee on Urban Noise, 1980). Residential areas and schools are considered compatible where the L_{dn} is up to 65 dBA; outdoor recreational activities such as fishing, golfing and horseback riding are compatible when noise exceeds 75 dBA; and parks are compatible with noise levels up to 75 dBA.

Table 3.12-1. Typical Sound Levels Measured in the Environment and Industry

At a Given Distance From Noise Source	*A-Weighted Sound Level in Decibels*	*Noise Environments*	*Subjective Impression*
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100')	100		Very Loud
	90	Boiler Room	
Freight Cars (50')		Printing Press Plant	
Pneumatic Drill (50')	80		
Freeway (100')		In Kitchen with Garbage Disposal Running	
Vacuum Cleaner (10')	70		Moderately Loud
		Data Processing Center	
	60		
		Department Store	
Light Traffic (100')	50		
Large Transformer (200')			
	40	Private Business Office	Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
	0		

Source: U.S. Department of Housing and Urban Development. 1985

Neither Arizona, California, nor Nevada has adopted any quantitative noise regulations that are applicable to the proposed action, although the CADHS, Environmental Health Division has established guidelines regarding land use compatibility.

Noise regulations established by local jurisdictions that govern stationary noise sources are typically included in noise ordinances, although policies that limit public exposure to noise may be included in the general or community plans of individual cities or counties. Some jurisdictions also have specific provisions addressing construction noise impacts that often limit

the hours and days of construction and may establish noise thresholds that may not be exceeded at specific locations, such as the property line of the site that is under construction. Tables 3.12-2 and 3.12-3 provide summaries of the regulations governing noise from construction and long-term operations, respectively.

Table 3.12-2. Construction Noise Regulations

County/State	*LDN OR CNEL (dB)*
La Paz County, AZ	None
Mohave County, AZ	65 dBA at property line.
Yuma County, AZ	None
Imperial County, CA	75 dBA Leq when averaged over an 8-hour period and measured at the nearest sensitive receptor (e.g., residences, schools, hospitals, parks, office buildings, and certain non-human species, including riparian bird species).
Riverside County, CA	Riverside County Code does not provide construction noise limits; however, it does restrict construction activities within ¼ mile of an occupied residence(s) to the hours of 6 A.M. to 6 P.M. during the months of June through September, and between 7 A.M. to 6 P.M. during the other months.
San Bernardino County, CA	For large projects, such as subdivision construction adjacent to developed/occupied noise sensitive land uses, a construction related noise mitigation plan is required prior to issuance of a grading permit.
Clark County, NV	None
City/ State	*LDN OR CNEL (dB)*
Parker, AZ	None
Quartzsite, AZ	None
Bullhead City, AZ	None
Lake Havasu City, AZ	None
City of San Luis, AZ	None
City of Somerton, AZ	Construction is not allowed, other than between the hours of 7:00 A.M. and 7:00 P.M. on weekdays, except in case of urgent necessity in the interest of public health and safety and then only with a permit which may be granted for a period not to exceed 30 days, while the emergency continues.
Yuma, AZ	Construction is not allowed in any residential district or section, other than between the hours of 6:00 A.M. and 7:00 P.M. from the first day of May to and including the 30th day of September and between the hours of 7:00 A.M. and 7:00 P.M. beginning the first day of October to and including the 30th day of April on weekdays.
Blythe, CA	None
Needles, CA	None
Laughlin, NV	None
Boulder City, NV	None
Henderson, NV	None
Wellton, NV	None

1

Table 3.12-3. Long-Term Noise Compatibility Thresholds

County/ State	*Noise Ordinance/ Controls? Yes/No*	**LDN OR CNEL (dBA)**			
		Residential	*Commercial*	*Industrial*	*Recreational*
La Paz County, AZ	Yes (nuisance ordinance)	Not specified	Not specified	Not specified	Not specified
Mohave County, AZ	Yes	50-60 dBA	50-70 dBA	50-75 dBA	50-75 dBA
Yuma County, AZ	No	NA	NA	NA	NA
Imperial County, CA	Yes	Daytime [50-55dB] Nighttime [45-50 dB]	Daytime [60dB] Nighttime [55 dB]	Anytime [70-75dB]	Not specified
Riverside County, CA	Yes	Daytime [65dB 10-min. Leq][2] Nighttime [45 dB 10-min. Leq] [2]	50-65 dBA	50-70 dBA	50-65 dBA
San Bernardino County, CA	Yes	Interior [45 dB] Exterior [60 dB]	Interior [45-50 dB] Exterior [60-65 dB]	Not specified	Interior [NA] Exterior [65 dB]
Clark County, NV	Yes	Daytime [56dB] Nighttime [46 dB]	Daytime [65dB] Nighttime [61 dB]	Daytime [65dB] Nighttime [61 dB]	Not specified
City/ State					
Parker, AZ	No	NA	NA	NA	NA
Quartzsite, AZ	No	NA	NA	NA	NA
Bullhead City, AZ	Yes	Not specified	Not specified	Not specified	Not specified
Lake Havasu City, AZ	Yes	Daytime [50-68 dB] Nighttime [45 dB]	Daytime [50-68 dB] Nighttime [45 dB]	Daytime [50-68 dB] Nighttime [45 dB]	Daytime [50-68 dB] Nighttime [45 dB]
City of San Luis, AZ	No	NA	NA	NA	NA
City of Somerton, AZ	Yes	Not specified	50 dB	Not specified	Not specified
Yuma, AZ	Yes	Not specified	70 dB	Not specified	Not specified
Blythe, CA	Yes	50-60 dB	50-65 dB	50-75 dB	50-55 dB
Needles, CA	Yes	45-65 dB	Not specified	Not specified	Not specified
Laughlin, NV	Yes	Daytime [56dB] Nighttime [46 dB]	Daytime [65dB] Nighttime [61 dB]	Daytime [65dB] Nighttime [61 dB]	Not specified
Boulder City, NV	Yes	Not specified	Not specified	Not specified	Not specified
Henderson, NV	Yes	32-72 dB[3]	32-72 dB[3]	32-72 dB[3]	32-72 dB[3]
Wellton, NV	No	NA	NA	NA	NA

1. Daytime is typically 7:00 A.M. to 10:00 P.M. and nighttime is typically 10:00 P.M. to 7:00 A.M.
2. Leq (Equivalent Energy Level) – The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically 18 or 24 hours.
3. Henderson generally regulates all uses and activities noise levels by the maximum sound pressure level radiated by any use or facility. These sound pressure levels vary depending on the octave-band range in cycles per second.
4. NA

2 **3.12.1 Affected Environment**

3 The following discussion describes the existing manmade noise sources for each reach of the
4 LCR, as well as the off-site conservation areas. Noise sensitive receptors are also identified,
5 including those in those in urban areas, although the proposed conservation measures likely
6 would not be located in proximity to such areas.

3.12.1.1 Lower Colorado River

Reach 1

Reach 1 is bordered by Clark County, Nevada and Mohave County, Arizona. The primary noise sources are related to recreational activities such as camping and boating on Lake Mead. Noise generated by the operation of Hoover Dam may also contribute to the noise environment within this reach. The main noise-sensitive receptors in this region are the Lake Mead NRA and Grand Canyon National Park. Here, campgrounds and other recreation areas where quiet is an essential part of the recreational experience are considered noise sensitive uses. The Hualapai Indian Reservation is also located in this reach.

Reach 2

Reach 2 is located within Clark County and Mohave County. The primary noise sources are related to recreational activities such as camping and boating on Lake Mohave. Noise generated by the operation of Davis Dam may also contribute to the noise environment within this reach. Because U.S. Highway 93 and Highway 68 cross the LCR perpendicularly, they are a noise source only in the vicinity of the point at which they cross the planning area. The main noise-sensitive receptors in this region are the Lake Mead Recreation Area, which extends from Reach 1, and residential uses in the communities that border this region.

Reach 3

Reach 3 is bounded mainly by Mohave County on the east and San Bernardino County on the west, although a small portion of the northern portion of the reach is located in Clark County. The main noise sources in this reach are recreational activities on Lake Havasu and below Davis Dam, vehicular traffic (particularly along Interstate 40), agricultural uses, and aircraft from the Lake Havasu City Airport. Operational noise from Parker Dam also contributes to the noise environment within this reach. The main noise-sensitive receptors in this region are the Lake Havasu and Bill Williams River NWRs and residential uses in the communities that border this region, including the Fort Mojave and Chemehuevi Indian reservations. Bullhead City, Lake Havasu City, and the City of Needles are also located in this reach, and contain noise-sensitive receptors such as schools, hospitals, and residences. Urban areas are also sources of noise.

Reach 4

Reach 4 is bordered by La Paz County on the east and is largely located within Riverside County on the west, although the northern portion of the reach is located in San Bernardino County and the southern portion is within Imperial County. The main noise sources within this reach are vehicular traffic (particularly along Interstate 10 and Highway 95), recreational boating, agricultural uses, and operational noise from Headgate Rock Dam and Palo Verde Diversion Dam. The main noise-sensitive receptors in this region are the Cibola NWR and residential uses in the communities that border this region, including the Colorado River Indian Tribes Reservation. The Town of Parker and City of Blythe are also located in this reach, and contain noise-sensitive receptors such as schools, hospitals, and residences. Urban areas are also sources of noise.

Reach 5

Reach 5 is bounded by La Paz and Yuma counties on the east and Imperial County on the west. The main noise sources within this reach are related to recreational activities such as camping and boating on Cibola, Adobe, or Martinez lakes. Limited agricultural uses also may contribute to the noise environment. The main noise-sensitive receptors in this reach are the Imperial NWR and the Picacho SRA.

Reach 6

Reach 6 is bordered by Yuma County on the east and Imperial County on the west. The main sources of noise within this reach are recreational activities on Mittry Lake. Traffic noise also contributes to the noise environment within this reach, as do agricultural uses and the operation of Imperial Dam. Noise-sensitive receptors in Reach 6 include the Mittry Lake State Wildlife Area, and residential uses in the communities that border this region, including the Fort Yuma Indian Reservation.

Reach 7

Reach 7 is located within Yuma County. The main sources of noise within this reach are traffic noise (primarily from Interstate 8), operational noise from Morelos Diversion Dam, and agricultural uses. The main noise-sensitive receptors in Reach 7 include the Cocopah Indian Reservation and associated residential uses. The City of San Luis and Yuma are also located in this reach, and contain noise-sensitive receptors such as schools, hospitals, and residences. Urban areas are also sources of noise.

3.12.1.2 Muddy River/Moapa Valley and Virgin River

These rivers are located in Clark County, Nevada, and the Muddy River also passes through the towns of Logandale and Overton. The main sources of noise are related to recreational activities such as camping and boating on upper Lake Mead, as well as agricultural uses in the Muddy River/Moapa Valley. Traffic noise from Interstate 15 contributes to the noise environment where it intersects the Muddy River. Noise-sensitive receptors in the Muddy River/Moapa Valley and Virgin River region include the Lake Mead National Recreation Area, and schools, hospitals, and residences that are associated with the towns of Logandale or Overton. Urban areas are also sources of noise.

3.12.1.3 Bill Williams River

The Bill Williams River borders both Mohave and La Paz counties. Agricultural activities are the main source of noise, and the primary noise-sensitive receptor in this region is the Bill Williams River NWR.

3.12.1.4 Lower Gila River

The lower Gila River is located in Yuma County. The main sources of noise are traffic (primarily Interstate 8) aircraft associated with the Marine Corps Air Station and Yuma

International Airport, which lie just south of the lower Gila River, and agricultural uses. Noise sensitive receptors include scattered residences and farmhouses.

3.12.2 Environmental Consequences

Significance Criteria

Impacts would be significant if the project would result in the following:

- exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies;
- exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

3.12.2.1 Alternative 1: Proposed Conservation Plan

Impacts

The proposed action would require standard construction activities, including clearing, grading, dredging, and construction of infrastructure. Long-term noise would result from the operation of diesel or electric pumps. No elements of the project would result in excessive groundborne vibration or groundborne noise levels.

CONSTRUCTION NOISE

Impact NOI-1: Construction activities could cause a temporary, substantial increase in ambient noise levels that could exceed local standards if construction occurred in proximity to noise-sensitive receptors. The proposed action would require a number of actions that would generate noise, including clearing, grading, dredging, and construction of infrastructure. The amount of noise generated by each of these key actions at varying distances from the source is shown on Table 3.12-4. The duration of construction would vary, depending on the type of site and the nature of the construction activity. Field facilities, for example, could be constructed in 1 to 3 months, whereas habitat establishment could take considerably longer, depending on the size and other characteristics of the site (e.g., agricultural land can be converted to habitat much more rapidly than undeveloped land). Construction generally would occur in agricultural or undeveloped areas. Thus, noise would be unlikely to affect concentrations of residences, churches, schools, or other sensitive receptors found in more heavily populated areas. Average ambient noise levels likely are low in the areas where construction would occur (about 45 dBA). Nonetheless, construction, particularly on the periphery of the sites, could potentially occur in proximity to individual rural residences. Some of the local jurisdictions in the planning area regulate construction noise, as indicated in Table 3.12-2. If construction activities generated noise levels that violated local standards or caused a substantial increase in areas containing noise-sensitive receptors, this impact would be

significant but mitigable to less than significant through the implementation of **Mitigation Measure NOI-1**.

OPERATIONAL NOISE

Impact NOI-2: Pumps located near noise-sensitive receptors could cause a substantial increase in ambient noise levels or exceed regulatory thresholds. The primary source of operational noise would be the use of electric or diesel pumps. It is assumed that pumps would generate approximately 85 dBA at 50 feet. Noise attenuation would be as shown for clearing and grading on Table 3.12-4. As described under construction, the established conservation area would be located in agricultural or undeveloped areas, and it is unlikely that pumps would be located in the vicinity of noise-sensitive receptors. As noted in section 2.1.1.4, conservation areas would be designed to minimize the effect of activities/events that may occur on adjacent lands. Thus, pumps generally would be sited to avoid exceeding local regulatory noise thresholds or causing a substantial permanent increase in ambient noise levels in the project vicinity if noise-sensitive receptors are present. However, if there were no flexibility in their placement, impacts could be *significant but mitigable to less than significant* through the implementation of **Mitigation Measure NOI-2**.

Table 3.12-4. Maximum Noise Levels (L_{dn}) with No Noise Reduction Measures in Place

Feet	*Clearing*	*Grading*	*Dredging*	*Irrigation*
50	85	85	93	93
100	79	79	87	87
200	73	73	81	81
300	69	70	77	77
400	67	67	75	75
500	65	65	73	73
600	64	64	71	71
700	62	63	70	70
800	61	61	69	69
900	60	60	68	68
1,000	59	60	67	67
1,200	58	58	65	65
1,400	56	57	64	64
1,600	55	56	63	63
1,800	54	55	62	62
2,000	54	54	61	61
2,500	52	52	59	59
Note: Background Noise Level (dBA) = 45				

Mitigation Measures

NOI-1 When construction occurs sufficiently close to noise-sensitive receptors so that noise from construction activities exceeds local regulatory standards or causes a substantial

increase in ambient noise levels, one or more of the following measures shall be implemented. This list does not preclude the use of additional mitigation measures if appropriate (*Addresses Impact NOI-1*).

- Use hydraulically or electrically powered impact tools when possible. If the use of pneumatically powered tools is unavoidable, use an exhaust muffler on the compressed air exhaust.
- Install manufacturer's standard noise control devices, such as mufflers, on construction equipment.
- Locate stationary equipment as far as possible from noise-sensitive receptors.
- Notify nearby property users whenever extremely noisy work might occur.
- Use stockpiles as noise barriers when feasible.
- Keep idling of construction equipment to a minimum (no more than 30 minutes) when not in use.
- Install temporary or portable acoustic barriers around stationary construction noise sources.
- As appropriate, modify noise enclosures with acoustical louvers, baffle walls, and/or acoustical panels.
- Whenever possible, limit construction activities to non-mating, non-nesting seasons of noise-sensitive species.

NOI-2 If pumps cannot be located at sufficient distances from sensitive receptors to avoid the exceedance of a local noise standard or a substantial increase in the ambient noise level at the sensitive receptors, then barriers or enclosures shall be constructed to ensure adherence to local standards. (*Addresses Impact NOI-2*)

Residual Impacts

Residual impacts would be *less than significant* since noise impacts would be reduced to meet regulatory standards or to avoid substantially increasing the ambient noise levels.

3.12.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.12.2.4 below), as well as along the LCR. **Impacts NOI-1 and NOI-2** apply to this alternative. To the extent that the agencies undertaking the covered activities proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species would not be included. This would also likely result in a smaller amount of conservation area being established, which would result in proportionately fewer noise impacts. However, due to the increased number of individual projects associated with the no action

alternative, and the greater likelihood that the conservation sites would be located closer to developed areas, noise impacts could be somewhat greater than under the proposed action.

Mitigation Measures

Mitigation measures would be developed as appropriate in the course of project-specific environmental reviews. If significant impacts are identified, mitigation measures similar to those identified in this EIS/EIR (**Mitigation Measures NOI-1** and **NOI-2)** could be implemented. Developing and implementing such mitigation measures is outside the authority of the lead agencies and is beyond the scope of this EIS/EIR.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant noise impacts.

3.12.2.3 Alternative 3: Listed Species Only

Impacts NOI-1 and NOI-2 apply to this alternative. The same types of *significant but mitigable to less than significant* impacts would occur as described for the proposed action, but the overall magnitude would be lessened since a smaller amount of conservation area establishment would occur.

Mitigation Measures

Mitigation Measures NOI-1 and NOI-2 are applicable to this alternative.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant noise impacts.

3.12.2.4 Alternative 4: Off-Site Conservation

Impacts NOI-1 and NOI-2 apply to this alternative. The difference between this alternative and the proposed action is that most conservation measures would be implemented at different locations (along the Muddy/Virgin, Bill Williams, and lower Gila rivers). The conservation measures directly related to fish, including backwater creation, would be implemented in the planning area, as described for the proposed action. Impacts would be *significant but mitigable to less than significant* through the implementation of **Mitigation Measures NOI-1 and NOI-2**.

Mitigation Measures

Mitigation Measures NOI-1 and NOI-2 are applicable to this alternative.

Residual Impacts

Residual impacts would be *less than significant* because mitigation measures are available that would reduce or avoid significant noise impacts.

3.13 POPULATION AND HOUSING

A detailed analysis of these resources was not performed because the proposed action and alternatives would not affect population or housing. Implementation of the proposed action would not generate any significant number of job opportunities that would cause an increase in population in the planning area. Conservation area establishment would be implemented on agricultural or undeveloped land in areas well removed from population centers. No residences would be proposed as part of the proposed action or alternatives, nor would roads or infrastructure be extended into areas that could serve new development. New access roads and irrigation infrastructure could be required in some areas, but they would be sized and positioned to serve only the conservation areas. Since agricultural or undeveloped land would be used for conservation area establishment, the proposed action and alternatives would not displace substantial numbers of existing houses or people, necessitating the construction of replacement housing elsewhere.

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3.14 PUBLIC UTILITIES AND SERVICES

A detailed analysis of public utilities and services was not performed because the proposed action and alternatives would have minimal impacts on these resources, as described below.

- *Wastewater treatment*. The proposed action and alternatives would not generate wastewater except at the two potential field facilities, which would generate only minimal amounts. Thus, no impacts to existing wastewater conveyance and treatment facilities would occur.
- *Water treatment*. Water use of the proposed action and alternatives would be associated primarily with irrigation. Colorado River water would be used and would not require treatment. The two potential field facilities would require only minimal potable water use, and therefore would not require the construction of new water treatment facilities or the expansion of existing facilities.
- *Water supply*. Water used in habitat establishment would be obtained from the Colorado River through legal means and would not affect the water supply or distribution systems of water purveyors. Only minimal amounts of potable water would be required to serve the two field facilities should they be constructed; thus, adequate water supply would be available to serve these facilities from existing entitlements.
- *Storm water drainage*. Minimal storm water drainage would be required for the two potential field facilities, which would not require or result in the construction of new storm water drainage facilities or the expansion of existing facilities.
- *Landfill capacity*. Minimal amounts of solid waste requiring disposal would be generated during construction and operations. Cleared vegetation would either be burned or shredded and used as mulch. Thus, landfill capacity would not be exceeded.
- *Need for new or physically altered facilities*. The proposed action and alternatives would not add population, and thus would not affect schools or parks. It is anticipated that one new law enforcement officer and one new wildland fire fighter would be provided, respectively, for every 5,000 and 2,500 acres of conserved land not already in public ownership. All new personnel would be stationed at existing facilities. Additionally, the Conservation Plan includes a number of provisions that would minimize the potential impacts from wildland fires and thus would not require the expansion of fire protection services by other agencies.

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3.15 RECREATION

This section addresses the potential for the use of recreational facilities to increase as a result of implementing the proposed Conservation Plan, leading to their deterioration, as well as the potential for decreased recreational opportunities.

3.15.1 Affected Environment

3.15.1.1 Lower Colorado River

Key recreational resources are identified by river reach, although much of the river system, including undeveloped land, is used for a variety of recreational purposes, including camping, fishing, boating, canoeing, hunting, and water-skiing.

Reach 1

GRAND CANYON NATIONAL PARK

Grand Canyon National Park is located in northern Arizona. Created as a national park in 1919, it was designated as a World Heritage Site in 1979. The park encompasses 277 miles of the Colorado River and adjacent uplands and contains 1.28 million acres. The park had more than 4.4 million recreation visits in 2001 (NPS 2002).

HUALAPAI INDIAN RESERVATION

The Hualapai Reservation offers camping, fishing, hiking, and big game hunting. A tribal enterprise operates a river rafting company that offers rafting trips on the Colorado River.

LAKE MEAD NATIONAL RECREATION AREA

Lake Mead NRA extends along the LCR from the western border of Grand Canyon National Park to Davis Dam. The Lake Mead portion is 110 miles long, with a surface area of 274 square miles and more than 500 miles of shore. The lakes within the NRA provide boating, canoeing, kayaking, sport fishing, swimming, and water skiing opportunities; while its desert offers impressive scenery enjoyed by hikers and wildlife photographers. Three of America's four desert ecosystems; i.e., the Great Basin, the Mojave, and the Sonoran deserts, converge in the Lake Mead NRA. As a result, this seemingly barren area contains a large variety of plant and animal species. A number of campgrounds and picnic areas provide additional recreational opportunities and include Boulder Beach, Calville Bay, Echo Beach, Las Vegas Bay, and Temple Bar. The Lake Mead NRA has approximately 6 million visitor use days per year (NPS 2001).

Reach 2

LAKE MEAD NATIONAL RECREATION AREA

The Lake Mead NRA extends into Reach 2. Lake Mohave, which is formed by Davis Dam, is part of this NRA. Lake Mohave is a 67-mile stretch of the Colorado River north of Bullhead City, Arizona and Laughlin, Nevada. The lake is comparatively narrow, not more than 4 miles across at its widest point. It is confined for most of its length between the steep walls of Black,

El Dorado, Painted, and Pyramid canyons. Lake Mohave provides habitat for fish and wildlife, and the area around Lake Mohave (e.g., Cottonwood Cove and Katherine Landing) and along the Colorado River below Davis Dam provides a multitude of recreational opportunities. Activities include boating, camping, exploring, fishing, photography, picnicking, swimming, and water skiing. There are also hundreds of beaches that can only be accessed by boat. Noted fish species in the area include largemouth and rainbow trout and striped bass.

Reach 3

LAUGHLIN

Laughlin, Nevada is set in a rugged mountain terrain that slopes to the banks of the Colorado River. Laughlin offers an abundance of recreational water activities, as well as gambling and nightclub entertainment. Approximately 5 million visitors visit the Laughlin area each year (Laughlin, Nevada Chamber of Commerce 2003).

BULLHEAD CITY

Bullhead City, which is located in Mohave County, features the Colorado River, miles of natural hiking, thousands of acres of public lands, the Lake Mead NRA, Arizona's Veteran Memorial, and the Colorado River Museum. More than 5 million people travel through Bullhead City annually (Desert USA 2003). Activities in the Bullhead City area include ghost town exploration, hiking, hunting, OHV use, rockhounding, and water sports on the Colorado River and Lake Mohave.

DAVIS CAMP

Located near Bullhead City, Davis Camp, a campground and day use area, has boat launching facilities, picnic areas, numerous campsites, and RV hookups. Davis Camp offers many recreational opportunities, including fishing and water sports.

NEEDLES

Needles offers a wide range of recreational opportunities, including camping, fishing, hiking, sightseeing, swimming, and other water sports.

HAVASU NATIONAL WILDLIFE REFUGE

The Havasu NWR covers 30 river miles (300 miles of shoreline) from Lake Havasu City, Arizona to Needles, California and includes one of the last remaining natural stretches of the LCR, which flows through the 20-mile-long Topock Gorge (USFWS 2002f). Four endangered bird species reside here: the peregrine falcon, the southern bald eagle, the southwestern willow flycatcher, and the Yuma clapper rail (USFWS 2002f). Typical activities include canoeing, fishing, boating through the scenic Topock Gorge, and hiking in the Havasu Wilderness Area. Each year, thousands of visitors explore the 4,000–acre Topock Marsh, which offers excellent canoeing, fishing, and waterbird watching. Other activities offered by the Havasu NWR include camping and hunting.

LAKE HAVASU STATE PARK

Lake Havasu, formed by Parker Dam, contains a number of coves and inlets, and is a popular spot for fishing. The waters of the lake also are used for canoeing, houseboating, jet-skiing, kayaking, sailing, speed-boating, swimming, and water-skiing. Camping and hiking also occur along the more than 400 miles of the lake's shoreline. Additional tourist opportunities include viewing the London Bridge.

BILL WILLIAMS RIVER NATIONAL WILDLIFE REFUGE

The Bill Williams River NWR is located along the Bill Williams River near its confluence with the LCR. The refuge offers a variety of recreational opportunities, including hiking and bird watching (as well as other wildlife viewing), with opportunities to view Yuma clapper rails and southwestern willow flycatchers, among other species. Hunting is permitted for dove, cottontail, quail, and desert bighorn sheep. Other activities include boating and fishing.

Reach 4

PARKER STRIP RECREATION AREA

The Parker Strip Recreation Area includes backcountry byways that traverse scenic corridors providing historic, natural, prehistoric, and scenic values along an 11-mile road that travels along the Colorado River. Recreational activities include boating, camping, fishing, hiking, rock hounding, swimming, and wildlife viewing.

PALO VERDE DIVERSION DAM

There are approximately 95 miles of navigable water between the Imperial Dam below Yuma and the Palo Verde Diversion Dam above Blythe. Activities include canoeing, fishing, hunting, power boating, and other water sports.

BLYTHE

Exploring ghost towns, hiking, hunting, and OHV sports are a few of the recreational activities available in the desert around Blythe. In addition, many water sports may be enjoyed along the Colorado River.

CIBOLA NATIONAL WILDLIFE REFUGE

The Cibola NWR, which includes Cibola Lake, is located about 15 miles south of Blythe. The largest concentration of Canada geese and sandhill cranes on the LCR winter at the refuge. Visitors to the refuge engage in canoeing, fishing, hiking through native cottonwood, mesquite and willow plant communities, hunting, photography, and wildlife observation. Over 288 species of birds have been found in the Cibola NWR, including Gambel's quail, greater sandhill cranes, many species of migratory songbirds, mourning and white-winged doves, roadrunners, snow geese and Vermilion flycatchers (USFWS 2002a). The bald eagle, southwestern willow flycatcher, and Yuma clapper rail are among the endangered birds that use Cibola NWR. Other listed species include the bonytail, desert pupfish, desert tortoise, and razorback sucker.

Reach 5

PICACHO STATE RECREATION AREA

Picacho SRA is a popular area for camping, desert exploring, river running, and sportfishing. Picacho SRA is bordered by 8 miles of the Colorado River and is approximately 24 miles north of the U.S.-Mexico boundary. The area has a group boat-in area, three individual boat-in camp areas, and large group camping areas. Bird watching and small game hunting for doves, ducks, and quail are among other recreational opportunities.

IMPERIAL NATIONAL WILDLIFE REFUGE

Imperial NWR protects habitat for wildlife species along 30 miles of the LCR in Arizona and California, including the last unchannelized section before the river enters Mexico (USFWS 2002g). The river, and its associated backwater lakes and wetlands, are a green oasis, contrasting with the surrounding desert mountains. Recreational opportunities include canoeing, fishing, and hunting. The refuge surrounds one of the few remaining "wild" places on the Colorado River and is valued by boaters for its remote scenery. In addition, scenic drives through the Sonoran Desert landscape allow access to the lookout points and the Painted Desert Trail.

MARTINEZ LAKE

Martinez Lake, which adjoins the Imperial NWR, encompasses 300 to 500 acres and is an attraction catering to anglers, birdwatchers, boaters, fishers, hunters, nature lovers, rock hounds, sightseers, and water skiers. Martinez Lake has a large variety of birds year around that can be viewed from boats on the Colorado River as well as the many side lakes along the river.

Reach 6

BETTY'S KITCHEN

Betty's Kitchen, a 10-acre wildlife interpretive area, provides birdwatching and fishing opportunities.

MITTRY LAKE WILDLIFE AREA

Mittry Lake, within the Mittry Lake Wildlife Area, covers approximately 600 acres and has undergone rehabilitation work, including fish habitat improvement, marsh dredging, and revegetation, making it an ideal location for small game hunting and sportfishing. Major species for small game hunting include doves, quail, rabbit, raccoon, and waterfowl. Major species of fish in the lake include bluegill, channel catfish, crappie, flathead catfish, and largemouth bass. There is a 3-lane boat launch ramp for motorized boating on the lake. The area is also popular for birdwatching and nature study.

Reach 7

YUMA

The City of Yuma is located on the edge of the historic floodplain to the east of the Colorado River. The area offers a number of recreational opportunities, including boating, fishing, hunting, and swimming.

3.15.1.2 Muddy River/Moapa Valley and Virgin River

Recreational activities such as camping, boating, fishing, and hiking occur on upper Lake Mead, described above. The Overton Wildlife Management Area provides opportunities for wildlife viewing and photography, waterfowl and upland game bird hunting, hiking, and fishing. The Overton Wildlife Management Area has an average of 5,300 annual visitor use days (NDOW 2001).

3.15.1.3 Bill Williams River

The Bill Williams River NWR is located along the Bill Williams River, as described above. Alamo Lake State Park, located at the eastern end of this off-site conservation area, includes fishing, hiking, wildlife watching, and camping.

3.15.1.4 Lower Gila River

The lower Gila River offers limited recreational opportunities, mostly in the form of wildlife observation and some warm-water fishing in the area with permanent water below Dome. Additionally, small game waterfowl hunting is available in the Lower Gila River area.

3.15.2 Environmental Consequences

Significance Criteria

The project would result in a significant impact if it would result in any of the following:

- increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial deterioration of the facility would occur or be accelerated; or
- cause the direct loss or substantial physical degradation of either public recreation uses or public recreational facilities resulting in decreased recreational opportunities, such as sport fishing, bird watching, or waterfowl hunting.

3.15.2.1 Alternative 1: Proposed Conservation Plan

Impacts

Established conservation areas would be located on agricultural or undeveloped land owned by public agencies, Indian tribes, or private owners. Access to habitat conservation sites would be controlled in order to protect the covered species and their habitats. Developed and heavily used recreational areas would not be suitable for conservation area establishment and thus

would not be directly affected by the proposed action. The conversion of agricultural land to conservation areas would not adversely affect recreational resources, because this land is generally not used for recreational purposes and is not accessible to the public. Water-based recreation generally would not be affected by the proposed action. As described in section 3.9, Hydrology, the relatively minor amount of water required to irrigate vegetation in conservation areas would not lower the water surface elevation of the LCR, and thus would not affect the operation of marinas, other boating facilities, or navigation in the river. Additionally, the proposed action would not restrict use of boating areas.

Impact REC-1. The implementation of certain conservation measures could result in the loss of recreational opportunities. The conversion of undeveloped land to conservation areas could result in the loss of some recreational opportunities, such as camping, fishing, and access to the LCR. This impact would be *less than significant* because a relatively small area would be affected in relationship to the total area available (the planning area contains approximately 126,000 acres of woody riparian vegetation and a maximum of 8,132 acres of conservation areas would be established), and the displacement of a limited amount of recreational uses to other areas would not result in the degradation of these areas. Limited fishing opportunities may be lost if backwaters were established in areas already used by the public for this purpose. Again, only a small area would be affected (360 acres out of 7,911 acres of open water [GEO/Graphics 2000]); thus, this impact would be *less than significant*.

The implementation of certain species-specific conservation measures also could result in the loss of access to recreational uses. Specifically, measures for the desert tortoise and flat-tailed horned lizard (DETO1 and FTHL1) include acquiring and protecting 230 acres of existing unprotected habitat, and measures for the lowland leopard frog include protecting existing unprotected habitat (LLFR2). To the extent that the protected habitat for these species was on lands used for public recreational purposes, access would be lost. Since the amount of recreational area that could be removed from public use is small in comparison to the area available (approximately 423,500 acres within the planning area are in open space or used for recreational purposes), the impact would be *less than significant*.

Population enhancement measures that could be implemented include controlling pisciverous fish in established backwaters prior to their use as grow-out facilities. This impact would be localized, would have a minor impact on overall fish populations, and would occur in conservation areas that would not be accessible to the public. The impact to fishing would be *less than significant*.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.15.2.2 Alternative 2: No Action Alternative

Impacts

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered actions, although some conservation could occur in the off-site conservation areas (as described in section 3.15.2.4 below), as well as along the LCR. **Impact REC-1** applies to this alternative. The same type of *less than significant* impacts would occur as described for the proposed action, but the overall magnitude would be lessened since a smaller amount of conservation area would be established.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.15.2.3 Alternative 3: Listed Species Only

Impacts

Impact REC-1 applies to this alternative. A smaller amount of conservation area would be developed than under the proposed action. Therefore, the same types of *less than significant* impacts would occur as described for the proposed action, but the overall magnitude would be lessened since a smaller area would be affected.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.15.2.4 Alternative 4: Off-Site Conservation

Impacts

Impact REC-1 applies to this alternative. The difference between this alternative and the proposed action is that most conservation measures would be implemented at different locations (along the Muddy/Virgin, Bill Williams, and lower Gila rivers). The conservation measures directly related to fish, including backwater creation, would be implemented in the planning area, as described for the proposed action.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.16 SOCIOECONOMICS

This section addresses the potential socioeconomic impacts associated with the voluntary conversion of agricultural land to conservation areas, focusing on (1) employment in the agricultural sector, (2) the market value of farm production, and (3) property tax and sales tax revenues. The potential loss of property taxes from the use of undeveloped or public land also is discussed. Other segments of the economy would not be substantively affected by the proposed action.

3.16.1 Affected Environment

The affected area is composed of the counties located within the lower basin of the Colorado River that are contained within the planning area and off-site locations, although the areas where conservation could occur comprise only a small portion of each of the counties. The affected counties include Imperial, Riverside, and San Bernardino counties in California; La Paz, Mohave, and Yuma counties in Arizona; and Clark County, Nevada. This section presents pertinent information describing selected characteristics of the above-mentioned counties, focusing on socioeconomic impacts associated with the agricultural sector of the economy since the most likely economic effect of implementing the proposed action is the conversion of agricultural lands from commercial activity to conservation areas for wildlife use. Virtually all agricultural activity in the LCR region is irrigation agriculture using water that is, for the most part diverted from the Colorado River directly or indirectly (through groundwater pumping). For each of the seven counties that are partially contained within the LCR region, the most recent data regarding farms and cropland is contained in the 1997 Census of Agriculture and 2000 Census of Population and Housing.

Selected summary information concerning the number, value, and size of farm units in each of the seven counties and for the states of Arizona, California, and Nevada is presented in Table 3.16-1. The average farm size ranges from 167 acres in Riverside County, California to 2,875 acres in La Paz County, Arizona. The amount of land in farms ranges from almost 71,000 acres in Clark County, Nevada to over 997,000 acres in Mohave County, Arizona. The proportion of farmland harvested for crops (excluding grazing land) varies greatly, from a low of just over 1 percent in Mohave County, Arizona to a high of 88 percent in Imperial County, California and 82 percent in Yuma, Arizona. Of the harvested cropland (which excludes grazing land), a uniformly high proportion (between 63 percent and 95 percent) is irrigated.

An indication of the value of farmland is given by the per acre market value of land and buildings. This value ranges from over $4,600 in Riverside County, California and almost $4,500 in Yuma County, Arizona to almost $700 in San Bernardino County, California and about $250 in Mojave County, Arizona. The average market value of agricultural products sold per farm is highest in Imperial County, California ($1.526 million) and Yuma County, Arizona ($1.122 million) (Table 3.16-1).

Table 3.16-1. Agricultural Data by County (1997)

	CALIFORNIA			ARIZONA			NEVADA
	Imperial	*Riverside*	*San Bernardino*	*La Paz*	*Mohave*	*Yuma*	*Clark*
Number of farms	557	3,048	1,455	97	212	465	209
Land in farms (acres)	489,726	509,031	924,015	278,854	997,171	237,742	70,741
Total harvested cropland (acres)	433,119	245,446	39,543	100,835	12,060	195,416	3,406
Market value of land and buildings per acre (dollars)	$3,068	$4,618	$693	$1,512	$257	$4,496	$1,610
Market value of agricultural products sold ($1000)	$850,315	$1,047,525	$617,833	$94,665	$14,983	$522,063	$18,926
Average market value of agricultural products sold per farm (dollars)	$1,526,662	$343,676	$424,628	$975,925	$70,674	$1,122,717	$90,557

Source: U.S. Department of Commerce, Census Bureau, Census of Agriculture, 1997.

3.16.1.1 Economic Activity

Arizona

Full- and part-time employment in the three-county region composed of La Paz, Mohave, and Yuma counties increased from 110,926 to 129,492 jobs between 1995 and 2000, for a total increase of 18,566 jobs (approximately 14 percent). Employment in all sectors of the regional economy increased, with the exception of the farm and mining sectors, which declined by 30.6 and 32.6 percent, respectively, in La Paz and Mohave counties combined. Farm employment in Yuma County, however, increased approximately 2.5 percent over the same time period (Table 3.16-2). The numerically greatest gains were experienced in the services; retail trade; finance, insurance, and real estate; and local government sectors.

California

Full- and part-time employment in the three-county region composed of Imperial, Riverside, and San Bernardino counties increased from 1,168,370 jobs in 1995 to 1,447,030 jobs in 2000, an increase of 278,660 jobs (approximately 19 percent). Employment in all sectors of the regional economy increased, with the following exceptions. Agricultural services, forestry, and fishing declined by 24 percent in Imperial and Riverside counties (compared to a decrease of about 1 percent in San Bernardino County), and military services declined by approximately 9 percent in Imperial and San Bernardino counties and by over 44 percent in Riverside County (Table 3.16-2). The numerically greatest gains were experienced in the following sectors: construction;

Table 3.16-2. Employment by Industry (number of jobs)

	California						*Arizona*						*Nevada*	
	IMPERIAL		RIVERSIDE		SAN BERNARDINO		LA PAZ		*MOHAVE*		YUMA		CLARK	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
Total full-time and part-time employment	58,946	61,744	514,523	662,481	595,171	722,805	6,704	7,537	44,320	54,095	59,902	67,860	617,216	866,758
BY TYPE														
Wage and salary employment	50,884	52,581	389,971	506,024	480,506	583,766	5,383	6,099	34,936	42,483	52,996	59,656	540,495	745,041
Proprietors employment	8,062	9,163	124,282	156,457	114,665	139,039	1,321	1,438	9,384	11,612	6,906	8,204	76,721	121,717
Farm proprietors employment	685	676	3,843	3,771	1,863	1,830	150	157	239	239	636	618	201	187
Nonfarm proprietors employment	7,377	8,487	120,439	152,686	112,802	137,209	1,171	1,281	9,145	11,373	6,270	7,586	76,520	121,530
BY INDUSTRY														
Farm employment	5,050	6,180	12,125	13,909	5,046	5,577	667	389	382	339	3,613	3,705	304	339
Nonfarm employment	53,896	55,564	502,128	648,572	590,125	717,228	6,037	7,148	43,938	53,756	56,289	64,155	616,912	866,419
Private employment	40,616	40,722	422,227	557,854	485,722	599,648	5,018	5,983	37,894	46,971	43,211	50,142	554,762	787,517
Agricultural services, forestry, fishing and other	10,181	7,711	19,001	21,080	7,823	7,731	346	484	464	632	9,560	11,888	5,824	9,175
Mining	(D)	(D)	1,167	893	1,228	894	41	(D)	235	145	68	(D)	1,389	1,424
Construction	2,007	2,283	37,514	63,146	33,769	45,244	262	190	4,212	4,837	2,352	3,400	52,832	75,531
Manufacturing	1,961	1,974	43,613	57,789	58,699	75,191	324	402	3,010	3,506	1,755	2,485	17,742	22,489

1

Table 3.16-2. Employment by Industry (number of jobs) (Continued)

	California						*Arizona*						*Nevada*	
	IMPERIAL		RIVERSIDE		SAN BERNARDINO		LA PAZ		*MOHAVE*		YUMA		CLARK	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
Transportation and public utilities	2,668	2,884	16,428	20,752	35,890	45,353	222	312	2,046	2,444	2,158	1,829	28,724	43,578
Wholesale trade	1,962	2,413	15,878	21,806	26,908	34,491	85	(D)	1,182	1,468	3,587	2,160	18,945	24,797
Retail trade	9,482	10,321	98,596	119,732	118,842	132,508	1,581	1,828	10,682	13,144	9,623	10,891	97,488	142,470
Finance, insurance, and real estate	(D)	(D)	33,601	50,668	31,680	45,941	354	397	3,532	4,374	2,662	(D)	46,433	85,685
Services	9,897	10,474	156,429	201,988	170,883	212,295	1,803	2,219	12,531	16,421	11,446	14,401	285,385	382,368
Government and government enterprises	13,280	14,842	79,901	90,718	104,403	117,580	1,019	1,165	6,44	6,785	13,078	14,013	62,150	78,902
Federal, civilian	1245	1776	6297	6,724	12,209	11,211	157	167	455	545	2,245	2,578	7,855	9,429
Military	578	523	5496	3,030	17,810	18,558	40	45	343	360	4,420	4,340	9,535	9,356
State and local	11457	12543	68108	80,964	74,384	87,811	822	953	5,246	5,880	6,413	7,095	44,760	60,117
State government	2611	2537	9886	11,704	10,182	10,971	67	64	401	(D)	425	(D)	9,707	10,940
Local government	8846	10006	58222	69,260	64,202	76,840	755	889	4,845	(D)	5,988	(D)	35,053	49,177

Notes: (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
Source: Bureau of Economic Analysis, Regional Economic Information System, Table CA25, May 2003.

finance, insurance, and real estate; and wholesale trade. Nonfarm personal income comprises over 95 percent of total income for all three counties. Agricultural services earnings as a percentage of nonfarm earnings, however, are greatest in Imperial County (about 8 percent) as compared to Riverside and San Bernardino counties where the contributions are 2 and 0.66 percent, respectively.

Nevada

Full- and part-time employment in Clark County increased from 617,216 jobs in 1995 to 866,758 jobs in 2000, an increase of 269,542 jobs (approximately 31 percent). Employment in all sectors of the regional economy increased, with the exception of the military sector, which declined by about 2 percent. The sectors that increased at the greatest rate were finance, insurance, and real estate, which increased by over 84 percent; agricultural services, fishing, and forestry, which increased by 57 percent; and transportation and public utilities, which increased by 51 percent. Farm employment in Clark County comprises less than 0.5 percent of total full-time and part-time employment within the county; the services industry employs almost half of the workforce. Nonfarm income comprises over 99.9 percent of the total personal income within Clark County. Earnings from agricultural services contribute less than 1 percent of the county's total nonfarm earnings. Of the total cash receipts from agricultural sales in Clark County, 66 percent are attributable to livestock and products, and 34 percent are attributable to crops. This proportion is similar to the state of Nevada as a whole. Thirty percent of total farm production expenses in the county are spent on hired farm labor, and about 15 percent are used to purchase feed. Fifty percent of the total production expenses fall in the "all other" production expenses category.

3.16.2 Environmental Consequences

Significance Criteria

The analysis of socioeconomic impacts is required by NEPA, which does not require the use of significance criteria. This analysis addresses whether the proposed action and alternatives would have substantial adverse effects to local employment levels and agricultural productivity within the planning area and surrounding communities.

Methodology

Since specific site sizes and locations are not known, the socioeconomic analysis evaluates impacts for selected quantities of land that could be converted from irrigated agricultural use to conservation areas (100 acres, 500 acres, and 1,000 acres). The corresponding number of farm workers whose labor would no longer be required is estimated, along with the reduction in the value of agricultural products that would not be produced. Each of these effects is compared to (1) the existing level of employment (both total and farm) and (2) market value of all agricultural products sold.

The potential loss of employment and value of agricultural products is estimated through the use of two ratios developed from readily available information. The first indicates the relationship between the change in the value of agricultural products and loss of agricultural

land. The second addresses the change in farm employment associated with a reduction in harvested cropland.

The first ratio describes the relationship between the total number of harvested irrigated cropland acres for each county for the year 1997 (Table 3.16-1) and the market value of crops harvested in 1997 (Table 3.16-1). To estimate the loss of value of agricultural products attributable to the proposed action, the quantity of land that is converted out of irrigated farmland (in acres) is multiplied by this ratio. The resulting value is an estimate of the potential economic loss in terms of market value for each acre of cropland taken out of production.

The second ratio relates the change in farm labor to a change in the amount of cropland harvested. The percentage of the market value of crops that is composed of labor is determined by comparing the annual expenses of hired farm labor (Table 3.16-3) to the total cash receipts from all agricultural products sold (Table 3.16-3). This percentage is applied to the value of crops harvested per acre, resulting in an estimate of the cost of labor per acre of land harvested. This is an expression of the cost of labor not expended for each acre taken out of production. Using an average wage rate for farm workers of $7.25/hour, the annual labor cost per worker (assuming full-time employment of 2,080 hours/year, is $15,080/year. Dividing the cost of labor per harvested acre by the annual cost of one farm worker results in the number of farm workers required per acre of harvested land per year.

To estimate the potential reduction in the value of agricultural products, the value of the crops harvested per acre was used to determine the total value of agricultural crops per 100, 500, and 1,000 acres. These figures were then compared to the total market value for all of the agricultural products sold in each county, resulting in the value of agricultural products as a percentage of the market value.

The results of the socioeconomic analysis for both the impact to employment and to the economy in terms of market values are displayed in Table 3.16-4.

The potential loss of property taxes was assessed qualitatively.

3.16.2.1 Alternative 1: Proposed Conservation Plan

Impacts

Impact SOC-1: Agricultural jobs would be lost if agricultural land were converted to conservation areas. Table 3.16-4 presents values that represent the likely impacts (to employment) associated with the voluntary conversion of varying amounts of irrigated agricultural land. (Note that this table contains information for Clark County. No impacts would occur in this county under the proposed action since no agricultural lands are present in Reaches 1 and 2 of the LCR. Clark County information is included in this table because it is relevant to Alternative 4 since the Virgin/Muddy rivers off-site conservation area is in this county.) Depending upon the county in which the conversion takes place, the reduction in farm employment could range from a low of 18 agricultural laborers (per 1,000 acres of converted farmland) in Mojave County, Arizona to a high of 124 workers (per 1,000 acres of converted farmland) in San Bernardino County, California. The agricultural sector of the economy is most

Table 3.16-3. Farm Income and Expenses (thousands of dollars)

	California						Arizona						Nevada	
	IMPERIAL		RIVERSIDE		SAN BERNARDINO		LA PAZ		MOHAVE		YUMA		CLARK	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
Total cash receipts from marketings	1,030,857	894,648	1,179,532	1,078,471	613,739	614,706	65,451	101,263	12,624	13,969	840,564	780,126	18,886	20,310
Cash receipts: livestock and products	261,870	253,267	488,947	415,496	550,118	530,271	390	418	4,372	10,040	138,899	148,152	14,669	13,408
Cash receipts: crops	768,987	641,381	690,585	662,975	63,621	84,433	65,061	100,845	8,252	3,929	701,665	631,974	4,217	6,902
Other income	24,679	41,193	28,001	36,783	11,691	16,889	6,430	15,242	4,281	7,292	15,961	32,239	1,708	2,400
Govt. payments	1,032	10,006	994	7,389	652	4,899	238	5,789	224	1,279	793	8,100	(L)	66
Imputed and misc. income received	23,647	31,187	27,007	29,394	11,039	11,990	6,192	9,453	4,057	6,013	15,168	24,139	1,677	2,334
Total production expenses	708,542	788,551	929,065	1,068,665	559,313	600,209	63,924	106,561	21,803	21,160	496,218	610,886	19,324	21,175
Feed purchased	82,002	88,224	185,783	225,038	223,060	251,018	69	56	1,339	1,14	21,474	21,820	3,501	3,194
Livestock purchased	104,567	102,110	49,641	40,516	46,135	39,178	(L)	(L)	303	1,412	55,994	87,265	798	497
Seed purchased	19,805	28,646	16,670	25,324	3,607	5,803	1,465	2,526	223	259	15,482	22,732	104	133
Fertilizer and lime (incl. Ag. chem.. 1078-fwd.)[1]	72,514	74,492	50,599	52,936	4,099	4,008	8,411	12,382	1246	989	46,152	48,876	259	351

Table 3.16-3. Farm Income and Expenses (thousands of dollars) (Continued)

	California						*Arizona*						*Nevada*	
	IMPERIAL		RIVERSIDE		SAN BERNARDINO		LA PAZ		MOHAVE		YUMA		CLARK	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
Petroleum products purchased	13,246	19,771	11,519	16,770	4,808	6,388	1,693	3,326	925	1,355	9,364	15,014	261	396
Hired farm labor expenses	173,465	205,621	220,362	270,766	74,096	93,962	30,964	54578	3,947	3,526	147,200	179,919	4,525	6,460
All other production expenses	242,943	269,687	394,491	437,315	203,508	199852	21,317	33,689	13,820	12,405	200,552	235,260	9,876	10,144
Total cash receipts and other income	1,055,536	935,841	1,207,533	1,115,254	625430	631595	71,881	116,505	16,905	21,261	856,525	812,365	20,594	22,710
less: Total production expenses	708,542	788,551	929,065	1,068,665	559,313	600,209	63,924	106,561	21,803	21,160	496,218	610,886	19,324	21,175
Realized net income	346,994	147,290	278,468	46,589	66,117	31,386	7,957	9,944	-4898	101	360,307	201,479	1,270	1,535
plus: Value of inventory change	-778	874	-2,551	-1,337	-2250	1,514	2,616	2,512	480	520	1,911	1,879	78	56
Total net income including corporate farms	346,216	148,164	275,917	45,252	63,867	32,900	10,573	12,456	-4418	621	362,218	203,358	1,348	1,591
less: Net income of corporate farms	44,534	80,632	25,491	15,544	569	843	517	5,705	-1,358	(L)	52,981	130,127	364	556
plus: statistical adjustment	(L)	(L)	(L)	(L)	0	(L)	0	0	0	0	(L)	(L)	0	0

Table 3.16-3. Farm Income and Expenses (thousands of dollars) (Continued)

	California						*Arizona*						*Nevada*	
	IMPERIAL		RIVERSIDE		SAN BERNARDINO		LA PAZ		MOHAVE		YUMA		CLARK	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
Total net farm proprietors' income	301,681	67,534	250,425	29,710	63,298	32,058	10,056	6,751	-3,060	652	309,236	73,233	984	1,035
plus: Farm wages and perquisites	72,855	91,526	134,801	165,979	62,414	74,880	15,025	7,720	3,041	2,822	61,105	78,210	2,549	5,199
plus: Farm other labor income	7,452	8,617	13,900	15,750	6,080	6,413	893	358	200	144	4,072	4,262	97	179
Total farm labor and proprietors' income	381,988	167,677	399,126	211,439	131,792	113,351	25,974	14,829	181	3,618	374,413	155,705	4,630	6,413

Notes: (1) Fertilizer and lime are expenditures on fertilizer and lime by all farms during a given calendar year. After 1977, this estimate includes expenditures on agricultural chemicals (pesticides), as well.
(L) Less than $50,000, but the estimates for this item are included in the totals.
Source: Bureau of Economic Analysis, Regional Economic Information System, Table CA45, May 2003.

Table 3.16-4. Impacts, by Size of Agricultural Conversion, to Employment and the Value of Agricultural Sales

COUNTY	*La Paz, Arizona*	*Mohave, Arizona*	*Yuma, Arizona*	*Imperial, California*	*Riverside, California*	*San Bernardino, California*	*Clark, Nevada*[a]
REDUCTION IN NUMBER OF FARM WORKERS							
100 acres	3.1	1.8	4.3	2.5	5.9	12.4	11.1
500 acres	15.5	9.0	21.5	12.5	29.5	62.0	55.5
1,000 acres	31.0	18.0	43	25.0	59.0	124.0	111.0
REDUCTION IN NUMBER OF FARM WORKERS AS PERCENT OF TOTAL EMPLOYMENT							
100 acres	0.04%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
500 acres	0.22%	0.02%	0.03%	0.02%	0.01%	0.01%	0.01%
1,000 acres	0.43%	0.04%	0.07%	0.04%	0.01%	0.02%	0.02%
REDUCTION IN NUMBER OF FARM WORKERS AS PERCENT OF FARM EMPLOYMENT							
100 acres	0.68%	0.51%	0.13%	0.06%	0.05%	0.26%	3.26%
500 acres	3.42%	2.53%	0.64%	0.28%	0.26%	1.29%	16.28%
1,000 acres	6.84%	5.06%	1.28%	0.55%	0.53%	2.58%	32.55%
REDUCTION IN VALUE OF AGRICULTURAL PRODUCTS SOLD							
1,000 acres	$938,810	$1,242,370	$2,671,550	$1,963,240	$4,267,840	$15,624,330	$5,556,660
REDUCTION IN VALUE OF AGRICULTURAL PRODUCTS SOLD AS PERCENT OF TOTAL MARKET VALUE							
1,000 acres	0.99%	8.29%	0.51%	0.23%	0.41%	2.53%	29.36%

Notes: a Impacts to Clark County would not occur under the proposed action. Information is included in this table because it is relevant to Alternative 4.

important in La Paz, Mojave, Yuma, and Imperial counties, where the average value is just under 30 workers per 1,000 acres of converted farmland. It is estimated that, on average, there would be a reduction of just under 30 workers for every 1,000 acres of farmland that is taken out of irrigated agricultural use. Losses of this magnitude represent extremely small shares (less than 1 percent) of total employment in the respective counties. The average reduction in farm employment in the representative counties would be 3.4 percent. Because this is a programmatic document, impacts to specific communities are not identifiable, but they would be considered during the site-selection process. Impacts to individual communities would be

minimized because of the need to disperse conservation areas along the LCR to meet the habitat needs of the covered species.

Impact SOC-2: Agriculture-related revenue would be lost if agricultural land were converted to conservation areas. Based on the conversion of 1,000 acres from agricultural use, it is estimated that the reduction in the value of agricultural products sold would range from just under $940,000 to over $15,624,000. Values for the most representative counties average about $1.7 million. When such potential losses are compared to existing levels of total value of all agricultural products sold in each of the four representative counties (La Paz, Mojave, Yuma, and Imperial) the reduction averages 2.5 percent (Table 3.16-4). Because this is a programmatic document, impacts to specific communities are not identifiable, but they would be considered during the site-selection process. Impacts to individual communities would be minimized because of the need to disperse conservation areas along the LCR to meet the habitat needs of the covered species. Individual landowners would not experience adverse economic impacts since privately owned land used for LCR MSCP purposes would be acquired or leased only on a voluntary basis, and landowners would receive compensation.

Impact SOC-3: Local property tax revenues could be reduced if privately owned land were leased or acquired by the Federal or state participants in the LCR MSCP. The LCR MSCP participants would either lease tribal land, acquire or lease private land, or use public land for conservation area establishment and the construction of field facilities. If tribal land were leased, no changes in property tax liability would occur, because Indian tribes do not pay local property taxes. If private land were leased, taxes would continue to be paid by the property owner, but they could decrease if the land were reassessed at a lower value resulting from the change in use to a wildlife conservation area. The amount of land potentially involved would be relatively small compared to the total amount of harvested cropland available in the region, however, and tax revenues derived from agricultural lands are typically small compared to revenues derived from land supporting higher levels of development such as urban and community uses. Additionally, as noted under **Impacts SOC-1 and SOC-2**, conservation would not be concentrated in one area, thus diminishing impacts to any particular area. If publicly owned land were used, no changes in local property taxes would occur since government entities do not pay such taxes.

Impact SOC-4: Local sales tax from the purchase of products related to agricultural uses would be reduced if privately owned agricultural land were placed in public ownership. Sales tax revenues would decrease along with agricultural output if agricultural land were converted to conservation areas with other land cover types, but this decrease would be small when compared to total sales taxes in any of the counties and would not have an impact to the overall economy. Sales taxes would be reduced if the land was leased as well as purchased.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.16.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.16.2.4 below), as well as along the LCR. **Impacts SOC-1, SOC-2, SOC-3,** and **SOC-4** apply to this alternative. To the extent that the agencies undertaking the covered activities proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species would not be included. This would also likely result in a smaller amount of conservation area being established. It is estimated that the no action alternative would develop fewer acres of conservation area than the proposed action, which would result in proportionately fewer socioeconomic impacts. The same types of impacts would occur as described for the proposed action, but the overall magnitude would be lessened since a smaller area would be affected.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.16.2.3 Alternative 3: Listed Species Only

Impacts

Impacts SOC-1, SOC-2, SOC-3, and **SOC-4** apply to this alternative, although a smaller amount of conservation area would be developed than under the proposed action. Under a worst-case scenario that assumes that all conservation areas would be established on agricultural land, impacts to socioeconomic resources would be less than under the proposed action, because less conversion of agricultural land would be required.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.16.2.4 Alternative 4: Off-Site Conservation

Impacts

Impacts SOC-1, SOC-2, SOC-3, and **SOC-4** apply to this alternative. Under this alternative, a total of 7,772 acres of conservation area would be established within the off-site conservation areas. Assuming that the conservation area would be evenly divided among the three off-site areas, approximately 2,590 acres would be established in each. Impacts to socioeconomic resources would affect Clark County, Nevada, and Yuma and Mohave counties in Arizona, along with towns and cities located in and near the off-site conservation areas. Impacts would be reduced in proportion to the amount of agricultural land converted to conservation area. The impacts associated with the establishment of 360 acres of backwaters would be identical to those of the proposed action for this component of the Conservation Plan since they would be located within the planning area.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

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3.17 TOPOGRAPHY, GEOLOGY, SOILS, AND MINERAL RESOURCES

This section focuses on erosional impacts from construction of the habitat conservation measures. The conservation measures would be implemented within the historic floodplain of the LCR or its tributaries, where the topography is generally flat-lying. Project grading, excavating, and dredging would not substantially alter the topography of the floodplain because it would only be altered enough to establish land cover types in the conservation areas and build roadways. Therefore, topographic impacts are not discussed in the following section. Similarly, construction would be limited to two prefabricated field offices, fish-rearing facilities, and miscellaneous water conveyance structures (e.g., pipelines). These structures would be constructed in accordance with seismic standards established in the Uniform Building Code; thus, potentially severe earthquake-induced ground motion would have minimal impacts on these components of the project. Therefore, seismic impacts are not discussed in the following section. Impacts to mineral resources also are not discussed because implementation of the proposed action would not interfere with any existing or foreseeable mineral extraction operations. The primary mineral resource of commercial importance in the vicinity of the LCR and its tributaries is crushed stone aggregate. Sources of this mineral are typically bedrock areas of high relief and minimal floodplain development, which are unfavorable for conservation area establishment.

3.17.1 Affected Environment

3.17.1.1 Lower Colorado River

Topography, Geology, and Soils

The LCR area of Arizona, Nevada, and California is located in the lower portion of the Basin and Range geomorphic province, within the western Sonoran Desert. This area is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys or basins. The basins are composed of silt-filled channels and alluvial fans, fan terraces, and floodplains, consisting of Quaternary sand, gravel, and conglomerate. Limited soil horizon development indicates young, unstable alluvial and floodplain surfaces of late Holocene age, subject to periodic flooding, sedimentation, and dynamic alteration.

The LCR generally consists of narrow stretches confined by resistant bedrock cliffs and bluffs and broad areas lined by low-lying alluvial floodplains. The bedrock areas generally lack organic soil development and would likely not be suitable for conservation area vegetation establishment activities. However, alluvial floodplain areas are generally mantled by soil profiles sufficient to support agricultural activities (USDA Soil Conservation Service 1974, 1986). Therefore, conservation area establishment activities would also likely be most appropriate in these areas.

The active floodplain is bounded by steep, active slopes (escarpments), active sand dunes, and washes (arroyos). The floodplain has low relief and includes the stream channel and associated features such as point bars and abandoned channels or meanders. Sand splays, point bars, and meander scrolls are typically underlain by coarse-grained alluvium, whereas broad shallow channels and backswamps are more clay-rich (Parsons et al. 1986).

The soils on the Colorado River floodplain are saline. The salinity is the result of accumulated salts from alluvial deposits and subsequent evaporation of soil moisture. The rainfall is not sufficient to leach these salts below the plant root zone; therefore, a continuing accumulation of salts occurs. These salts are primarily calcium, sodium, magnesium, chloride, and sulfate. An excessive amount of toxic salts in the soil can delay or prevent seed germination, decrease available water capacity, interfere with plant growth, and impede the movement of air and water through the soil. Intensive management is required to minimize salinity to levels that do not inhibit plant growth (USDA Soil Conservation Service 1986).

3.17.1.2 Muddy River/Moapa Valley and Virgin River

From the Overton Arm of Lake Mead, the Muddy River trends northwest through alternating areas of relatively flat-lying, alluvial-filled valleys and steeper topography of the North Muddy Mountains, which are underlain by sedimentary and volcanic strata (Nevada Bureau of Mines and Geology [NBMG] 1978). From the Overton Arm of Lake Mead, the Virgin River trends north-northeast through the Virgin Valley, located between the Mormon Mesa to the west and Black Ridge to the east. This valley gradually broadens toward the northeast. Sedimentary rocks underlie the Mormon Mesa and metamorphic rocks underlie the Black Ridge. Quaternary alluvium underlies the floor of the Virgin Valley, immediately adjacent to the river (NBMG 1978). Soils overlying the low-lying, alluvial fans and floodplains in the Lake Mead area generally consist of deep, medium- to coarse-textured, nearly level to gently sloping soils. Soils in the steeper bedrock areas generally consist of shallow, gravelly and cobbly, moderately sloping to very steep soils (USDA Soil Conservation Service 1975).

3.17.1.3 Bill Williams River

Eastward from the Colorado River, the Bill Williams River traverses the Bill Williams Mountains, the southern portion of the Castaneda Basin, and then forms the boundary between the Rawhide Mountains to the north and the Buckskin Mountains to the south. Along the western stretch of the river, the Bill Williams Mountains are composed of metamorphic, sedimentary, and volcanic rocks. The Castaneda Basin is underlain by sandstone and conglomerate, which form high rounded hills and ridges. The eastern stretch of the Bill Williams River, through the Rawhide and Buckskin mountains, are similarly composed of metamorphic, sedimentary, and volcanic rocks (Arizona Geological Survey [AGS] 2000). Soils along the mountainous portions of the river consist primarily of shallow, gravelly and cobbly, moderately coarse to moderately fine-textured, gently sloping to very steep soils and rock outcrop on hills and mountains. The portion of the river that traverses the Castaneda Basin are composed of deep, medium-textured, limy and gravelly, moderately coarse- and coarse-textured, nearly level to moderately sloping soils on floodplains and dissected alluvial surfaces (USDA Soil Conservation Service 1975).

3.17.1.4 Lower Gila River

Eastward from the Colorado River, the lower Gila River traverses a gap through a narrow band of northwest-trending mountains, composed of the Gila Mountains to the south and the Laguna Mountains to the north, and then trends south of the Muggins Mountains, through the broad, flat-lying Dome and Mohawk valleys. The northwest trending Mohawk Mountains terminate just south of the river in the eastern Mohawk Valley. Sedimentary rocks are present along the

river through the short section between the Gila and Laguna mountains, as well as at the north end of the Mohawk Mountains. The portion of the river traversing the Dome and Mohawk valleys is underlain by river alluvium, consisting primarily of unconsolidated to weakly consolidated sand and gravel in river channels and sand, silt, and clay on floodplains (AGS 2000). Soils along this section of the lower Gila River primarily consist of deep, stratified, coarse- to fine-textured nearly level to gently sloping soils on floodplains and lower alluvial fans (USDA Soil Conservation Service 1975).

3.17.2 Environmental Consequences

Significance Criteria

The project would have a significant impact on geology, soils, and minerals if it would result in substantial soil erosion or the loss of topsoil.

3.17.2.1 Alternative 1: Proposed Conservation Plan

Impacts

Impact GEO-1: Activities associated with conservation area establishment could result in erosion-induced siltation of the Colorado River. Conservation area establishment would include such actions as clearing vegetation, grading, excavating, dredging, stockpiling soil, construction/modification of supply canals, berm construction, and swale construction. Each of these activities could result in increased soil erosion and associated sedimentation of the Colorado River, which in turn, would result in adverse water quality impacts. Less clearing and grading would be required if agricultural land were used instead of undeveloped land; erosion-induced siltation could occur, however, just to a lesser extent. Standard BMPs have been included as part of the proposed action (refer to section 3.0), and could include construction of silt fences, revegetation, minimization of grading (to the extent possible), construction of surface water velocity reducers, and installation of erosion control barriers around stockpiled soil. Given the implementation of these BMPs, impacts would be *less than significant* since substantial soil erosion and loss of topsoil would not occur.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.17.2.2 Alternative 2: No Action Alternative

Under the no action alternative, it is likely that conservation measures similar to those included in the proposed action would be implemented since compliance with the ESA still would be required for the covered activities, although some conservation could occur in the off-site conservation areas (as described in section 3.17.2.4 below), as well as along the LCR. **Impact GEO-1** applies to Alternative 2. To the extent that the agencies undertaking the covered

activities proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species would not be included. This would likely result in a smaller amount of conservation area being established and proportionately lessened impacts related to erosion-induced siltation.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.17.2.3 Alternative 3: Listed Species Only

Impacts

Impact GEO-1 applies to Alternative 3. The same types of impacts would occur as described for the proposed action, but the overall magnitude would be lessened proportionately since less construction would occur.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.17.2.4 Alternative 4: Off-Site Conservation

Impacts

Impact GEO-1 generally applies to this alternative. This impact would be substantially the same as described for the proposed action (*less than significant*) since the same overall amount of conservation area would be established. Impacts from the establishment of cottonwood-willow, honey mesquite, and marsh would occur along the Muddy/Virgin, Bill Williams, and lower Gila rivers. To the extent that impacts would result from backwater creation, they would occur in the planning area under this alternative, as well as under the proposed action.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

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3.18 TRANSBOUNDARY IMPACTS

The body of NEPA law directs Federal agencies to analyze the reasonably foreseeable consequences of proposed actions, regardless of where impacts might occur. Based on this, the CEQ, in a July 1, 1997 memorandum to heads of agencies, determined that NEPA requires agencies to include analysis of reasonably foreseeable transboundary effects in their analysis of proposed actions in the United States. The CEQ further states that such effects are best identified during the scoping stage, and should be analyzed to the best of the agency's ability using reasonably available information. Such analysis should be included in the environmental documentation for the proposed action (CEQ 1997). The CEQ policy has been incorporated into DOI's Environmental Statement Memorandum 97-2.

The transboundary impacts analysis addresses impacts to environmental resources in Mexico, as well as United States' treaty obligations and other agreements with Mexico.

3.18.1 Affected Environment

As illustrated in Figure 3.18-1, from Morelos Diversion Dam (RM 22.1) at the NIB (the California-Mexico border), the Colorado River flows southwesterly, roughly paralleling the Limitrophe section of the Arizona-Mexico border. After passing the SIB (the Arizona-Mexico border), the river flows southwest and receives tributary flows from the Rio Hardy before draining into the Sea of Cortez (also called the Gulf of California).

3.18.1.1 Environmental Resources

Impacts from construction-related activities in Reach 7 could affect environmental resources in Mexico. Because construction impacts would be localized, only the areas immediately adjacent to Reach 7, the Mexicali Valley in Baja California and the San Luís Río Colorado Valley in Sonora, are discussed. The Mexicali and San Luís Río Colorado valleys are generally in agricultural use and contain a few scattered rural residences. No residences appear to be present in the area immediately adjacent to the LCR where conservation measures would be implemented. The only urban areas sufficiently close to be affected by construction activities are the city of Algodones, which is located adjacent to the Colorado River just south of the NIB, and the city of San Luís Río Colorado, which is located just south of the Arizona-Sonora Border, immediately east of the river.

Air quality within the Reach 7 area is generally good, but the Yuma area was determined to be in non-attainment of the NAAQS for PM_{10} in November 1990. The area has not violated the NAAQS since 1991. Contributors to PM_{10} include agricultural activities, prescribed burning, unpaved roads, general construction activities, and various other sources.

Flows in Reach 7 vary. At times the lower part of this reach is dry. Cohen and Henges-Jeck (2000) reported average total flows in this reach of 22,000 af in non-flood years and 2,120,000 af in flood years. These flows are the result of seepage from Morelos Diversion Dam, flow releases from Morelos Diversion Dam (flood flows and excess water not diverted by Mexico), irrigation return flows from Mexico, canal wasteways in the United States, and groundwater accumulation from both the United States and Mexico. Figure 3.18-2 shows monthly average

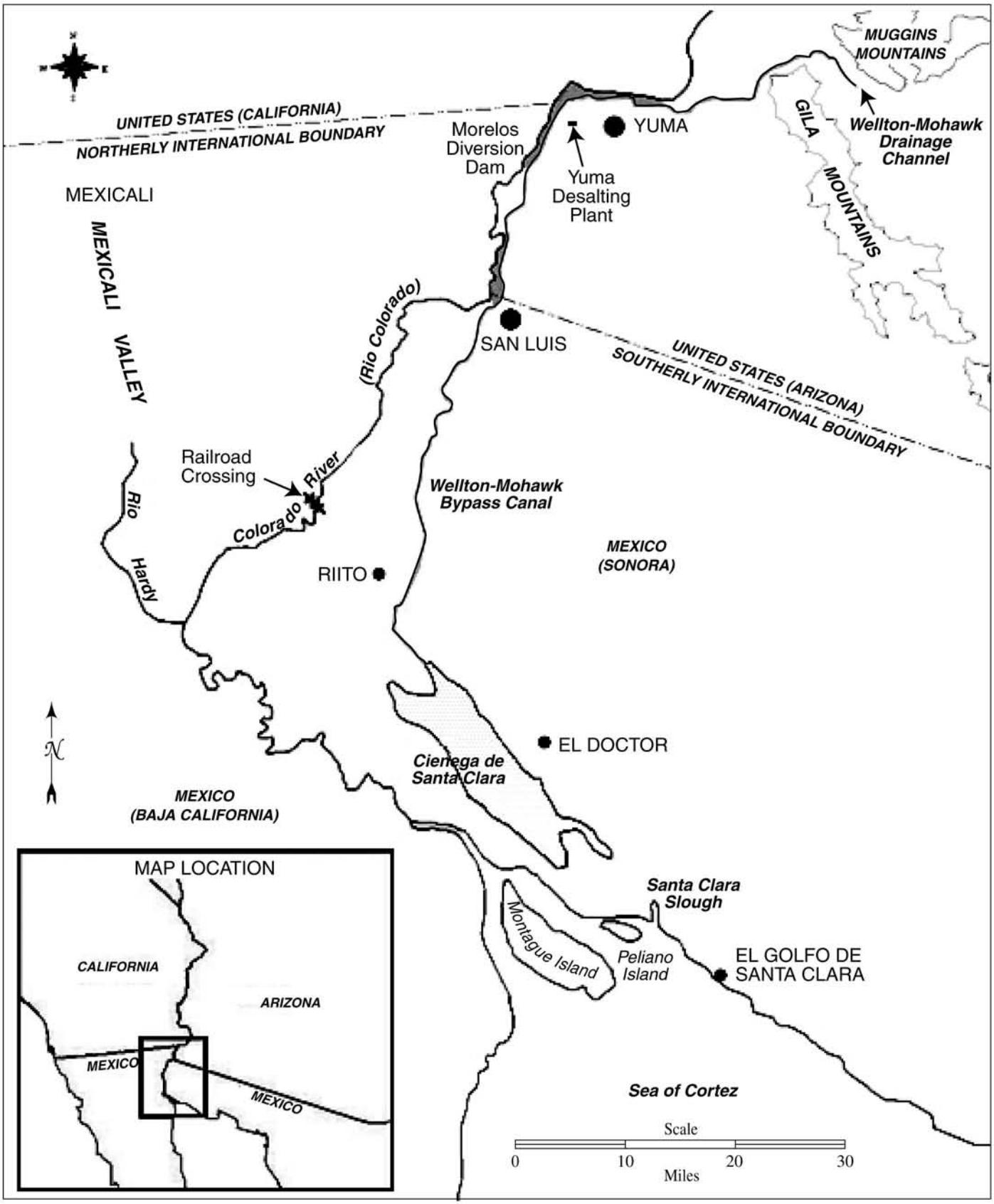

Figure 3.18-1. Colorado River Location Within Mexico

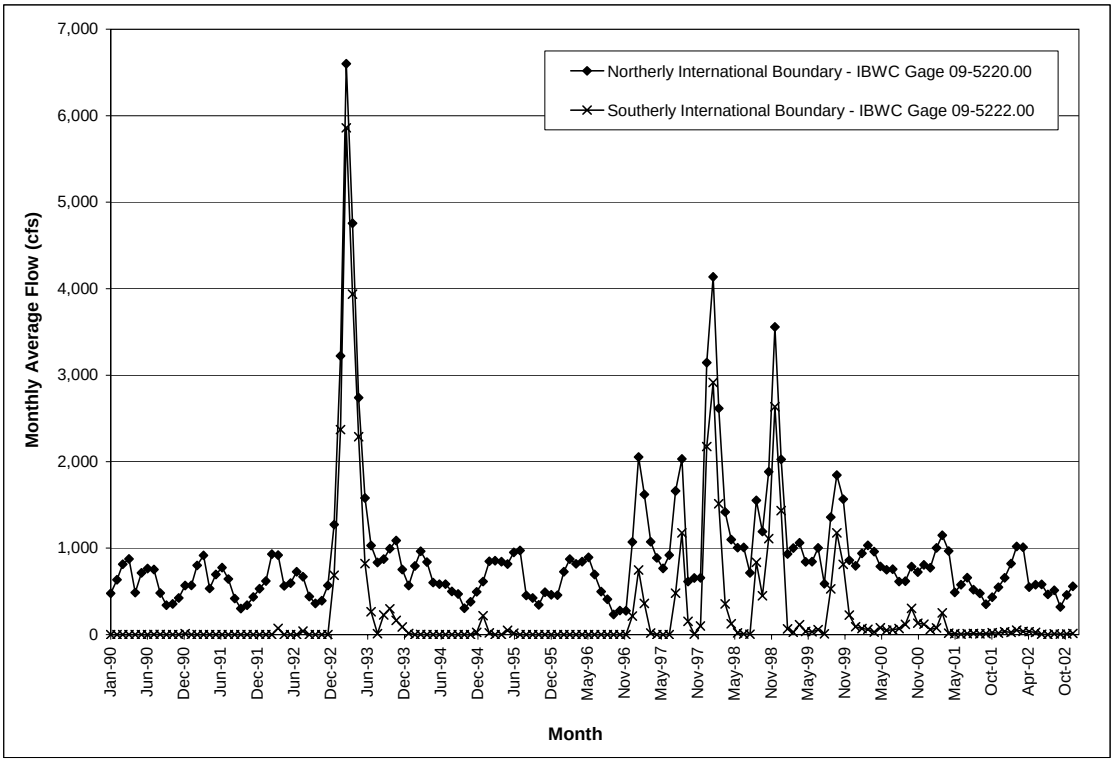

Figure 3.18-2. Monthly Average Colorado River Flows at the NIB and SIB

flows at the NIB and SIB from 1990 to 2002. These flows are recorded and reported by the IBWC (2003). Water quality immediately below Morelos Diversion Dam meets the standards required by USIBWC Minute No. 242 of the 1944 Water Treaty, and likely deteriorates to some degree further downstream depending on flows.

The Comisíon Nacional del Agua is the Federal agency that defines and administers water policy in Mexico, including overseeing the operation, maintenance of delivery canals and drainage systems and the allocation and management of all waters that belong to the nation (Clark et. al. 2001). The Mexicali and San Luís Río Colorado valleys are within the Colorado River Irrigation District Number 14. The irrigation district obtains its supply from the Colorado River and groundwater. Although irrigation accounts for the majority of the water used in the district, the district does provide water to municipal and industrial users in Mexicali, Tecate, Tijuana, Ensenada, and San Luís Río Colorado (Clark et. al. 2001). The Colorado River Irrigation District Number 14 contains 23 irrigation modules. The irrigation modules have the local governing responsibility for water management along with the operation and maintenance of distribution canals (Clark et al. 2001).

3.18.1.2 United States' 1944 Water Treaty Obligation

Flows in the reach of the Colorado River below Imperial Dam are primarily water to be delivered to Mexico in accordance with the 1944 Water Treaty. Under Article 10(a) of the treaty, Mexico is allotted a guaranteed annual amount of 1.5 maf of Colorado River water. Under

Article 10(b) of the treaty, Mexico may schedule up to an additional 0.2 maf when "there exists a surplus of waters of the Colorado River in excess of the amount necessary to satisfy uses in the United States." Under current practice, this 0.2 maf is available to Mexico when flood control releases are made, and is scheduled for delivery throughout the year in accordance with Article 15 of the 1944 Water Treaty. Additionally, under Article 10(b) of the treaty, Mexico was allotted "any other quantities arriving at the Mexican points of diversion." These flows are generally referred to as "excess flows" and are over and above the 1.5 maf (or 1.7 maf) delivery to Mexico under the 1944 Water Treaty. Excess flows are primarily a result of (1) operational activities upstream (e.g., canceled water orders in the United States, maintenance activities, etc.), (2) a Gila River flood event, or (3) flood control releases along the mainstream of the Colorado River. Article 10(b) also stipulates that in the event of an extraordinary drought or serious accident to the irrigation system of the United States, water allotted to Mexico can be reduced in the same proportion as consumptive uses in the United States are reduced. The United States has met the 1944 Water Treaty obligations every year.

Per USIBWC Minute 242 of the 1944 Water Treaty, the United States must deliver water to Mexico with an average annual salinity concentration no greater than 115 ppm +/- 30 ppm over the average annual salinity concentration of the Colorado River at Imperial Dam. Thus, an increase in salinity at Imperial Dam directly translates to an allowable increase in salinity of water delivered to Mexico and an increase in salinity of water flowing past Morelos Diversion Dam. The United States has met the water quality obligations every year.

The waters of the Colorado River, once delivered to Mexico, are under the jurisdiction of Mexico. The 1944 Water Treaty contains no provisions requiring Mexico to provide water for environmental protection, nor any requirements relating to Mexico's use of that water[1]. As flows arrive at Morelos Diversion Dam, Mexico has the discretion to divert more water than its allocation or allow all the additional flows to pass downstream of Morelos Diversion Dam. In the past, Mexico has generally chosen to increase its diversion for use in agriculture for increased crop production and soil salinity improvement, or for diluting flows delivered at the SIB, municipal industrial uses, or to recharge groundwater aquifers in the Mexicali Valley (USBR 2001a).

Various other agreements including, although not limited to, Minutes of the 1944 Water Treaty and other treaties with Mexico (such as the 1970 Boundary Treaty) define the United States responsibility for Colorado River water deliveries, water quality, and river and levee maintenance.

3.18.2 Environmental Consequences

The analysis of transboundary impacts is required by NEPA, which does not require the use of significance criteria. This analysis addresses whether construction and operation of the proposed action would have substantial adverse effects on environmental resources in Mexico.

1 In December 2000, the governments of the United States and Mexico, through Minute 306 of the 1944 Water Treaty agreed to (1) develop joint studies that include possible approaches to ensure use of water for ecological purposes on the Colorado River below the NIB; and (2) through a binational technical task force, to examine the effect of flows on the existing riparian and estuarine ecology of the Colorado River from the NIB to the delta with a focus on defining the habitat needs of fish, and marine and wildlife species of concern to each country.

In addition, it addresses whether the proposed action would have substantial adverse effects to the United States' treaty obligations or other agreements with Mexico where important resources in Mexico would be affected.

3.18.2.1 Alternative 1: Proposed Conservation Plan

Impacts

ENVIRONMENTAL IMPACTS

No construction would occur in Mexico; therefore, direct impacts such as those associated with the conversion of agricultural land to conservation areas, the loss or alteration of existing habitat, and impacts to cultural resources would not occur. Substantial adverse noise impacts would not occur since the area adjacent to the LCR is used for agriculture and noise sensitive receptors are not present. Runoff from created/restored habitat would not alter the slopes of adjoining fields because the Colorado River is the low point between Arizona and Mexico, thus preventing water from flowing from conservation areas to Mexican fields. Other impacts, such as erosion-induced siltation, accidental spills, and increased risk of wildfires and vectors would be minor and localized and would not adversely affect Mexico. The water supply for the proposed action would be obtained through a contract with an existing water purveyor, or purchase or transfer from existing Colorado River water users in the United States and would not affect Mexico's Colorado River supply. Air emissions from construction activities could affect Mexico, as described below.

Impact TRANS-1: PM_{10} and combustive emissions from the construction and maintenance of created conservation areas in Reach 7 could disperse to Mexico. As described in section 3.3, construction activities and periodic prescribed burns would produce temporary fugitive dust emissions and intermittent combustive emissions. These air emissions would last only for the duration of the construction or maintenance activity and would dissipate as the distance from the construction site increased. The portion of Mexico that is near Reach 7 is in agricultural use and is sparsely populated. Thus, sensitive receptors would not be adversely affected by these air emissions. Over the long-term, to the extent that agricultural land is converted to conservation areas, emissions would be reduced since fields would no longer be plowed. The proposed action would not result in substantial adverse impacts to Mexico.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur. The implementation of **Mitigation Measures AQ-1 and AQ-2** would, however, reduce air quality impacts in Mexico.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

TREATY OBLIGATIONS

The proposed action would not affect the amount of water delivered to Mexico, nor would it conflict with the 1944 Water Treaty and related agreements. As described in section 3.14, water supply for the proposed action would be obtained through legal means consistent with the Law of the River. Because the supply would be obtained through a contract with an existing water purveyor, or purchase or transfer from existing Colorado River water users in the Untied States, and would not be an expansion of water use in the Lower Division States, excess flows and flood flows to Mexico would not be affected by the proposed action. Reclamation would continue to make deliveries to Mexico in compliance with the 1944 Water Treaty, USIBWC Minute 242 of the 1944 Water Treaty, and all other applicable agreements. The waters of the Colorado River, once delivered to Mexico, would continue to be under the jurisdiction of Mexico, and any conservation measure implemented in Reach 7 would not obligate Mexico to dedicate or deliver water for land cover type enhancement purposes, unless mutually agreed upon by both countries. Additionally, Reclamation would continue to meet the requirements of the various other agreements, treaties, and Minutes of the 1944 Water Treaty. Because the proposed action would not affect Colorado River water deliveries to Mexico, including 1944 Water Treaty flows, excess flow and flood flows, and would not otherwise change the terms of the 1944 Water Treaty, USIBWC Minute 242 of the 1944 Water Treaty, or other applicable agreements, it would not have adverse effects to the United States' treaty obligations or other agreements with Mexico where important resources in Mexico would be affected.

3.18.2.2 Alternative 2: No Action Alternative

Under Alternative 2, it is likely that conservation measures similar to those included in the proposed action would be implemented because compliance with the ESA still would be required for the covered actions, although some conservation could occur in the off-site conservation areas (as described in section 3.18.2.4 below), as well as along the LCR. To the extent that conservation was implemented in the off-site conservation areas, transboundary impacts would not occur because these sites are not sufficiently close to Mexico. To the extent that the agencies undertaking the covered actions proceed with ESA compliance through section 7 consultations instead of the section 10 permitting process, there may be a reduced number of covered species because unlisted species will not be included. This would also likely result in a smaller amount of conservation area being established, resulting in a lower likelihood of conservation measures being implemented in Reach 7. The potential for transboundary impacts would be even less than described for the proposed action.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur. The implementation of mitigation measures such as **Mitigation Measures AQ-1 and AQ-2** would, however, reduce air quality impacts in Mexico.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.18.2.3 Alternative 3: Listed Species Only

Impacts

Impact TRANS-1 applies to Alternative 3. It is estimated that Alternative 3 would develop fewer acres of conservation area than the proposed action, which generally would result in proportionately fewer air quality impacts and less potential for conservation to occur in Reach 7.

Mitigation Measures

No mitigation measures are required because substantial adverse impacts would not occur. The implementation of **Mitigation Measures AQ-1 and AQ-2** would, however, reduce air quality impacts in Mexico.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

3.18.2.4 Alternative 4: Off-Site Conservation

Impacts

No transboundary impacts would occur under Alternative 4. Construction activities would not occur in Reach 7 or in proximity to the Mexican border. As described for the proposed action, the water supply for the Conservation Plan would be obtained through a contract with an existing water purveyor, or purchase or transfer from existing Colorado River water users in the United States and would not affect Mexico's Colorado River water supply.

Mitigation Measures

No mitigation measures are required because no significant impacts would occur.

Residual Impacts

Residual impacts are those that would occur after the implementation of mitigation measures to reduce an impact. No mitigation measures are required; thus, no residual impacts would occur.

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3.19 TRANSPORTATION

The proposed action and alternatives would have only minor impacts on transportation. As described in section 3.0, only small numbers of workers would be needed to construct land cover types and related improvements (fewer than 30 at any given location). Additionally, minimal amounts of equipment would be required. Heavy equipment typically is brought to a site and remains until its task is completed. Construction would be spread out over a 20-30 year period and would occur at different locations within a large planning area. Conservation area establishment would occur in agricultural or undeveloped areas that have limited amounts of traffic. Adding the minor amounts of traffic generated by the proposed action would not affect roadway capacity, the volume-to-capacity ratio on roads, congestion at intersections, or cause inadequate emergency access.

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4.0 CUMULATIVE IMPACTS

Both NEPA and CEQA require that cumulative impacts of the proposed action in combination with other projects be addressed in an EIS/EIR.

4.1 CUMULATIVE IMPACT METHODOLOGY

This section addresses the cumulative impacts of the proposed action in combination with other projects. (The "proposed action" when used in this analysis refers to implementation of the Conservation Plan and issuance of a section 10 [a][1][B] permit by the Service.) A list approach was used to identify projects that are closely related to the proposed action (i.e., either located within or in the vicinity of the planning area and having the potential to impact common resources) that could result in cumulatively considerable impacts. Where appropriate, the analysis includes potential impacts on common resources that extend outside the planning area (e.g., transboundary impacts). Federal, state, and local agencies and tribal governments with planning and regulatory authority within or in the vicinity of the planning area were contacted to identify projects that may result in a cumulative impact. These projects then were examined for their potential to result in a cumulative impact when combined with the proposed action. In addition, future Federal and non-Federal covered activities were reviewed and included based on the criteria discussed above.

Many of the impacts of the proposed action would result from construction activities, as would many of the impacts of the other projects considered in the cumulative impact analysis. Most of the adverse construction-related impacts of the proposed action would be temporary and localized (such as impacts related to air quality, noise, erosion, and spills of hazardous materials, as well as some impacts on aesthetics, water quality, and biological resources), and individual construction sites would be dispersed over a wide geographic area. Moreover, construction would be implemented over a long period of time, as shown on Tables 2.1-8a through 2.1-8d, with relatively minor amounts of construction occurring in any given year. Thus, construction associated with the proposed action would not likely overlap in time or place with the other projects considered in the cumulative impact analysis, although this could occur.

In general, if the proposed action would result in a significant impact on a resource that also could be adversely affected by another project, the impact is considered to be a significant cumulative impact, although the potential for the combination of less than significant impacts to result in significant cumulative impacts also is considered. The proposed action would have long-term beneficial impacts on biological resources and aesthetics and thus would not contribute to a long-term cumulative adverse impact on these resources.

Section 4.2 describes the projects included in the cumulative impact analysis, the status of their environmental documentation, anticipated environmental impacts of those projects, and the potential cumulative impacts of those projects in combination with those of the proposed Conservation Plan. Section 4.3 summarizes cumulative impacts by each resource and identifies mitigation measures where appropriate. The implementation of these mitigation measures may be the responsibility of agencies other than the lead agencies for this EIS/EIR, who would adopt them as part of their own environmental review and approval processes.

4.2 ANALYSIS OF CUMULATIVE IMPACTS

This section provides an analysis of the potential cumulative impacts that would affect the present environment within, and in the vicinity of, the planning area. An overview of the present environment in the planning area, as well as the historical environmental changes, is provided in section 3.0. These changes have occurred primarily as a result of actions affecting the flow regime of the LCR (e.g., the construction of large, mainstem dams such as Hoover Dam and Glen Canyon Dam). The river is no longer free flowing and does not constitute a continuous ecosystem because of the many impoundments along its length and the hydrologic regime does not support extreme fluctuations. Moreover, the vegetation within the planning area has also changed over time with a general decline of native communities.

4.2.1 Future Covered Activities

Future Federal and non-Federal covered activities for which ESA compliance is being sought by the LCR MSCP participants (refer to section 1.2.2) were reviewed to identify those that could result in cumulative impacts; these generally were projects that would result in new construction and associated construction-related impacts, as would the proposed action, or have the potential to affect those resources that are central to the proposed action (e.g., agricultural resources and biological resources), although the change in point of diversion of up to 1.574 mafy is considered, as well.

Changes in Points of Diversion of up to 1.574 mafy of Colorado River Water

Project Description

Covered activities include the potential changes in points of diversion of up to 1.574 mafy of Colorado River water by water contractors in Arizona, California, and Nevada. Diversion changes are expected to occur in response to shifts in water demand during the 50-year term of the Conservation Plan. Neither the source nor the recipient of water that will be diverted as a result of future projects can be determined until these projects are developed. However, the LCR MSCP participants expect that there will be shifts in demand among water users within each of the Lower Basin States and between the states. Although no additional water would be diverted in a normal water year as a result of these future projects, the points of diversion would change based on demand.

Project's Environmental Analysis Status and Anticipated Impacts

Specific transfers for the entire 1.574 mafy have not been identified; therefore, the impact analysis for the changes in points of diversion is programmatic. It is anticipated that a shift in water diversion from the southern reaches of the Colorado River upstream to Lake Mead and to Lake Havasu will occur. Potential impacts could include changes in water surface elevation along the LCR where points of diversion are changed, which could result in concomitant impacts on biological resources. These actions also could result in increased water conservation on agricultural lands, including lands within the planning area. This could lead to increased short-term and long-term fallowing and the construction of on-farm conservation measures, such as canal lining and irrigation system improvements. These changes could result in impacts on agricultural resources in the event that long-term fallowing were required as well as

associated changes to socioeconomic resources (e.g., revenue, sales tax, and employment) and environmental justice (from the potential loss of agricultural jobs). Fallowing also could result in increased fugitive dust emissions. Construction of on-farm conservation measures could result in short-term impacts on air quality, geology and soils/water quality (from erosion), cultural resources, hazards, biological resources, and noise.

Cumulative Impacts with the Proposed Action

The proposed action would not change the surface water elevation of the LCR; therefore, no cumulative impacts on hydrology associated with water elevation would occur. Impacts on biological resources resulting from the changes in surface water elevation would be mitigated by the implementation of the proposed action, and a cumulative impact would not occur.

Both the proposed action and the implementation of water conservation measures, if needed, would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be *cumulatively less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and water conservation projects occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*. Fallowing associated with the changes in points of diversion also could result in increased fugitive dust emissions, but this could be offset by the proposed action, which would convert some agricultural land to other land cover types, and long-term impacts would not be cumulatively significant.

Both projects would have the potential for construction-related impacts on biological resources, but these would be *cumulatively less than significant*[1] because the impacts of both projects would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. Moreover, the water conservation projects likely would be constructed on farmland, thus minimizing the potential for impacts on biological resources.

Both projects would result in increased ambient noise levels during construction, but impacts would be considered *cumulatively less than significant* because noise impacts are highly localized, and impacts would be temporary, lasting only for the duration of the construction[2]. Both projects also would have only minor, temporary, and localized construction-related impacts on hazards, geology and soils, and water quality, and the impact on these resources would be *cumulatively less than significant*. Cumulative impacts on cultural resources could be *cumulatively significant* because construction associated with both actions could affect significant cultural resources.

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1 The proposed action could result in a significant impact on non-covered sensitive species, particularly birds, as a result of backwater creation. The anticipated schedule includes construction of only 15 acres of backwaters per year and these would be dispersed throughout Reaches 3 through 5. This impact would not in itself trigger a cumulatively significant impact unless other projects would specifically affect the same species.

2 The proposed action could result in significant long-term noise impacts from pump operations. Pumps would be located in agricultural or undeveloped areas, and it is unlikely that they would be located in the vicinity of noise-sensitive receptors; thus, the operation of individual pumps, which would have a highly localized impact, would not contribute to a long-term cumulative noise impact in combination with the other projects considered in this analysis.

Since water conservation measures likely would be implemented on agricultural lands, construction would not result in aesthetic impacts since these are typical of agricultural areas. Although the proposed action could result in temporary less than significant impacts, cumulative impacts would not occur.

Jetty Construction

Project Description

In RMs A238.5-A240.0, between nine and 21 new jetties may be constructed and are currently in the pre-design phase. Along RMs 50-260, a total of one to 20 new jetties may be constructed. These may be constructed on the LCR as needed.

Project's Environmental Analysis Status and Anticipated Impacts

The jetty projects have not yet undergone environmental review. Construction could result in temporary impacts on aesthetics, biological resources, air quality, hazards (due to the use of hazardous materials during construction), water quality (due to the use of hazardous materials during construction and turbidity resulting from construction in and near water), and geology and soils. Long-term aesthetic impacts also may occur.

Cumulative Impacts with the Proposed Action

Both the proposed action and the construction of water conservation measures would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be *cumulatively less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and jetty projects occurred at the same general time and in the same general location, and if the latter required earth-moving activities, fugitive dust emissions would be *cumulatively significant*.

Both projects would have the potential for construction-related impacts on terrestrial and aquatic biological resources, but these would be cumulatively *less than significant* because the impacts of both projects would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR.

Both projects would result in construction-related, short-term disturbances to aesthetic resources, but these would be *cumulatively less than significant* since they would be temporary and localized. Depending on their placement, the jetties could have long-term adverse aesthetic impacts, but the proposed action would have long-term beneficial impacts on aesthetics, and would not contribute to a long-term cumulative impact in combination with the jetty construction projects. The proposed action and the jetty projects would have only minor, short-term, and localized construction-related impacts on hazards, geology and soils, and water quality, and the cumulative impact would be *less than significant*.

Riparian Plant Community Rehabilitation and Restoration Projects

Project Description

Riparian plant community rehabilitation and restoration projects could be implemented on both Lake Mead and Lake Mohave. On Lake Mead, such projects would likely be restricted to the tributary confluence areas of the Virgin River, Muddy River, and Las Vegas Wash. Activities associated with these projects may include the removal of non-native saltcedar by mechanical means (e.g., chain saws or bulldozers), prescribed fire, and the use of EPA-registered herbicides. Native riparian species, including willow and cottonwood, may be planted using seed, cuttings, poles, or transplants of nursery stock. The total project area would be approximately 500 acres, and it is not anticipated that more than 20 acres would be under construction in any one year.

On Lake Mohave, a secondary objective of saltcedar removal and willow plantings would be the enhancement of aesthetics for recreation in selected areas through the creation of open shoreline or shade. Saltcedar removal for recreational purposes would be limited to specific areas; no more than 10 coves on Lake Mohave (potentially including Nevada Telephone Cove, North Telephone Cove, South Telephone Cove, Cabinsite Cove, and the boat-beaching area adjacent to the Arizona Hot Springs drainage) would be affected, and it is not expected that any areas where saltcedar would be cleared would exceed 2 acres. The total project area would be approximately 100 acres, and it is not anticipated that more than 5 acres would be under construction in any one year.

Project's Environmental Analysis Status and Anticipated Impacts

The riparian plant community rehabilitation and restoration projects have not yet undergone environmental review. Anticipated impacts include long-term beneficial impacts on recreation, aesthetics, and biological resources. Vegetation removal and replanting activities would likely result in similar impacts as the proposed action, including impacts on biological resources, fire hazards, air quality, hydrology, geology and soils, cultural resources, and noise.

Cumulative Impacts with the Proposed Action

Both the proposed action and the plant community rehabilitation and restoration projects would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be *cumulatively less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction and prescribed fires associated with the proposed action and rehabilitation and restoration projects occurred at the same general time and in the same general location, fugitive dust emissions would be *cumulatively significant*.

Both projects would have the potential for construction-related impacts on terrestrial and aquatic biological resources, but most of these would be cumulatively *less than significant* because the impacts of both projects would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. The proposed action would have less than significant or significant impacts on native common and sensitive fish species inhabiting the Virgin and Muddy rivers. Impacts on these fish could be

cumulatively significant but mitigable to less than significant if the riparian plant community rehabilitation and restoration projects were implemented along these rivers. Long-term impacts on biological resources generally would be *cumulatively beneficial* because both projects would replace non-native vegetation with native vegetation.

Significant cumulative impacts on cultural resources could occur if both projects affected significant cultural resources. All other impacts on the resources identified above would be *cumulatively less than significant* because only 25 total acres in any given year would be affected by the riparian plant community rehabilitation and restoration projects, and impacts would be localized. Long-term *cumulatively beneficial* impacts on aesthetics would occur since the proposed action would establish 8,132 acres of habitat and the Lake Mead/Lake Mohave restoration projects would restore an additional 600 total acres of vegetation.

Farmland Development/Construction of Irrigation Systems

Project Description

A number of tribal irrigation projects are planned, including the Colorado River Indian Irrigation Project (25,000 acres of potential additional irrigated land), the Fort Mojave Irrigation Project (3,745 acres of potential additional irrigated land), the Chemehuevi Irrigation Project (1,855 acres of potential additional irrigated land), a Fort Yuma Agency irrigation project that would include 600 acres of potential additional irrigated land, and a total of 500 acres of irrigated agriculture development on three Cocopah Indian Reservation sites. The projects would include the creation of lined and unlined canals and maintained roadways.

Project's Environmental Analysis Status and Anticipated Impacts

These projects have not yet undergone environmental review. Anticipated impacts of the planned irrigation projects include beneficial impacts on agriculture and construction-related impacts associated with the creation of canals and roadways, such as impacts on aesthetics, air quality, biological resources, cultural resources, hazards (due to the use of hazardous materials during construction), water quality (due to the use of hazardous materials during construction), and geology and soils.

Cumulative Impacts with the Proposed Action

Although the proposed action could result in the conversion of agricultural land to other land cover types, the tribal irrigation projects would have beneficial impacts on agriculture by increasing the amount of land in agricultural production; therefore, no adverse cumulative impacts would occur.

Both the proposed action and the tribal irrigation projects would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and tribal irrigation projects occurred at the same general time and in the same general location, fugitive dust emissions would be *cumulatively significant*.

The tribal irrigation projects could potentially convert other land cover types to agricultural land, which could result in an adverse impact on biological resources, but the proposed action would create 8,132 acres of land cover types that provide habitat for covered species. Thus, it would not contribute to a long-term cumulative impact in combination with the tribal irrigation projects.

Both the proposed action and the tribal irrigation projects would cause adverse impacts on aesthetics during construction; however, these impacts would be *cumulatively less than significant* because they would be temporary and localized. The tribal irrigation projects could result in changes to the visual character along the LCR if they converted undeveloped land to agricultural uses, but the proposed action would have long-term beneficial aesthetic impacts and would not contribute to a cumulative impact in combination with the tribal irrigation projects.

Construction-related activities would result in *cumulatively less than significant* impacts on the remaining resource areas mentioned above because they would be short-term, minor, and localized.

Yuma Area Water Resources Management Group Drainage Project

Project Description

The Yuma Area Water Resource Management Group Drainage Project is a plan by Reclamation to achieve better control of groundwater levels in the Yuma Area. This is being accomplished by increasing total drainage pumping on the Yuma Mesa and in the Yuma Valley to reduce groundwater levels in the Yuma Valley to acceptable levels of 6–8 feet below the ground surface. Under the plan, the original drainage wells have been upgraded and are being operated for a larger portion of the year, and six new drainage wells and additional groundwater monitoring wells have been installed. Once the desired groundwater levels are achieved, the drainage pumping on the Yuma Mesa and Yuma Valley will be reduced to maintain those levels in the future. It is expected that the highest drainage pumping will occur during the first 5 years after installation of the new facilities, and then the pumping will be reduced to that required to maintain the desired groundwater levels. The plan calls for increasing drainage pumping by about 40,000–50,000 af for 5 years, beginning in 2003. The drainage pumping will then be reduced to maintain those groundwater levels in the future. Of the total drainage pumping, some drainage will be discharged to the Colorado River above the NIB and some will be discharged into the Yuma Valley drainage system for delivery to Mexico at the SIB.

Project's Environmental Analysis Status and Anticipated Impacts

A Categorical Exclusion was prepared for *Repairs and Modifications to the Yuma Mesa Conduit (YMC) Drainage System* (YAO-CE No. 2001-02) on March 16, 2001 (USBR 2001b). On September 7, 2003, the Categorical Exclusion was supplemented by an analysis entitled *Effects on Riparian and Marsh Communities along the Colorado River Due to Water Table Reduction in the Yuma Valley* (USBR 2003b). The Categorical Exclusion concluded that the project would be implemented in highly disturbed areas and would not affect sensitive species or cultural resources or significantly affect other environmental resources. It also concluded that the project would help

control groundwater levels in the Yuma Valley and improve the salinity of flows into Mexico at the SIB. The Supplemental Analysis concluded that no effects to habitat or endangered or special listed species would occur as a result of the project due to careful monitoring and modification of the drainage pumping program to avoid impacts to habitat.

Cumulative Impacts with the Proposed Action

The drainage project would result in changes to groundwater levels in the Yuma Valley; the proposed action, however, would not affect this resource, and no cumulative impacts would occur.

4.2.2 Urban Development Projects

Emerald River and Associated Townhome Development

Project Description

The Emerald River project is an approximately 275-acre development project along the Colorado River in Laughlin, Nevada. The project would include a small hotel, approximately 600 residential units, and a marina in the Laughlin Bay lagoon area. A 43-unit townhome development is associated with this project and would occur on approximately 7 acres.

Project's Environmental Analysis Status and Anticipated Impacts

Environmental documentation has not been completed for this project. Part of the Major Project process for development will include submittal of a Public Facilities Needs Assessment to address issues such as transportation, flood control, fire and police protection, parks, schools, water, and sewer services. Potential environmental impacts include biological impacts in the lagoon area and construction-related impacts, such as impacts on aesthetics, air quality, hazards (due to the use of hazardous materials during construction), noise, water quality (due to the use of hazardous materials during construction), and geology and soils. Long-term transportation, public services, noise, and aesthetic impacts may also occur.

Cumulative Impacts with the Proposed Action

Both the proposed action and the Emerald River project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and Emerald River project occurred at the same general time and in the same general location, fugitive dust emissions would be *cumulatively significant*.

Both projects would have the potential for impacts on aquatic, and possibly to terrestrial biological resources, but these would be cumulatively *less than significant* because the impacts of the proposed action would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. The extent to which long-term impacts on biological resources would as a result of the Emerald River project is not known at

this time, but the long-term impacts of the proposed action would be beneficial and would not contribute to a cumulative impact in combination with the development project.

Both projects would result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. The Emerald River project would result in long-term changes to the visual character of the LCR, but the proposed action would have long-term beneficial aesthetic impacts and would not contribute to a cumulative impact in combination with the development project.

Both projects would result in increased ambient noise levels during construction, but impacts would be *cumulatively less than significant* because noise impacts are highly localized, and impacts would be temporary, lasting only for the duration of the construction. Both the proposed action and the Emerald River project likely would have only minor, short-term, and localized impacts on hazards, geology and soils, and water quality, and the impact would be *cumulatively less than significant*. The proposed action would have only negligible impacts on transportation and public services and would not contribute to a cumulative impact.

Riverfront Specific Plan #01-0001 and Tract Maps #946 and #947

Project Description

The owners of an 80-acre parcel west of the Colorado River, Rio del Sol, LLC and River Estates, are developing 34 residential lots and 9 open space lots. This site is located in Imperial County.

Project's Environmental Analysis Status and Anticipated Impacts

A Mitigated Negative Declaration was approved in February 2003. The anticipated impacts include less than significant impacts on aesthetics (due to the conversion of existing open space to developed land and the creation of a new source of light and glare); air quality (generation of dust); geology and soils (due to seismic and/or flood hazards and impacts from septic systems); hydrology and water quality (the project would change the flow of Vinagre Wash, resulting in interference with groundwater recharge, and would have water quality impacts); land use and planning (potential conflicts with habitat conservation); noise (increase in ambient noise levels); population and housing (growth inducement); public services (impacts on schools, law enforcement services, and the use of the Colorado River for recreational purposes); and recreation (impacts associated with increased usage of the Colorado River and other facilities).

Potentially significant but mitigable impacts were identified to biological resources (potential impacts on wetlands, and the project may be in southwestern willow flycatcher, Yuma clapper rail, Gila woodpecker, yellow-billed cuckoo, and desert tortoise habitat); cultural resources; hazards and hazardous materials (increased fire hazard); hydrology and water quality (the project lies within a 100-year flood zone and may alter drainage patterns); land use and planning (the proposed project may be located in southwestern willow flycatcher habitat); public services (impacts associated with fire protection); transportation and traffic (increased traffic and fire hazards); and utilities and service systems (due to the construction of new water treatment/storm water drainage facilities and impacts on landfills).

Cumulative Impacts with the Proposed Action

Both the proposed action and the Riverfront project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and Riverfront project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Both projects would result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. The Riverfront project would result in long-term changes to the visual character near the LCR, but the proposed action would have long-term beneficial aesthetic impacts and would not contribute to a cumulative impact in combination with the development project.

Both projects would have the potential for impacts on terrestrial and aquatic biological resources, but these would be cumulatively *less than significant* because the impacts of the proposed action would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. The proposed action would have long-term beneficial impacts on the biological resources that may be impacted by the Riverfront project (i.e., southwestern willow flycatcher, Yuma clapper rail, desert tortoise, Gila woodpecker, and yellow-billed cuckoo) and would not contribute to a cumulative impact in combination with the development project.

Both projects could require the use of hazardous materials. The cumulative impact would be *less than significant* because spills would be small and localized. Additionally, most construction associated with the proposed action would be located in unpopulated areas, and best management practices would be implemented to minimize the potential for accidents to occur. All spills would be cleaned up in accordance with permit conditions. Both projects would result in increased ambient noise levels during construction, but impacts would be considered *cumulatively less than significant* because noise impacts are highly localized, and impacts would be temporary, lasting only for the duration of the construction; moreover, the proposed conservation measures would not be constructed in proximity to a developed area. Cumulative impacts associated with cultural resources would be *significant* since both the proposed action and the Riverfront project would result in significant impacts on this resource.

The minor traffic impacts associated with the proposed action would be localized and would not contribute to a cumulative impact. The proposed action would have less than significant impacts on recreation, and the limited displacement of recreational uses to other areas would not result in the degradation of these areas (a relatively small area would be affected in relationship to the total area available because the planning area contains approximately 423,500 acres of recreational area and a maximum of 8,132 acres would be affected). Moreover, the proposed action would not result in increased population and would not increase the demand for recreational activities. The impact on recreation would be *cumulatively less than significant*.

The proposed action would result in minimal impacts on water treatment, storm drainage, and landfill capacity and would not contribute to a cumulative impact on these resources. The other impacts associated with the Riverfront project (i.e., on geology and soils, hydrology and water quality, population and housing, and public services) would not result in cumulative impacts in combination with the proposed action because the proposed action would not have the same types of impacts.

Palo Verde River Properties

Project Description

The Palo Verde River Properties subdivision project is an 18-parcel subdivision (12 parcels would be adjacent to the LCR) located in Imperial County. Each of the 18 lots included in the project would range in size from approximately 0.5 acre to 6 acres, and the total site is 31.7 acres. The intent of the project is to create lots for residential purposes and individual ownership along the LCR. The project would potentially include the construction of up to 18 wells and would include septic tank leach field systems.

Project's Environmental Analysis Status and Anticipated Impacts

A Mitigated Negative Declaration was completed for this project in 1991. Potential impacts were identified for the following resources: changes in population distribution; transportation (increased traffic, etc., associated with a residential area); geology and soils (primarily construction related); air quality (construction-related and potential odors from septic tanks); water resources (including changes in drainage patterns, runoff amounts, flow of groundwater and flood waters, water quality due to contamination from septic tanks, flood hazards, and water supplies); biological resources (due to clearing/grading activities and the removal of approximately 30 acres of habitat for wildlife and plants); noise (increased noise levels resulting from the development and the exposure of people to airport noise); increased light and glare; land use (conversion of undisturbed land along the LCR); aesthetics (removal of natural vegetation); hazards and hazardous materials (associated with urban areas and possible interference with emergency response plans); public services (police and fire protection, schools, access to LCR recreational areas, increased roadway maintenance, and other public services); utilities (related to septic tanks, stormwater drainage, and solid waste); human health (associated with flood hazards and flood detention areas that could be mosquito breeding grounds that could expose people to encephalitis); recreation (limitation on access to the fish and wildlife habitat along the LCR); and cultural resources (potential impacts on cultural resources associated with construction).

Cumulative Impacts with the Proposed Action

Both the proposed action and the Palo Verde River Properties subdivision would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be *cumulatively less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and subdivision occurred at the same general time and in the same general location, fugitive dust emissions would be *cumulatively significant*. The proposed action would

not result in odors and would not contribute to a cumulative impact associated with objectionable odors.

Both projects would have the potential for *impacts on* biological resources, but these would be *cumulatively less than significant* because the impacts of the proposed action would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. The subdivision project would result in long-term impacts on biological resources, but the long-term impacts of the proposed action would be beneficial and would not contribute to a cumulative impact in combination with the development project.

Both projects would result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. The subdivision project would result in long-term changes to the visual character of the LCR, but the proposed action would have long-term beneficial aesthetic impacts and would not contribute to a cumulative impact in combination with the development project.

Both projects would result in increased ambient noise levels during construction, but impacts would be *cumulatively less than significant* because noise impacts are highly localized, and impacts would be temporary, lasting only for the duration of the construction. The proposed action would not affect/change population distributions and would have minor, localized transportation impacts; thus, no cumulative impacts on these resources would occur. Both projects would have only minor, short-term, and localized impacts on geology and soils, and the impact would be *cumulatively less than significant*. The proposed action would not affect the flow of groundwater or floodwaters, and no cumulative impacts would occur. The proposed action would have only minor, short-term, and localized impacts associated with hazardous materials and water quality, and would not likely be implemented near developed areas, and the impact would be *cumulatively less than significant*.

The proposed action would have minor impacts on public services and utilities (i.e., water treatment, storm drainage, water supply, and landfill capacity) from construction and operations, and would not contribute to a cumulative impact. The proposed action would not affect emergency response plans or increase flooding risks, but would have less than significant impacts associated with fires and exposing people to vectors. The proposed action would avoid developed areas, however, and the cumulative impacts associated would be *less than significant*.

The proposed action would have less than significant impacts on recreation, and the limited displacement of recreational uses to other areas would not result in the degradation of these areas (a relatively small area would be affected in relationship to the total area available because the planning area contains approximately 423,500 acres of recreational area and a maximum of 8,132 acres would be affected. Moreover, the Palo Verde River Properties project would affect only a small area (approximately 30 acres). The impact on recreation would be *cumulatively less than significant*.

The proposed action would have significant impacts on cultural resources, and if the Palo Verde River Properties project also affected cultural resources, cumulative impacts could be cumulatively *significant*.

Blythe Mobile Home Park Solar Power Conversion

Project Description

The Blythe Mobile Home Park is located adjacent to the Colorado River south of I-10 in the City of Blythe. This project involves the conversion of buildings within the park to solar power. The completion date is scheduled for June 30, 2008 (personal communication, B. Loew 2003).

Project's Environmental Analysis Status and Anticipated Impacts

A Negative Declaration was completed for this project and no adverse environmental impacts were identified (personal communication, B. Loew 2003).

Cumulative Impacts with the Proposed Action

No cumulative impacts would result because the Blythe Mobile Home Park Solar Power Conversion project would have no adverse environmental impacts.

Riverview Estates

Project Description

The Riverview Estates project is located in the City of Blythe along the west bank of the LCR. The project is a phased 79-lot single-family residential subdivision on an approximately 50-acre site. Site grading and public improvements are under construction. In addition to the residential lots, the project would include an open space area (approximately 1 acre) that would consist of a community beach and boat launching dock. The project would also include a sand and oil interceptor to reduce the risk of hazardous waste entering the LCR in drainage waters.

Project's Environmental Analysis Status and Anticipated Impacts

A Negative Declaration was completed for this project in January 2000. Less than significant impacts were identified for aesthetics (creation of light or glare); air quality (due to construction and future project-related traffic); hydrology and water quality (alteration of drainage patterns); land use and planning (incompatibility with existing land uses in the vicinity); noise (substantial permanent and temporary/periodic increase in ambient noise levels in the project area); population and housing (growth inducement); public services (fire, police, schools, public services maintenance, and other government services); transportation and circulation (substantial increase in traffic); and utilities and service systems (require or result in the construction of new water, wastewater, or stormwater facilities).

Potentially significant impacts were identified for geology and soils (construction-related erosion); hydrology and water quality (increased runoff); and land use and planning (conflicts with existing zoning or general plan designation).

Cumulative Impacts with the Proposed Action

Cumulative construction-related impacts would not occur because the Riverview Estates project is currently under construction and would likely be completed before construction of LCR

MSCP construction projects would begin. The proposed action would not result in an increase in light and glare, would not be growth-inducing, would not affect drainage patterns, and would have only minimal traffic and public services and utilities impacts (including runoff/storm drainage); thus, cumulative impacts would not occur in combination with the proposed action. The proposed action would generally be considered a permitted use in the undeveloped and agricultural areas where it would occur, and the zoning of each potential conservation project site would be reviewed to minimize any potential land use conflicts. Thus, cumulative impacts on land use and planning would be *less than significant*.

Palo Verde Oasis

Project Description

The Palo Verde Oasis project is a 29-unit single-family residential development located in the City of Blythe. This portion of the project is the final phase of a 106-unit single-family residential development and is currently in the pre-construction phase.

Project's Environmental Analysis Status and Anticipated Impacts

A Negative Declaration was completed for the complete 106-unit project in June of 1996. Less than significant impacts were identified for noise (exposure of people to I-10 noise due to the proximity of the residential development I-10), and utilities and service systems (increased need for water treatment/sewer systems).

Cumulative Impacts with the Proposed Action

Both the proposed action and the Palo Verde Oasis subdivision would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and subdivision occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Both projects would result in increased ambient noise levels during construction, but impacts would be *cumulatively less than significant* because noise impacts are highly localized, and impacts would be temporary, lasting only for the duration of the construction. Moreover, the proposed action would avoid developed areas like the subdivision site. Cumulative impacts on utilities and service systems would not occur because the water use for the proposed action would be associated primarily with irrigation and would not require treatment. The two potential field facilities associated with the proposed action would require only minimal potable water use and therefore would not require the construction of new water treatment facilities or the expansion of existing facilities. The proposed action would also not generate wastewater except at the two potential field facilities, which would generate only minimal amounts. Thus, no cumulative impacts on existing wastewater conveyance and treatment facilities would occur.

Mayflower Park Improvements and Expansion

Project Description

The Mayflower Park Improvements and Expansion project will be located in an unincorporated area approximately 4 miles north of the City of Blythe. The project includes a total of 12 individual projects, including planning and development of the park expansion site, infrastructure improvements, lagoon improvements, and construction of new recreational buildings and restrooms on an approximately 85-acre site (of which approximately 65 acres have been purchased for the expansion). All individual projects are expected to be completed in 2008 (personal communication, B. Loew 2003).

Project's Environmental Analysis Status and Anticipated Impacts

A Mitigated Negative Declaration has been completed for this project. Anticipated environmental impacts include less than significant impacts on aesthetics (introduction of new sources of nighttime light to the area) and agricultural resources (conversion of 65 acres of Prime Farmland). Potentially significant but mitigable impacts were identified for geology and soils (liquefaction and subsidence hazards).

Cumulative Impacts with the Proposed Action

Both the proposed action and the Mayflower Park project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and Mayflower Park project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Both projects would result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. The subdivision project would result in long-term changes to the visual character of the LCR, but the proposed action would have long-term beneficial aesthetic impacts and would not contribute to a cumulative impact in combination with the development project.

Both projects would result in the conversion of Important Farmland, but impacts would be *cumulatively less than significant* since the total amount that could be affected is not substantial compared to the overall amount available in the planning area (i.e., approximately 3.7 percent of the total Important Farmland in the planning area could be affected by the two projects). The proposed action would not result in liquefaction or subsidence impacts; therefore, no cumulative impacts would occur. No other common resources would be affected by the implementation of the proposed action and the Mayflower Park Improvements and Expansion project and, therefore, no other cumulative impacts would occur.

Queshan Park Improvements

Project Description

Queshan Park is located adjacent to the Colorado River just north of I-10 in the City of Blythe. This project includes the planning, design, and construction of improvements including a boat launch, RV parking, new campsites, limited boat slips, restaurant, and lagoon improvements. The project schedule is not finalized.

Project's Environmental Analysis Status and Anticipated Impacts

The City of Blythe is the lead agency and has not yet conducted CEQA analysis on this project; therefore, the project's impacts have not been identified (personal communication, B. Loew 2003). It is anticipated that the project could result in impacts on aesthetics, air quality, water quality, biological resources, hazards related to construction activity, and geology and soils.

Cumulative Impacts with the Proposed Action

Both the proposed action and the Queshan Park project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and Queshan Park project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

The extent to which the Queshan project could affect biological resources is not known, but it is assumed it would have the potential for such impacts. Short-term impacts would be *cumulatively less than significant* because the impacts of the proposed action would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. The Queshan project could result in long-term impacts on biological resources, but the long-term impacts of the proposed action would be beneficial and would not contribute to a cumulative impact in combination with the development project.

Both projects could result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. The Queshan project could result in long-term changes to the visual character of the LCR, but the proposed action would have long-term beneficial aesthetic impacts and would not contribute to a cumulative impact in combination with the development project. Both projects likely would have only minor, short-term, and localized impacts on geology and soils, hazards, and water quality, and the cumulative impact would be *less than significant*.

Needles Highway Improvement Project

Project Description

The Needles Highway Improvement Project, which is under the jurisdiction of Caltrans (District 8-San Bernardino County), would improve the highway pavement and add passing lanes,

thereby reducing accidents caused by traffic congestion. The project would include horizontal and vertical alignment changes, including possibly bypassing a section of roadway with a separate alignment; pavement widening; passing lanes; left turn pockets as needed; shoulder widening; and pavement rehabilitation at various locations. Right-of-way would be acquired to achieve the engineered design. The comprehensive project is the complete reconstruction of 20 miles of the Needles Highway from Needles, California, to Laughlin, Nevada with a right-of-way of approximately 300 feet in width. Thus, the project area would encompass approximately 730 acres.

Project's Environmental Analysis Status and Anticipated Impacts

A draft preliminary environmental study has been prepared, as well as a draft study methodology and outline. The latest project schedule shows the completion of environmental documentation in December 2004. Depending on the alignment chosen, impacts on biological and cultural resources may occur. Biological resources that may be present in the study area include the Mojave desert tortoise, the Arizona bill's vireo, elf owl, yellow-breasted chat, Sonoran yellow warbler, Crissal thrasher, prairie falcon, Le Conte's thrasher, burrowing owls, and desert mesquite vegetation. Although the amount of habitat for each species that would be impacted has not yet been determined, the project is not expected to affect these habitats in the entire project area (personal communication, D. Clark 2004). Additionally, the preliminary environmental study has identified the potential to disrupt agricultural activities on the Fort Mojave Indian Reservation, although no Important Farmland is expected to be affected. Other anticipated impacts could include construction-related impacts such as impacts on aesthetics, air quality, water quality, hazards related to construction activity, and geology and soils. Additionally, traffic impacts during construction would be expected.

Cumulative Impacts with the Proposed Action

Both the proposed action and the Needles Highway Improvement project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable impact, from increased PM_{10} emissions, and if construction associated with the proposed action and highway improvement project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Both projects would have the potential for construction-related impacts on biological resources, but these would be *cumulatively less than significant* because the impacts would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. Both projects could result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized.

Both the proposed action and the highway improvement project would have only minor, short-term, and localized impacts on geology and soils, hazards, and water quality, and the cumulative impact would be *less than significant*. Both projects could result in significant impacts on cultural resources and the impact would, therefore, also be *cumulatively significant.* Cumulative impacts on agricultural resources would be *cumulatively less than significant* because

the highway improvement project would not result in the conversion of Important Farmland in to nonagricultural use, although it could result in some disturbance agricultural activities. The proposed action would result in only minor, localized transportation impacts would not contribute to a cumulative impact in combination with the highway improvement project.

Gateway Park

Project Description

Gateway Park is a planned recreation and historic interpretive park located in the Yuma area. The project includes 20 acres of recreational and historic interpretative park improvements using native vegetation. The project is anticipated to begin in December 2004 and completion is anticipated in December 2005. The park will use only native vegetation that should provide ancillary habitat for listed or unlisted species.

Project's Environmental Analysis Status and Anticipated Impacts

No environmental documentation has been completed for this project; however, no impacts are anticipated. Project-related improvements would occur above the ordinary high water mark and, therefore, no impacts would occur to wetlands (personal communication, M. Spriggs 2003).

Cumulative Impacts with the Proposed Action

No cumulative impacts would result from the Gateway Park project and the proposed action because no adverse impacts were identified for the Gateway Park project and it would be completed before the onset of construction activities associated with the proposed action.

Replacement of the Somerton Wastewater Treatment Facility

Project Description

The City of Somerton, Arizona is proposing to reconstruct the existing Wastewater Treatment Plant (WWTP), which is currently unable to adequately treat wastewater and has experienced recurrent NPDES permit violations. The project is also necessary to alleviate existing adverse environmental effects associated with the Somerton WWTP, which include the generation of offensive odors, and risks to human health and safety. The proposed treatment units are being designed at 0.8 million gallons per day (mgd), which allow for a 30 percent increase in flows over current conditions. However, to allow for future expansion, the headworks, pump station, and outfall will be built for approximately 1.4 mgd. Construction is scheduled to begin the first quarter of 2004 and startup of the new WWTP is anticipated for the first quarter of 2005. The project site is approximately 15 acres.

Project's Environmental Analysis Status and Anticipated Impacts

The EPA has prepared an Environmental Assessment (EA), in compliance with NEPA, that examined the potential environmental impacts of the proposed action in the United States, as well as the transboundary impacts that might occur in Mexico. The EA did not identify any significant impacts on the environment that would result from the implementation of the project. Less than significant impacts included minor impacts on wildlife due to the removal of

lagoons that would eliminate bird resting areas; temporary construction-related noise impacts; aesthetic impacts due to the construction of tanks; minor environmental justice impacts associated with increased noise levels during construction; minor increases in energy use; and minor indirect impacts relating to the support of growth.

Cumulative Impacts with the Proposed Action

No cumulative construction-related impacts would occur because construction of the WWTP would be completed prior to the onset of construction of the LCR MSCP conservation projects. The WWTP project would have long-term, less than significant impacts on aesthetics from new facilities, as well as from increased energy use during operations. It also would have indirect impacts associated with population growth. The proposed action would have beneficial long-term impacts on aesthetics, would have minimal energy demands, and would not result in population growth; thus, no cumulative impacts on these resources would occur.

Bullhead City Development Projects

Project Description

Between 90 and 100 platted and proposed residential, commercial, and other development projects could be constructed in Bullhead City, Arizona.

Project's Environmental Analysis Status and Anticipated Impacts

Environmental documentation for these projects has not been completed. Anticipated impacts of these projects include construction-related impacts such as impacts on aesthetics, biological resources, air quality, hazards (due to the use of hazardous materials during construction), water quality (due to the use of hazardous materials during construction), and geology and soils. Long-term aesthetic impacts may also occur.

Cumulative Impacts with the Proposed Action

Both the proposed action and the Bullhead City projects would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be *cumulatively less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and development projects occurred at the same general time and in the same general location, fugitive dust emissions would be *cumulatively significant*.

The extent to which the Bullhead City projects could affect biological resources is not known, but it is assumed that they would have some adverse impacts. Short-term construction-related would be *cumulatively less than significant* because the impacts of the proposed action would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. The Bullhead City projects could result in long-term impacts on biological resources, but the long-term impacts of the proposed action would be beneficial and would not contribute to a cumulative impact in combination with the development projects.

Both the proposed action and the Bullhead City projects could result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. The Bullhead City projects could result in long-term changes to the visual character of the LCR, but the proposed action would have long-term beneficial aesthetic impacts and would not contribute to a cumulative impact in combination with the development projects.

The proposed action and Bullhead City projects likely would have only minor, short-term, and localized impacts on hazards, geology and soils, and water quality, and the impact would be *cumulatively less than significant*.

4.2.3 Habitat Enhancement Projects

Mittry Lake Emergency Stabilization and Rehabilitation

Project Description

This project is an emergency stabilization and rehabilitation effort on approximately 475 acres of BLM-administered lands located within the Mittry Lake Wildlife Area, which is being undertaken in response to disturbance caused by the Mittry Lake Fire that occurred in March 2003. All efforts would occur within Yuma County, Arizona. The proposed rehabilitation includes mechanical clearing, mulching, grubbing, planting, caging, fertilizing, pruning and seeding, irrigation, herbicide application, soil analysis, and California black rail habitat improvement. The purpose of this project is to re-establish stands of cottonwood, willow, and mesquite.

Project's Environmental Analysis Status and Anticipated Impacts

A Decision Record (BLMYFO 2003a) for this project was signed in July 2003 by the BLMYFO, and is supported with the Mittry Lake Emergency Stabilization and Rehabilitation EA (BLMYFO 2003b) and Finding of No Significant Impact. The EA determined that the project would have limited impacts on recreational resources due to temporary restricted access to recreational areas (although long-term impacts would be beneficial); air quality (construction-related emissions); aesthetics (short-term, construction-related degradation of visual quality); biological resources (temporary disturbance from construction activities); water quality (increased nutrient loading to Mittry Lake); and geology and soils (erosion impacts).

Cumulative Impacts with the Proposed Action

Both the proposed action and the Mittry Lake project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be *cumulatively less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and Mittry Lake project occurred at the same general time and in the same general location, fugitive dust emissions would be *cumulatively significant*.

Both projects would result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. Both projects would have long-term beneficial aesthetic impacts through the creation or restoration of a combined total of 8,607 acres of land cover types dominated by native vegetation; thus, the long-term impacts would be *cumulatively beneficial*.

Both projects would have the potential for construction-related impacts on biological resources, but these would be *cumulatively less than significant* because the impacts would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. Both projects would have long-term beneficial impacts on biological resources through the creation or restoration of a combined total of 8,607 acres of land cover types that provide habitat for covered and non-covered species; thus, the long-term impacts would be *cumulatively beneficial*.

Both the proposed action and Mittry Lake project would have only minor, short-term, and localized impacts on water quality and geology and soils, and the impact would be *cumulatively less than significant*. The proposed action would result in the loss of access to recreational uses, but the amount of recreational area that could be removed from public use is small in comparison to the area available. The recreational impacts associated with the Mittry Lake project would be temporary, and it would have long-term beneficial impacts on recreational resources. Therefore, impacts would be *cumulatively less than significant*.

Mittry Lake Hazardous Fuels Reduction and Riparian Restoration

Project Description

The BLMYFO is proposing to restore riparian plant communities along the LCR on selected sites deemed suitable for intensive revegetation. Approximately 80 acres of land would be revegetated with native plants following removal of saltcedar at the south end of Mittry Lake. This project is being proposed to improve wildlife species diversity, encourage wildlife species numbers, increase habitat complexity, and reduce the amount of hazardous fuels in the project area.

Project's Environmental Analysis Status and Anticipated Impacts

An EA was completed for this project in December 2002. The EA determined that minor impacts on air quality (increased PM_{10} and construction-related emissions for a period of approximately 1 month), aesthetics (due to the clearing of land resulting in patchy topography), and water quality (nutrient loading to Mittry Lake) would result from the Mittry Lake Hazardous Fuels Reduction and Riparian Restoration project.

Cumulative Impacts with the Proposed Action

Both the proposed action and the Mittry Lake project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and Mittry

Lake project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Both projects would result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. Both projects would have long-term beneficial aesthetic impacts through the creation or restoration of a combined total of 8,212 acres of native land cover types; thus, the long-term impacts would be *cumulatively beneficial*.

Both projects would have the potential for construction-related impacts on biological resources, but these would be *cumulatively less than significant* because the impacts would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. Both projects would have long-term beneficial impacts on biological resources through the creation or restoration of a combined total of 8,212 acres of land cover types that provide habitat for covered and non-covered species; thus, the long-term impacts would be *cumulatively beneficial*.

Both the proposed action and Mittry Lake project would have only minor, short-term, and localized impacts on water quality and geology and soils, and the impact would be *cumulatively less than significant*.

Yuma East Wetlands Restoration Project

Project Description

The Yuma East Wetlands Restoration Project (YEW) is a 1,400-acre native riparian and river restoration project that is centered on the restoration of habitat for wetland-associated species through the re-opening of historic channels and sloughs, clearing of non-native species, and revegetation of the area with native plants and trees. A formal plan was completed in July of 2001 for the area by the Quechan Indian Nation, the City of Yuma, and the Yuma Crossing National Heritage Area acting as the lead entities. The project is scheduled to begin in winter 2003, and completed, depending on funding, between 2008-2013.

Project's Environmental Analysis Status and Anticipated Impacts

A Section 404 permit has been issued by the Corps of Engineers for the YEW project. The project could result in the conversion of approximately 400 acres of agricultural land to native vegetation and would have construction-related impacts on air quality. Currently, the owners of an 80-acre cultivated area and the owners of a 200-acre area within the project boundary are in the process of considering if these lands may be included in the restoration effort. It is anticipated that these lands will be included; however, owner agreement is still pending. No determination has been made whether the agricultural land that would be converted to wetlands is Important Farmland.

Cumulative Impacts with the Proposed Action

Both the proposed action and the YEW project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both

projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and YEW project occurred at the same general time and in the same general location, fugitive dust emissions would be *cumulatively significant*.

The proposed action has the potential to convert Important Farmland to native vegetation, as could the YEW project. It is not known if the YEW project would convert Important Farmland, but even if it were, the impact would be *cumulatively less than significant* because the total amount that could be affected is not substantial compared to the overall amount available in the planning area (i.e., approximately 3.8 percent of the total Important Farmland in the planning area could be affected by the two projects).

The implementation of both projects would result in long-term, *cumulatively beneficial* impacts on aesthetics and biological resources since both would create or restore native vegetation.

Yuma West Wetlands

Project Description

The Yuma West Wetlands (YWW) is a 110-acre former landfill and includes another 35 acres of wetland restoration through the removal of exotic plant species and revegetation with native plants and trees on the lower bench within jurisdictional Waters of the U.S. YWW has received its Section 404 permit and 25 acres of the lower bench has been revegetated. Ongoing monitoring and additional revegetation will occur within the project area. The remaining 10 acres of revegetation is expected to begin construction in winter 2003 or late summer 2004 depending upon the timing of migration season and project timing. Landfill conversion to a recreational park will be completed in 2007 and the revegetation, depending on funding, will be complete in 2005.

Project's Environmental Analysis Status and Anticipated Impacts

An EA was completed for the YWW project that identified potential beneficial impacts on aesthetics, recreation, socioeconomics, wildlife habitat, and wetlands. Potential adverse impacts (the level of significance of these impacts was not specifically identified) included temporary construction-related air quality impacts, including fugitive dust emissions (these impacts would be minimized by spraying water on disturbed areas) and exhaust from construction equipment/vehicles; groundwater impacts due to fuels and other construction-related contaminants leaching into groundwater (a spill response plan would minimize potential impacts); surface water impacts due to sedimentation during construction activities (these impacts would be minimized by complying with permit requirements); temporary displacement of wildlife during construction; potential but unlikely impacts on the southwestern willow flycatcher due to disruption of habitat; and limited socioeconomic impacts related to air quality, noise, and traffic.

Cumulative Impacts with the Proposed Action

No adverse cumulative impacts with the proposed action would result because construction periods would not likely overlap and all adverse impacts associated with the YWW project are construction-related. The implementation of both projects would result in long-term, *cumulatively beneficial* impacts on aesthetics and biological resources since both would create or restore native vegetation, and the YWW would convert a landfill to a park.

Clark County Multiple Species Habitat Conservation Plan

Project Description

Clark County, Nevada, has prepared an MSHCP to conserve a wide variety of species and their habitats throughout the county. The MSHCP is an extension of the effort begun with the Clark County Desert Conservation Plan (DCP), which was prepared in response to the Federal listing of the desert tortoise as a threatened species. Whereas the DCP focused primarily on the conservation of the desert tortoise, the MSHCP was prepared to establish a means to address the conservation needs of the entire range of biological resources within Clark County. The provisions of the DCP have been integrated into the MSHCP and supersede the provisions of the DCP.

The MSHCP was prepared pursuant to section 10(a) of the ESA, as amended. It identifies those actions necessary to maintain the viability of natural habitats in the county for approximately 232 species residing in those habitats. While the MSHCP addresses all 232 species, it proposes that 79 of these species be covered by a section 10(a)(1)(B) permit for those species that are currently listed and Prelisting Agreements for those species that are not listed (covered species). Among the 79 covered species are the southwestern willow flycatcher (*Empidonax traillii extimus)*; Mojave desert tortoise (*Gopherus agassizii)*; and blue diamond cholla (*Opuntia whipplei* var. *multigeniculata)*. All covered species are treated as though they were listed and are subject to the standards set forth in section 10(a)1(B) of the ESA and 50 C.F.R. 17.32(b) and 17.22(b).

Project's Environmental Analysis Status and Anticipated Impacts

The Final MSHCP and accompanying EIS were issued by the Clark County Department of Comprehensive Planning and the Service in September 2000. The Service subsequently issued a 30-year permit authorizing the incidental take of the listed species covered by the plan. The EIS concluded that the MSHCP would have impacts on recreation, mineral extraction, transportation, and utility rights-of-way.

Cumulative Impacts with the Proposed Action

The proposed action would have either no impacts or less than significant impacts on most resources affected by the Clark County MSHCP. Impacts on recreation would be *cumulatively less than significant* because the total area affected would be small in comparison to the total recreational area available in the planning area (approximately 423,500 acres). Both projects would have an overall beneficial impact on aesthetic and biological resources since they are designed to establish or conserve native vegetation; therefore, a *cumulatively beneficial* impact would result from their implementation.

Cocopah Tribe River Restoration Project

Project Description

The Cocopah Tribe River Restoration Project is currently in the conceptual phase and therefore does not have a well-defined project description. The project would involve saltcedar eradication and replanting with honey mesquite and cottonwood-willow.

Project's Environmental Analysis Status and Anticipated Impacts

It is anticipated that this restoration project would have long-term beneficial impacts on aesthetics and biological resources. Vegetation removal and replanting activities would likely result in similar impacts as the proposed action, including impacts on aesthetics, biological resources, air quality, hydrology, geology and soils, cultural resources, and noise.

Cumulative Impacts with the Proposed Action

Both the proposed action and the tribal restoration project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and tribal restoration project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Both projects would have the potential for construction-related impacts on biological resources, but these would be *cumulatively less than significant* because the impacts would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. Both projects would have long-term beneficial impacts on biological resources through the establishment of native vegetation; thus, the long-term impacts would be *cumulatively beneficial*.

Both projects would result in construction-related short-term disturbances to aesthetic resources, but these would be *cumulatively less than significant* since they would be temporary and localized. The implementation of both projects would result in long-term, *cumulatively beneficial* impacts on aesthetics since both would establish native vegetation.

Cumulative impacts on cultural resources could be *cumulatively significant* because construction associated with both actions could affect significant cultural resources. All other cumulative impacts on the resources identified above would be *less than significant* since impacts would be short-term and localized.

4.2.4 Other Conservation and Restoration Projects

A number of conservation and restoration projects are ongoing within the planning area. These include ongoing razorback sucker and bonytail conservation including the Native Fish Work Group projects and improvements to Willow Beach National Fish Hatchery, among others. The impact on biological resources from the implementation of the proposed action in combination

with these other restoration projects would be *cumulatively beneficial*. *Cumulatively less than significant*, localized, construction-related impacts may occur associated with dredging activities.

4.2.5 Other Projects

Land Management, Crop Rotation, and Water Supply Program in the Palo Verde Irrigation District

Project Description

Metropolitan and the PVID are developing a land management, crop rotation, and water supply program in the Palo Verde Valley. The program's objective is to develop a flexible and reliable water supply for Metropolitan of approximately 111,000 AFY for 35 years and to assist in stabilizing the farm economy within the Palo Verde Valley through sign-up payments and annual payments for participating farmers and through implementation of specific community improvement programs. Participation in the program would be voluntary. Participating farmers would, at Metropolitan's request and with specific notice periods, not irrigate a portion of their farmland. The same land would not be irrigated for a minimum of a 1-year term and a maximum of a 3-year term at the farmer's option. A base load area of 6,000 acres would not be irrigated each year of the 35 years. Metropolitan would have the option to increase the non-irrigated area from 6,000 acres up to a maximum of 26,500 acres. Overall, a maximum of 24,000 acres in any 25-year period or 26,500 acres in any 10-year period during the 35-year program would be dedicated to the program. Metropolitan would provide financial compensation to the participating farmers. Not irrigating a portion of the Palo Verde Valley's farmland would result in less Colorado River water being used by PVID. The amount of water conserved by the program would be determined on an annual basis by a verification committee composed of Metropolitan, PVID, and Reclamation and made available for diversion by Metropolitan at Lake Havasu through the CRA.

Project's Environmental Analysis Status and Anticipated Impacts

A Final EIR was completed for this project in September 2002 that focused on five environmental resource areas: agricultural resources, geology and soils, air quality, hydrology and water quality, and biological resources. No impacts on air quality would occur, nor would the project convert farmland to other uses. The following less than significant impacts were identified: erosion-related impacts; decreases in groundwater levels; reduced flow in some areas of the LCR; agricultural impacts due to a reduction in the amount of farmland being irrigated at any one time; and indirect impacts on biological resources that forage in agricultural areas.

Cumulative Impacts with the Proposed Action

Erosion-related impacts for both projects would be temporary, localized, and *cumulatively less than significant*. The proposed action would not decrease groundwater levels or affect river flow; thus, no cumulative impacts on hydrology or biological resources from such changes would occur. The PVID project would result in less than significant impacts on agriculture due to a reduction in the amount of farmland being irrigated at any one time. The proposed action

could result in the conversion of Important Farmland to other land cover types; however, impacts on agricultural resources would be *cumulatively less than significant* because the PVID project would not convert farmland to non-agricultural use, and the proposed action would affect only a small percentage of the agricultural land along the LCR. Impacts on biological resources would be *cumulatively less than significant*. The PVID project would have a less than significant impact on species that forage and winter on agricultural lands due to changes in irrigation and crop-planting regimes, and the proposed action would have temporary, less than significant impacts on these species due to the conversion of this land to native land cover types. The establishment of additional native land cover types would allow population expansion for these species, however, which is a long-term beneficial impact.

All-American Canal Lining Project

Project Description

Lining the All-American Canal was authorized by Title II of Public Law 100-675, dated January 25, 1988. This Act authorized the Secretary to construct a new lined canal or to line the previously unlined portions of the All-American Canal to reduce seepage of water. Title II authorizes the Secretary to determine the amount of water conserved by this canal lining. The Act further directs that the water so conserved be made available for consumptive use by California contractors within their service areas according to their priority under the Seven-Party Agreement. The preferred project alternative for controlling seepage from the AAC (constructing a parallel canal) would reduce seepage by approximately 67.7 kafy.

Project's Environmental Analysis Status and Anticipated Impacts

A Final EIS/EIR for the All-American Canal Lining Project was released in March 1994. Environmental impacts were identified in the following areas: groundwater, water quality in Mexico, biological resources (wetlands including wetlands along the canal and along the impacted reach of the Colorado River, terrestrial plant communities and associated wildlife, and special status species), canal fisheries, air quality, cultural resources, hydroelectric power, and recreation (USBR and IID 1994). A variety of mitigation measures have been incorporated into the project, including establishing 43 acres of honey mesquite and cottonwood/willow and 1 acre of marsh, restoring shelter for juvenile fish by constructing artificial reefs in the canal, replacing and protecting habitat for special status species and to help maintain the fishery for recreational fishing, and avoiding cultural resources sites where feasible.

A ROD was prepared and signed by the Lower Colorado Region's Regional Director on July 29, 1994. On November 22, 1999, Reclamation determined that the EIS and ROD continued to meet the requirements of NEPA.

Cumulative Impacts with the Proposed Action

Only a small segment of the canal-lining project would occur in the planning area, and air quality from construction is the only resource that would potentially contribute to a cumulative impact. Both the proposed action and the canal-lining project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less*

than significant. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and canal-lining project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Lower Colorado River Boundary and Capacity Preservation Project

Project Description

The Lower Colorado River Boundary and Capacity Preservation Project is proposed by the USIBWC. The project is located along the Limitrophe Division of the Colorado River, the 23.7 mile "international segment" of the Colorado River. This portion of the river serves as the border between the United States (State of Arizona) and Mexico (State of Baja California del Norte). The study area begins west of Yuma, Arizona, at the NIB, the northernmost point where the river begins to serve as the international boundary and continues south to the SIB, just west of San Luis, Arizona, where the Colorado River flows south into Mexico. The study area includes Morelos Diversion Dam, which is south of the NIB. The project would include measures to preserve and stabilize the international boundary and improve flood control of the channel, as well as long-term operations and maintenance activities. The project may also include clearing a 100-foot wide path upstream and downstream of the centerline of the cable on the United States side of the cable crossing approximately 1.1 mile upstream of Morelos Diversion Dam. This would affect 72,000 square feet in the United States.

Project's Environmental Analysis Status and Anticipated Impacts

The Draft EIS for this project is expected to be completed by early 2005. The USIBWC, assisted by the Corps, is preparing the EIS and will evaluate specific options for three related actions:

- The preservation and stability of the international boundary between the U.S. and Mexico.
- Enhancement of the channel's carrying capacity so it provides flood carrying capacity of 140,000 cfs and a pilot channel with a capacity of 15,000 cfs.
- Maintenance activities to ensure that channel capacity and boundary stability are retained in the future.

In addition to the required "no action alternative," the EIS will evaluate four alternatives that incorporate various pilot channel routes and designs between the levees, each of which would become the new international boundary and provide the required flood protection. Alternatives will also consider raising the levees in certain locations along the Limitrophe Division.

The environmental impacts of the project may include loss of vegetation and associated wildlife habitat between the river levees as a result of clearing for the pilot channel. The extent of that impact will depend on the actual route of the channel, which is now being developed. Other impacts could include air quality impacts since the project construction area is located in a PM_{10} non-attainment area and the project would include a significant amount of construction, and other construction-related impacts on aesthetics, hazards, geology and soils, and water quality.

Cumulative Impacts with the Proposed Action

Both the proposed action and the USIBWC project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively less than significant. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and IBWC project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Both projects would have the potential for impacts on aquatic and terrestrial biological resources, but these would be cumulatively *less than significant* because the impacts of the proposed action would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. The extent to which long-term impacts on biological resources would occur as a result of the USIBWC project is not known at this time, but the long-term impacts of the proposed action would be beneficial and would not contribute to a cumulative impact in combination with the development project.

Both projects would result in construction-related short-term disturbances to aesthetics, but these would be *cumulatively less than significant* because they would be temporary and localized. The USIBWC project could result in long-term visual changes to the LCR, but the proposed action would have long-term beneficial aesthetic impacts and would not contribute to a cumulative impact in combination with the development project.

Both projects would result in increased ambient noise levels during construction, but impacts would be *cumulatively less than significant* because noise impacts are highly localized, and impacts would be temporary, lasting only for the duration of the construction. Both the proposed action and the USIBWC project likely would have only minor, short-term, and localized impacts on hazards, geology and soils, and water quality, and the impact would be *cumulatively less than significant*.

Nevada Division of State Lands Floating Docks

Project Description

This project would involve the replacement of a dock system and ramps for private use near the Regency Casino property near Laughlin in Clark County, Nevada. In order to protect property from erosion form heavy flows in the early 1980s, Clark County Public Works, the State of Nevada, and Reclamation cooperated in the emergency placement of several jetties and riprap protection along the developed portion of the LCR in the project area and subsequently the dock system was constructed.

Project's Environmental Analysis Status and Anticipated Impacts

No environmental documentation has been prepared for this project. Impacts likely would be construction related, including impacts on aesthetics, biological resources, air quality, hazards (due to the use of hazardous materials during construction), water quality (due to the use of hazardous materials during construction), and geology and soils. Long-term aesthetic impacts

may also occur. The permit issued by the Corps of Engineers, however, requires compliance with applicable water quality standards (including compliance with Section 404 of the Clean Water Act); minimization of adverse impacts on wildlife; the institution of measures to cover exposed foam floatation on the dock to avoid degradation due to wave action or fauna; avoidance of toxic pollutants in discharged dredge material; and the implementation of erosion avoidance measures.

Cumulative Impacts with the Proposed Action

Both the proposed action and the floating docks project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be cumulatively *less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and floating docks project occurred at the same general time and in the same general location, fugitive dust emissions would be cumulatively *significant*.

Both projects would have the potential for impacts on aquatic and terrestrial biological resources, but these would be cumulatively *less than significant* because the impacts of the proposed action would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. Additionally, the Corps permit would require the implementation of measures that would minimize adverse impacts on wildlife.

Both projects would result in construction-related short-term disturbances to aesthetic resources, but these would be *less than significant* since they would be temporary and localized. Since the floating docks project would involve the replacement of existing docks and ramps, it would not result in long-term aesthetic impacts and no long-term cumulative impacts would occur. The proposed action and the floating docks project would have only minor, short-term, and localized construction-related impacts on hazards, geology and soils, and water quality, and the cumulative impact would be *less than significant*.

South Point/Calpine Cogeneration Plant

Project Description

This project would involve the long-term lease of Fort Mojave Indian Reservation lands in Mohave County, Arizona to Calpine for the development of the Southpoint Power Plant. The power plant would be a natural gas fired, 500 megawatt, combined cycle power facility on a 320-acre site. The Southpoint Power Plant project would use water withdrawn from the LCR and piped to the plant in a buried pipeline. Two onsite wells would provide a backup water supply. The project would require up to 4,000 af of water per year. Wastewater produced by the plant would be piped for disposal to a lined evaporation pond. Approximately 94 af of water per year would be piped to the pond to evaporate. A similarly lined 3-acre interim storage pond would also be constructed as part of the project. Stormwater would be retained in on-site retention basins approximately 30 acres in size. Approximately 212 acres of the site would remain undeveloped and would serve as a buffer surrounding the power plant.

Project's Environmental Analysis Status and Anticipated Impacts

A Final EIS for the Southpoint Power Plant project was issued by the BIA in January of 1999. Significant but mitigable impacts were identified for the project's preferred alternative for transportation (increased traffic on County Route 227 and State Route 95 during construction); air resources (construction and plant operational activities); and community infrastructure (hazardous materials and fire protection response capabilities).

Cumulative Impacts with the Proposed Action

Both the proposed action and the cogeneration plant project would result in construction-related air quality impacts from increased combustive and PM_{10} emissions. Combustive emissions from both projects would be mobile and intermittent and would be *cumulatively less than significant*. The proposed action would result in a significant, potentially unavoidable, impact from increased PM_{10} emissions, and if construction associated with the proposed action and the cogeneration plant project occurred at the same general time and in the same general location, fugitive dust emissions would be *cumulatively significant*. The cogeneration plant would have long-term air quality impacts, but the proposed action would have only intermittent impacts associated with maintenance activities spread over a wide area, and long-term cumulative air quality impacts would not occur.

The proposed action would result in minor, temporary, and localized transportation impacts, and no cumulative impact would occur.

Impacts related to hazardous materials would be *cumulatively less than significant* since impacts of the proposed action would be temporary and minor and impacts of both would be localized. The proposed action would not impact fire protection response capabilities, and no cumulative impacts would occur.

4.3 IMPACTS BY RESOURCE

This section provides a summary of the potential cumulative impacts, organized by resource area, which would result from the implementation of the proposed action and the projects analyzed above. Mitigation measures to reduce significant impacts are also identified.

4.3.1 Aesthetics

No significant cumulative impacts would result from implementation of the proposed action in combination with the projects described above. *Cumulatively less than significant* construction-related impacts would result from the proposed action and other projects since they would be short-term, localized, and would not result in substantial adverse aesthetic changes. While the development projects would result in visual changes to the character of the LCR through the development of open space, the proposed action would result in overall long-term beneficial aesthetic impacts. Therefore, no long-term adverse cumulative impacts would result from the implementation of the proposed action in combination with the development projects. Long-term impacts of the proposed action would be *cumulatively beneficial* in combination with other restoration projects since a more natural appearance would be restored to the affected lands.

4.3.2 Agricultural Resources

The proposed action may result in the conversion Important Farmland to other land cover types, and other projects also could affect agricultural resources. For example, the changes in points of diversion of up to 1.574 mafy of Colorado River could result in long-term fallowing of agricultural land, the YEW project would result in the conversion of farmland to other uses (400 acres), the Mayflower Park Improvements and Expansion project would convert 65 acres of Important Farmland, the PVID project would result in less than significant impacts on agricultural uses, and the Needles Highway Improvement project would disrupt tribal agricultural activities. The impact would, however, be *cumulatively less than significant* because the total amount of farmland that could be affected is not substantial compared to the overall amount available in the planning area. Assuming the proposed action converted 8,132 acres, a total of 8,597 acres would be converted in the planning area or approximately 3.8 percent of the total Important Farmland in the planning area. Moreover, these impacts would be offset by the implementation of a number of tribal farmland development/irrigation projects described in section 4.2.1, including the (1) CRIT plan to bring an additional 25,000 acres into agricultural production should Congress appropriate adequate funds; (2) Fort Mojave Tribe plan to fully develop its farmland, which would increase farmed acreage by approximately 3,745 acres; (3) the Chemehuevi Tribe plan to irrigate up to 1,855 acres of agricultural land; (4) Fort Yuma Agency plan to irrigate 650 acres of agricultural land; and the (5) Cocopah Tribe plan to irrigate three agricultural sites, totaling 500 acres.

4.3.3 Air Quality

Cumulatively significant impacts associated with PM_{10} and NO_x emissions could occur if the proposed action were implemented at the same time and in the same general location as other projects requiring construction or controlled burns. These impacts would be at least partially mitigable through the implementation of the mitigation measures listed below; however, residual, *cumulatively significant and unavoidable* impacts could occur since these measures may not adequately reduce impacts below the significance thresholds identified in this EIS/EIR.

C-AQ-1 One or more of the following measures shall be implemented as standard operating practices to minimize fugitive dust (PM_{10}) emissions during construction activities.

1. Comply with applicable local and state rules that regulate proposed sources of fugitive dust.
2. Apply water or other dust palliatives to areas where vehicles and equipment perform ground-disturbing activities on dry soil.
3. Reduce dust from dirt roads used by project equipment with the use of pavement, gravel, water, or non-toxic soil stabilizers.
4. Increase water applications or reduce ground-disturbing activities as wind speeds increase. Curtail ground-disturbing activities when sustained wind speeds exceed 25 miles per hour.
5. Minimize the amount of disturbed area.

6. Cover inactive soil stockpiles or treat them with soil binders, such as crusting agents or water them to keep moist.
7. Cover trucks that haul soils or fine aggregate materials.
8. Clean dirt from construction vehicle tires and undercarriages when leaving the construction site and before entering local roadways.
9. Sweep streets near the construction area at the end of the day if soil track-out occurs on these roadways.
10. Designate personnel to monitor dust control program activities to ensure that they effectively minimize fugitive dust emissions.

C-AQ-2 A smoke management plan shall be implemented for all construction and maintenance activities involving the use of fire.

C-AQ-3 Implementation of Best Available Control Technology (BACT) measures will be implemented to minimize operational impacts from the Southpoint Power Plant project.

4.3.4 Biological Resources

The proposed action could result in construction-related, less than significant impacts on most biological resources, although some impacts associated with backwater creation would be significant but mitigable, as would impacts on common and sensitive native fish species in the Virgin and Muddy rivers. Other projects also could result in temporary, construction-related impacts on biological resources. The combined impacts of these projects generally would be *cumulatively less than significant* since the impacts of all projects would be temporary and localized and would not cause substantial adverse changes to vegetation or wildlife communities along the LCR. To the extent that other projects affected native fish species along the Virgin and Muddy rivers, impacts could be *cumulatively significant but mitigable to less than significant*.

While the development projects could result in long-term impacts on biological resources through the development of open space, the proposed action would result in overall long-term beneficial impacts on biological resources. Therefore, no long-term, adverse cumulative impacts would result from the implementation of the proposed action in combination with the development projects. Moreover, *cumulatively beneficial* biological impacts would result from the proposed action in combination with other restoration projects. The proposed action would establish 8,132 acres of conservation area with native plant community restoration, and a number of other projects also would result in native vegetation and aquatic habitat restoration, including the Mittry Lake Emergency Stabilization Project (475 acres), Mittry Lake Hazardous Fuels Reduction and Riparian Restoration Project (80 acres), YEW (1,400 acres), YWW (145 acres), Clark County HSHCP (100,000 acres), and the Cocopah Tribe River Restoration Project (unknown acreage). Additionally, as described in section 4.2.4, a number of other conservation and restoration projects are ongoing in the planning area.

Mitigation measures for significant cumulative impacts on native species in the Virgin and Muddy rivers are as follows:

C-BIO-1 Design site-specific land cover type establishment plans to avoid and minimize potential effects on sensitive native fish habitats along the Virgin and Muddy rivers. Preparation of the design plans shall be coordinated with and approved by the Service as part of section 7 consultation. If appropriate, design plans shall include measures to rehabilitate any affected habitat.

4.3.5 Cultural and Historic Resources

Cumulatively significant impacts could occur because the proposed action could result in significant impacts on cultural resources, as could the Riverfront project and possibly other projects requiring ground disturbance, such as the construction of water conservation measures associated with the changes in points of diversion of up to 1.574 mafy of Colorado River water. These impacts would be *mitigable to less than significant* through the implementation of the following measures.

C-CULT-1: One or more of the following mitigation measures shall be implemented:

1. Consult with the appropriate SHPO(s), tribes, and other interested parties, perform archival research, interview informants, and conduct cultural resource inventories during site-specific environmental review to identify any cultural resources that may be affected. Consult with geologists, geomorphologists, and/or geophysicists to determine if there are areas that may contain buried cultural deposits and to determine the appropriate methods/techniques for locating these. Implement subsurface exploration activities as a part of the inventory and identification program.
2. Evaluate all identified cultural resources for potential listing on the NRHP or state or local registers with respect to applicable criteria and appropriate historic themes, research questions, and data requirements as identified in regional, local, and/or project specific historic contexts.
3. Modify project design, if feasible, to avoid cultural resources found eligible for listing on the national, state, or local registers.
4. When required (i.e., in California), consult with the SHPO, tribes, and other interested parties to develop and implement, prior to construction, a "Testing and Evaluation Plan" if "potentially significant" archaeological sites cannot be avoided through project redesign.
5. If an archaeological site eligible for listing on the national, state, or local registers of historic places cannot be avoided through project redesign, in consultation with the appropriate SHPO, tribes, and other interested parties, develop and implement a Data Recovery Plan. If the eligible property is a building or structure, consult with the appropriate SHPO and other interested parties, and document the resource to the agreed to standards.
6. Develop a Cultural Resources Construction Monitoring Plan prior to construction if ground disturbance would occur within any areas of potential archaeological sensitivity.
7. In the event of an unanticipated cultural resource discovery during construction, re-direct construction to other areas until the discovery has been documented by a qualified archaeologist and its potential significance evaluated in terms of applicable

criteria. Resources considered significant would be avoided or subject to a testing and evaluation program and/or a data recovery program as described above.

8. If the project has the potential to discover or otherwise result in the excavation of Native American cultural items on Federal or tribal lands, then the appropriate Federal agency or agencies will initiate consultation with any known lineal descendants and relevant Indian tribes as per the Native American Graves Protection and Repatriation Act (NAGPRA). Consultation would identify, among other things, procedures that would be followed in the event that project-related activities resulted in the excavation or discovery of Native American human remains on Federal or tribal lands. If cultural resources or human remains were discovered on non-Federal or non-tribal lands, state and local laws would be followed.
9. Procedures that would be identified under item 8, above, would be incorporated into all archaeological testing and date recovery plans and the Cultural Resources Construction Monitoring Plan as appropriate.

4.3.6 Energy and Depletable Resources

The proposed action would require only minor consumption of energy and depletable resources and would not adversely affect hydropower production. Cumulative impacts would be minor.

4.3.7 Environmental Justice

The proposed action would result in environmental justice impacts associated with air quality and noise emissions and the loss of agricultural jobs. Impacts associated with air quality and noise emissions would be short-term and localized (with the exception of impacts associated with noise from pumps, which would be ongoing, but highly localized, affecting only those persons in the immediate vicinity). Noise impacts from individual projects could, however, disproportionately affect low income and minority populations. These impacts would be *mitigable* through implementation of **Mitigation Measures C-EJ-1 and C-EJ-2**.

Air quality-related impacts could be short-term but could cumulatively disproportionately affect low income and minority populations if construction occurred in the same geographic area at the same time. Implementation of **Mitigation Measures C-AQ-1, C-AQ-2, and C-AQ-3**, identified in section 4.3.3, would reduce cumulative impacts, but those associated with fugitive dust could be *substantial* on a temporary basis.

A number of projects considered in the cumulative impact analysis could result in the loss of agricultural jobs, including the proposed action, which could convert up to 8,132 acres of agricultural land to other land cover types; the changes in points of diversion of up to 1.574 mafy of Colorado River water, which could result in long-term fallowing; the YEW project, which would result in the conversion of 400 acres of farmland to other uses; and the Mayflower Park Improvements and Expansion project, which would convert 65 acres of Important Farmland. To some extent, this could be offset by the tribal farmland and irrigation projects described in section 4.2.1, including the (1) CRIT plan to bring an additional 25,000 acres into agricultural production should Congress appropriate adequate funds; (2) Fort Mojave Tribe plan to fully develop its farmland, which would increase farmed acreage by approximately

3,745 acres; (3) the Chemehuevi Tribe plan to irrigate up to 1,855 acres of agricultural land; (4) Fort Yuma Agency plan to irrigate 650 acres of agricultural land; and the (5) Cocopah Tribe plan to irrigate three agricultural sites, totaling 500 acres. The potential still exists, however, for disproportionate cumulative impacts on minority and low-income populations from the loss of agricultural jobs. This impact would be *mitigable* through the implementation of **Mitigation Measure C-EJ-3**.

C-EJ-1 When construction occurs sufficiently close to noise-sensitive receptors so that noise from construction activities exceeds local regulatory standards or causes a substantial increase in ambient noise levels, one or more of the following measures shall be implemented. This list does not preclude the use of additional mitigation measures if appropriate.

- Use hydraulically or electrically powered impact tools when possible. If the use of pneumatically powered tools is unavoidable, use an exhaust muffler on the compressed air exhaust.
- Install manufacturer's standard noise control devices, such as mufflers, on construction equipment.
- Locate stationary equipment as far as possible from noise-sensitive receptors.
- Notify nearby property users whenever extremely noisy work might occur.
- Use stockpiles as noise barriers when feasible.
- Keep idling of construction equipment to a minimum (no more than 30 minutes) when not in use.
- Install temporary or portable acoustic barriers around stationary construction noise sources.
- As appropriate, modify noise enclosures with acoustical louvers, baffle walls, and/or acoustical panels.
- Whenever possible, limit construction activities to non-mating, non-nesting seasons of noise-sensitive species.

C-EJ-2 If pumps cannot be located at sufficient distances from sensitive receptors to avoid the exceedance of a local noise standard or a substantial increase in the ambient noise level at the sensitive receptors, then barriers or enclosures shall be constructed to ensure adherence to local standards.

C-EJ-3 The lead agencies shall work with local jurisdictions and/or growers to ensure that agricultural workers are notified as soon as possible of the potential for a loss of jobs once specific project locations have been identified. They will encourage the local jurisdictions and/or growers to provide timely information and assistance to agricultural workers regarding the availability of alternative employment.

4.3.8 Hazards and Hazardous Materials

No significant cumulative impacts associated with hazards or hazardous materials were identified. Impacts would be minor and localized, and impacts would be *cumulatively less than significant*.

4.3.9 Hydrology and Water Quality

No significant cumulative impacts associated with hydrology and water quality were identified. Impacts of the proposed action would be minor and localized and would not contribute to a cumulative impact in combination with the impacts of other projects.

4.3.10 Indian Trust Assets

The proposed action could affect ITAs, but none of the projects described above have identified impacts on ITAs; therefore, no cumulative impacts would occur.

4.3.11 Land Use

No significant cumulative impacts would result from the implementation of the proposed action in combination with the projects described above. The proposed action would result in the change of undeveloped or agricultural land to other land cover types, but the Conservation Plan would be implemented in a manner that was consistent with local zoning ordinances and general plan requirements and thus would not contribute to an adverse cumulative impact.

4.3.12 Noise

No significant cumulative impacts associated with noise were identified. Noise from the proposed action would be highly localized, and impacts from construction would be short-term. Since noise impacts from the proposed action and other projects would be unlikely to occur in the same time and at the same location, and the proposed action would avoid developed areas, impacts would be *cumulatively less than significant*.

4.3.13 Population and Housing

No significant cumulative impacts would result from the implementation of the proposed action in combination with the projects described above. The proposed action would not affect population or housing and thus would not contribute to a cumulative impact.

4.3.14 Public Utilities and Services

No significant cumulative impacts would result from the implementation of the proposed action in combination with the projects described above. The proposed action would have negligible impacts on public utilities and services and would not contribute to a significant cumulative impact in combination with other projects.

4.3.15 Recreation

Cumulatively less than significant impacts would result from the implementation of the proposed action in combination with the projects described above. The proposed action would result in a minor loss of recreational opportunities. The Riverfront project also would have impacts on recreational resources from the increased use of the LCR. This increased use from the creation of 34 residences would not result in a significant cumulative impact on recreational resources in combination with the proposed action, particularly in light of the large amount of area available for recreational activities along the river. Some projects, such as the YWW and Mittry Lake Emergency Stabilization and Rehabilitation Project, would result in long-term beneficial impacts on recreational resources. Short-term loss of access to the recreational resources of Mittry Lake from the latter project would not contribute to a cumulative impact in combination with the proposed action since they likely would not overlap in time.

4.3.16 Socioeconomics

The proposed action would result in the loss of agricultural jobs and revenue and could result in a reduction in property and sales tax, as well. Similar impacts could result from other projects, identified in section 4.3.2, that would result in the conversion of agricultural land to other uses. The amount of jobs and taxes affected by these projects would be minor in comparison to the overall regional economy. The Farmland Development/Construction of Irrigation Systems project could result in increased agricultural employment opportunities, and could increase sales tax revenues to the extent that products related to agricultural uses were purchased. Other urban development projects could result in increased property and sales tax revenues and could create other employment opportunities. The adverse cumulative socioeconomic impacts of these projects would not be substantial.

4.3.17 Topography, Geology, Soils, and Mineral Resources

Cumulatively less than significant impacts would result from the implementation of the proposed action in combination with the projects described above. Impacts of the projects considered would be short-term and localized and would not contribute to a significant cumulative impact.

4.3.18 Transboundary Impacts

The proposed action could result in temporary fugitive dust emissions and intermittent combustive emissions. These air emissions would last only for the duration of the construction or maintenance activity and would dissipate as the distance from the construction site increased. The portion of Mexico that is near Reach 7 is in agricultural use and is sparsely populated. Thus, sensitive receptors would not be adversely affected by these air emissions. Over the long-term, to the extent that agricultural land is converted to other land cover types, emissions would be reduced since fields would no longer be plowed. The proposed action would not result in substantial adverse impacts on Mexico. The Lower Colorado River Boundary and Capacity Preservation Project could result in air quality impacts, but cumulative impacts would only occur if construction activities of both projects took place at the same time near Mexico. Cumulative impacts would not be substantial because the portion of Mexico that is near Reach 7 is in agricultural use and is sparsely populated and because impacts would be temporary.

4.3.19 Transportation

No significant cumulative impacts would result from the implementation of the proposed action in combination with the projects described above. Transportation impacts of the proposed action would be minor, short-term, and localized and would be unlikely to occur in the same location at the same time as those of other projects.

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5.0 SUMMARY COMPARISON OF ALTERNATIVES

5.1 COMPARATIVE DESCRIPTION OF ALTERNATIVES AND EFFECTS

NEPA requires a comparative analysis of project alternatives to provide the basis for the choice that is to be made by the decisionmaker and to define the issues for the public (40 C.F.R. section 1502.14). CEQA similarly requires a comparison of the alternatives with the proposed project (14 C.C.R. section 15126.6[d]). This section compares the alternatives that have been analyzed in this EIS/EIR. The comparison of impacts is summarized in Table 5.1-1, located at the end of this chapter. Section 5.2 compares the action alternatives to no action.

The proposed action (Alternative 1) has the potential to cause impacts to environmental resources, as described in Chapter 3. Many of these potential impacts would be caused by construction activities, such as grading required to establish the proper topography for growing riparian vegetation or to develop backwaters and marsh land cover. Once the habitat has been established, ongoing maintenance activities would not significantly impact most resources. Potential construction-related temporary and less than significant impacts have been identified for aesthetics, biological resources, hazards and hazardous materials, hydrology, geology, and transportation. Construction also could result in significant impacts to agricultural resources, air quality, biological resources (associated with backwater creation), cultural resources, and noise. Additionally, construction would result in temporary environmental justice impacts (associated with air quality and noise) and transboundary impacts (associated with air quality). It also could result in long-term changes to ITAs. Mitigation measures have been identified that would reduce most of the potential significant impacts to a less than significant level. (Impacts to aesthetics, hazards and hazardous materials, hydrology, ITAs, geology, transboundary impacts, and transportation do not require mitigation, nor do some impacts to air quality and biological resources.) Depending on the characteristics of specific conservation sites and construction methods implemented, there may be significant temporary impacts to air quality and associated impacts to environmental justice that cannot be avoided.

Potential impacts that may result from the maintenance and monitoring of the conservation sites after construction is completed and from implementing other conservation measures are either less than significant or can be mitigated to be less than significant, with the exception of air quality impacts from the largest prescribed burns and associated environmental justice impacts.

No significant long-term operational impacts have been identified for the proposed action with the exception of potential noise impacts from pump operation and associated environmental justice impacts. The potential long-term effects to agricultural resources, land use, environmental justice, and socioeconomics would be less than significant. Furthermore, the proposed action would result in long-term beneficial impacts on biological resources, aesthetics, and water quality.

The no action alternative (Alternative 2) is assumed to include many of the same conservation measures as the proposed action. These measures would be implemented on a case-by-case basis as required to mitigate the effects of covered actions that are undertaken by the various agencies. Although the construction, maintenance, and operation of these individual

conservation projects have the potential to cause impacts that are similar to those of the proposed action, there would be differences in the scope of those impacts. In the absence of a coordinated conservation program, the individual conservation projects are likely to be smaller and more widely scattered. It also is likely that conservation would focus only on listed species, thus reducing the total amount of conservation area that would be created.

These factors may reduce the effects on agricultural resources, land use, environmental justice (loss of agricultural jobs), and socioeconomics below those caused by the proposed action. However, there would likely be similar levels of impacts to aesthetics, air quality, cultural resources, and transportation. The potential for significant air quality and associated environmental justice impacts would still exist, even with adoption of mitigation measures, depending on the location and size of the conservation projects. Although less than significant, impacts would likely be greater than those caused by the proposed action for hazards and hazardous materials and noise because of the increased number of individual projects involved and the greater likelihood that the conservation sites would be located closer to developed areas near existing facilities used in implementing the covered actions. The no action alternative could include conservation in the off-site conservation areas. To the extent that this occurred, short-term impacts on environmental justice associated with air quality and noise, ITAs, and transboundary impacts would be reduced because these impacts would not occur in the off-site areas.

More importantly, the no action alternative would provide fewer benefits to biological resources, along with reduced benefits to aesthetics and water quality. In the absence of a coordinated program with the capacity to develop large blocks of conservation area, the multiple individual mitigation sites that would be developed under this alternative would be smaller, with greater edge areas proportionate to their size, and are less likely to be located in proximity to existing occupied habitat. These factors would reduce the effectiveness of the mitigation sites as compared to the conservation measures in the proposed action. Furthermore, the absence of a coordinated monitoring and adaptive management program for the individual projects would reduce their likelihood of success in providing the benefits for the biological resources that would result from the program proposed for the LCR MSCP. Impacts to native fish species along the Virgin and Muddy rivers also could occur under this alternative, however, which would represent a greater impact to biological resources than identified for the proposed action.

Overall, under the no action alternative, the short-term, construction-related impacts are potentially greater, while the permanent agricultural and associated environmental justice impacts and biological, aesthetic, and water quality benefits are potentially less than those of the proposed action.

The listed species only alternative (Alternative 3) would require the construction of a smaller amount of conservation area, reducing the short-term, construction-related impacts from the levels that would be caused by the proposed action. Unlike the no action alternative, the construction of the conservation projects would still be a coordinated effort, focusing on creating large size patches of integrated mosaics of vegetation. This approach would likely involve fewer construction sites than would be required under the proposed action, but there would still be the potential for significant unmitigable impacts to air quality and related

environmental justice impacts, depending on the location and size of the sites. Other construction-related, short-term impacts would likely be less than those identified for the proposed action. Effects on agricultural resources, land use, environmental justice (from noise and loss of agricultural jobs), and socioeconomics would also likely be less since fewer acres of existing agricultural land would be subject to conversion for conservation area use. As with the proposed action, these effects would be less than significant. However, this alternative would not provide the same level of long-term, beneficial impacts to biological and aesthetic resources and water quality that are provided by the proposed action.

The off-site conservation alternative (Alternative 4) differs from the proposed action in the location, but not the quantity, of the riparian and mesquite habitat that would be created. As a result, the scope of short-term, construction-related impacts would be similar to those identified for the proposed action, although transboundary and ITA impacts would not occur, and the potential for short-term environmental justice impacts associated with air quality and noise and long-term impacts associated with noise would be greatly lessened. The potential for significant, unmitigable impacts to air quality remains, although the California air quality standards would not be applicable to this alternative since none of the conservation areas for riparian or marsh land cover types would be created in California. The environmental justice impacts associated with noise and air quality would not occur in the off-site conservation areas since the percentage of low-income and minority populations in these locations is less than in the larger community of comparison; they would be associated only with the creation of 360 acres of backwaters. Effects to agricultural resources, land use, environmental justice (loss of agricultural jobs), and socioeconomics would be similar to the proposed action, and less than significant. Potential impacts to ITAs would be greatly lessened under this alternative because they are not present in the off-site conservation areas, and impacts would occur only in the areas where the 360 acres of backwaters would be created.

This alternative would provide the same long-term benefits to biological resources, aesthetic resources, and water quality as the proposed action, but it has the potential to cause significant unavoidable short- and long-term impacts to biological resources that are present at off-site conservation areas (native common and sensitive fish inhabiting the Virgin and Muddy rivers) that are not present in the planning area. These potential short- and long-term impacts to biological resources offset the difference between this alternative and the proposed action with respect to short-term air quality and associated environmental justice impacts, as well as environmental impacts associated with noise since this impact would be feasibly mitigable. Alternative 4 would not result in transboundary impacts, but these are impacts that would occur in a different location than those of the proposed action; they are not different types of impacts. Alternative 4 also would not result in impacts to ITAs (with the exception of potential impacts from backwater creation), but these, too, are feasibly mitigable.

5.2 COMPARISON OF THE NO ACTION ALTERNATIVE AND ACTION ALTERNATIVES

As described in section 2.1.2, under the no action alternative (Alternative 2), the covered activities described in the LCR MSCP BA and LCR MSCP HCP would likely be implemented, but regulatory compliance would be required and applied on a case-by-case basis as each action

is considered and approved. In the absence of a comprehensive, coordinated conservation program, the following would be expected:

- It is unlikely that funding would be provided to maintain existing habitat that is not impacted by the individual projects.
- The individual project mitigation programs likely would not provide the regional wildfire suppression and law enforcement funding proposed in the Conservation Plan.
- Coordinated monitoring and adaptive management programs would not be implemented.
- Since each individual project would establish its own mitigation sites, it is likely that more maintenance and storage facilities would be required.
- More, smaller mitigation sites would be established, requiring more infrastructure (access roads and irrigation pipelines/canals and pump facilities).
- To the extent that the agencies undertaking the covered activities proceed with ESA compliance, there may be a reduced number of covered species because unlisted species likely would not be included.

Thus, the no action alternative would not result in a continuation of existing conditions. Its impacts generally would be similar to those of the action alternatives because similar conservation measures likely would be implemented, and differences in impacts typically would be a matter of degree rather than kind. Table 5.2-1, which follows Table 5.1-1 at the end of this chapter, compares the magnitude of the impacts of the action alternatives to those of no action. In general, the impacts that are directly associated with the amount of conservation area established (including beneficial impacts) would be comparable to those of Alternative 3 and less than those of Alternatives 1 and 4.

The no action alternative would result in similar types of construction-related impacts as the action alternatives. In some cases, the intensity of the impact would be comparable to Alternative 3 and less than under Alternatives 1 and 4 (e.g., short-term aesthetic impacts to conservation area establishment sites; impacts from erosion). In other cases (e.g., air quality, noise), short-term impacts would be greater because the lack of a comprehensive, coordinated effort could result in more, smaller projects, and the need to develop more infrastructure and support facilities. As noted above, this may reduce the effects to agricultural resources, land use, environmental justice (loss of agricultural jobs) and socioeconomics below those caused by the proposed action and Alternative 4 (off-site conservation).

Beneficial impacts to aesthetic resources and water quality would be less than under Alternatives 1 and 4 because a smaller amount of conservation area would be created and comparable to those of Alternative 3 because similar amounts of conservation area would be created. Beneficial impacts to biological resources that are directly linked to the amount of conservation area created would be less than under Alternatives 1 and 4 and comparable to Alternative 3. Beneficial impacts of all action alternatives to biological resources would be reduced under the no action alternative because funding would not be provided to maintain existing habitat that is not impacted by the individual projects, regional wildfire suppression

and law enforcement funding likely would not be provided, and coordinated monitoring and adaptive management programs would not be implemented.

Long-term noise from pump operation could be slightly greater than under the proposed action and Alternative 4 because conservation measures would be more likely to be implemented closer to developed areas and approximately equal to those of Alternative 3.

The no action alternative could include conservation in the off-site conservation areas. To the extent that this occurred, short-term impacts on environmental justice associated with air quality and noise, ITAs, and transboundary impacts identified for Alternatives 1 and 3 would be reduced because these impacts would not occur in the off-site areas. Impacts to native fish species along the Virgin and Muddy rivers could occur under this alternative, as is the case for Alternative 4. This would represent a greater impact to biological resources than identified for Alternatives 2 or 3.

5.3 ENVIRONMENTALLY PREFERRED ALTERNATIVE

Both NEPA and CEQA require identification of the environmentally preferred (or environmentally superior) alternative. This section discusses the comparisons of the potential effects of the alternatives.

As discussed above, each of the alternatives would have the potential to cause short-term, construction-related impacts to many of the resources analyzed in this EIS/EIR. Although these potential impacts may be less for Alternatives 2 (no action), and 3 (listed species only), they can be mitigated to less than significant levels for all of the alternatives, except for the potential impacts to air quality and associated environmental justice impacts. Some impacts would not occur or would be reduced under Alternatives 2 and 4 because ITAs are not present in the off-site conservation areas, and transboundary impacts and environmental justice impacts associated with noise and air quality would not occur as a result of construction in these off-site areas. These impacts would all be feasibly mitigable with the exception of air quality-related impacts, as noted above. Depending on the location and size of conservation project sites, there may be significant air quality impacts that cannot be mitigated to a less than significant level, and this potential exists for each alternative, although the associated environmental justice impacts would be greatly reduced under Alternative 4, and the transboundary impacts would be avoided. To the extent that conservation occurred in the off-site conservation areas as part of Alternative 2, these impacts would be reduced or avoided as well.

Similarly, each of the alternatives could cause long-term impacts through ongoing maintenance of created habitat. These impacts would be less than significant for each alternative, with the exception of air quality impacts from prescribed burns, which could be unavoidable for the largest burns. The effects to agricultural resources, land use, environmental justice, and socioeconomics would be less for Alternatives 2 and 3, although environmental justice impacts associated with noise and air quality could be lessened under Alternative 2 to the extent that conservation occurred in the off-site conservation areas. Alternatives 2 and 3, however, would not provide the same level of long-term biological, aesthetic, or water quality benefits as the proposed action or Alternative 4 (off-site conservation). These long-term benefits would offset the less than significant short-term effects to other resources. Alternative 4, like Alternative 2, would potentially cause greater biological impacts than the proposed action, which would

offset the equal benefit that it would provide to these resources. These long-term biological beneficial impacts would outweigh the short-term air quality and environmental justice impacts and the feasibly mitigable environmental justice impact associated with noise from pumps that would be avoided under Alternative 4.

Overall, most of the short-term, construction-related impacts that would potentially occur under each alternative can be mitigated to less than significant levels. The potentially significant air quality impacts would exist for all the alternatives and do not provide a basis for distinguishing between them, although short-term air quality impacts associated with environmental justice would be lessened under Alternative 4, and transboundary impacts, which are not considered substantial impacts, would not occur. The long-term impacts, with the implementation of the mitigation measures identified in this EIS/EIR, would similarly be less than significant for all the alternatives. The primary difference between the alternatives lies with the level of benefit that is provided to the biological resources. Both Alternatives 1 and 4 provide the same level of benefit, but Alternative 4 poses the potential for short- and long-term impacts to endangered fish species that inhabit the Virgin and Muddy rivers where the off-site conservation projects would be sited. Therefore, Alternative 1 is the environmentally preferred alternative.

Table 5.1-1. Comparison of Impacts of Project Alternatives

Impacts of the Proposed Action (Alternative 1)	MAGNITUDE OF IMPACTS OF PROJECT ALTERNATIVES COMPARED TO THE PROPOSED ACTION[1]		
	Alternative 2 No Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
AESTHETICS			
AESTH-1: Construction/maintenance activities would temporarily lessen the visual quality of the conservation area establishment sites located on or near visually sensitive resources (*less than significant impact*).	=	<	=
AESTH-2: The construction of field facilities and fish-rearing facilities could be required, which could alter the visual quality of the selected sites (*less than significant impact*).	>	=	=
AESTH-3: Conservation area establishment would return sites to a more natural appearance (*beneficial impact).*	<	<	=
AGRICULTURAL RESOURCES			
AG-1: Important Farmland could be converted to a nonagricultural use (*less than significant impact*).	<	<	=
AG-2: Waterfowl attracted to established backwaters and marshes could destroy crops grown on adjacent farmland *(less than significant impact*).	=	=	=
AG-3: Runoff from established conservation areas could alter the slopes of adjoining laser-leveled fields (*significant impact*).	<	<	=
AG-4: Covered species attracted to established conservation areas could disperse to other lands within the planning area *(less than significant impact*).	<	<	=
AIR QUALITY			
AQ-1: The use of fossil fuel-fired construction equipment during construction, maintenance, and operational activities would result in intermittent combustive emissions that would not violate any air quality standard or contribute substantially to an existing or projected air quality violation (*less than significant impact*).	=	<	=
AQ-2: The development of the largest projects would produce fugitive dust emissions that could exceed an ambient 24-hour PM10 standard (*significant impact*).	=	<	=
AQ-3: Emissions from the largest prescribed burns during terrestrial vegetation establishment or maintenance activities would produce emissions that could contribute to an exceedance of an ambient 24-hour PM10 standard (*significant impact*).	=	<	=
AQ-4: Air emissions from proposed conservation area establishment activities and facility construction could exceed the MDAQMD daily NOx or PM10 emission significance thresholds, which would result in a cumulatively considerable net increase of a nonattainment pollutant (*significant impact*).	=	<	Not Applicable

Table 5.1-1. Comparison of Impacts of Project Alternatives (continued)

Impacts of the Proposed Action (Alternative 1)	ACTION[1]		
	Alternative 2 No Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
AIR QUALITY (CONTINUED)			
AQ-5: Air emissions from the proposed conservation area establishment activities would not expose sensitive receptors to substantial pollutant concentrations (*less than significant impact*).	=	<	=
AQ-6: Air emissions from the proposed conservation area establishment activities would not create objectionable odors that affect a substantial number of people (*less than significant impact*).	=	<	=
BIOLOGICAL RESOURCES[2]			
BIO-1: Issuance of the section 10(a)(1)(B) permit would authorize the incidental take of up to 27 covered species from implementation of both the covered activities and the Conservation Plan (*less than significant impact*).	Not Applicable	<	=
BIO-2: The establishment of 7,260 acres of cottonwood-willow and honey mesquite land cover would increase the extent of cottonwood-willow riparian forest and mesquite woodland sensitive communities (*beneficial*).	<	<	=
BIO-3: Clearing, grading, planting, and site maintenance during conversion of agricultural lands to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing low value habitat used by resident and migratory wildlife, removal of weedy vegetation and crops, alteration of habitat characteristics through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	<	<	=
BIO-4: Clearing, grading, planting, and site maintenance during conversion of undeveloped lands (primarily saltcedar) to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing non-native vegetation and the habitat it provides for wildlife, short-term effects on habitat characteristics from alteration of local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	<	<	=
BIO-5: Clearing, grading, planting, and site maintenance during establishment of marsh would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	<	<	=
BIO-6: Clearing, grading, and site maintenance during establishment of backwaters would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant* or *significant short-term impacts; beneficial long-term impacts).*	<	<	=
BIO-7: Maintenance of established habitats would result in the removal of invasive non-native vegetation, alteration of habitat characteristics through changes in local hydrology, and short-term elimination or displacement of resident wildlife (*less than significant short-term impacts; less than significant or beneficial long-term impacts*).	<	<	=

Table 5.1-1. Comparison of Impacts of Project Alternatives (continued)

Impacts of the Proposed Action (Alternative 1)	ACTION[1]		
	Alternative 2 No Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
BIOLOGICAL RESOURCES[2]			
BIO-8: Population enhancement activities for covered fish and bird species could adversely affect existing individuals or populations of covered or sensitive species (*less than significant short-term impacts; beneficial long-term impacts*).	<	<	=
BIO-9: Native land cover type establishment and maintenance could temporarily affect wetlands and waters of the U.S. (*less than significant short-term impacts; beneficial long-term impacts*).	<	<	=
CULTURAL AND HISTORIC RESOURCES			
CULT-1: Disturbance of the ground surface could directly or indirectly disturb or destroy significant archaeological or historical resources, particularly in undeveloped or previously undisturbed areas (*significant impact*).	=	<	=
CULT-2: Cultural resources may be affected by unauthorized artifact collection during construction or by a lack of awareness of cultural resource mitigation measures on the part of construction personnel (*significant impact*).	=	<	=
ENERGY AND DEPLETABLE RESOURCES			
Minor impact associated with use of diesel fuel and electrical power during construction and operations. Negligible impact to hydropower production due to consumptive use of water for conservation areas.	=	=	=
ENVIRONMENTAL JUSTICE			
EJ-1: Significant, short-term air quality impacts from construction activities and prescribed burns in or near agricultural areas could result in disproportionate impacts to minority and low-income populations.	<[3]	<	<[3]
EJ-2: Noise from construction and pumps that exceeded local standards could disproportionately affect minority and low-income populations.	<[3]	<	<[3]
EJ-3: If agricultural land were converted to conservation areas, the loss of agricultural jobs would disproportionately affect minority and low-income populations.	<	<	=
HAZARDS AND HAZARDOUS MATERIALS			
HAZ-1: The use of pesticides, lubricants, fuels, and other hazardous materials during construction, operations, and maintenance could result in localized spills, which could create a hazard to the environment (*less than significant impact*).	>	<	=
HAZ-2: The increase in riparian and backwater areas could result in an increase in vectors (*less than significant impact).*	>	<	=
HAZ-3: Construction activities could cause wildfires (*less than significant impact).*	>	<	=
HAZ-4: Fire used as a construction and maintenance tool could escape control and become a wildland fire (*less than significant impact).*	<	<	=

Table 5.1-1. Comparison of Impacts of Project Alternatives (continued)

Impacts of the Proposed Action (Alternative 1)	ACTION[1]		
	Alternative 2 No Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
HAZARDS AND HAZARDOUS MATERIALS			
HAZ-5: Conservation area establishment actions implemented within an Accident Potential Zone of an airport or near a private airstrip could cause a comparatively minor increase in bird populations (*less than significant impact)*.	<	<	Not Applicable
HYDROLOGY AND WATER QUALITY			
HYDRO-1: Habitat installation activities could result in erosion-induced siltation (*less than significant impact*).	<	<	=
HYDRO-2: Habitat establishment could have a short-term adverse effect to water quality if irrigation mobilized (released) pesticides, salts, or other contaminants (*less than significant impact*).	<	<	=
HYDRO-3: Water quality in created or restored backwaters and marshes could be affected by increasing concentrations of various naturally occurring and man-made chemicals (both in the soil and the water column) that result from evaporation of water (*less than significant impact*).	=	=	=
HYDRO-4: Conservation area establishment would result in a long-term improvement to water quality if agricultural land were used (*beneficial impact*).	<	<	=
INDIAN TRUST ASSETS			
ITA-1: Implementing conservation measures on tribal land could result in changes to all classes of ITAs.	< [4]	<	<[4]
LAND USE			
No significant impacts specific to land use were identified, although significant land use conflicts were identified in the agricultural resources and noise analyses (Impacts AG-3, AG-4, NOI-1, and NOI-2).	<	<	=
NOISE			
NOI-1: Construction activities could cause a temporary, substantial increase in ambient noise levels that could exceed local standards if construction occurred in proximity to noise-sensitive receptors (*significant impact)*.	>	<	=
NOI-2: Pumps located near noise-sensitive receptors could cause a substantial increase in ambient noise levels or exceed regulatory thresholds (*significant impact)*.	>	<	=
POPULATION AND HOUSING			
No impact on population or housing.	=	=	=

Table 5.1-1. Comparison of Impacts of Project Alternatives (continued)

Impacts of the Proposed Action (Alternative 1)	ACTION[1]		
	Alternative 2 No Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
PUBLIC SERVICES AND UTILITIES			
Minimal impacts to water treatment, storm drainage, and water supply from the potential construction and operation of two field facilities. Minor impacts to landfill capacity from construction and operations.	=	=	=
RECREATION			
REC-1: The implementation of certain conservation measures could result in the loss of recreational opportunities (*less than significant impact*).	<	<	=
SOCIOECONOMICS			
SOC-1: Agricultural jobs would be lost if agricultural land were converted to conservation areas.	<	<	=
SOC-2: Agricultural-related revenue would be lost if agricultural land were converted to conservation areas.	<	<	=
SOC-3: Local property tax revenues could be reduced if privately owned land were leased or acquired by the Federal or state participants in the LCR MSCP.	<	<	=
SOC-4: Local sales tax from the purchase of products related to agricultural uses would be reduced if privately owned agricultural land were placed in public ownership.	<	<	=
TOPOGRAPHY, GEOLOGY, SOILS, AND MINERAL RESOURCES			
GEO-1: Activities associated with conservation area establishment could result in erosion-induced siltation of the Colorado River (*less than significant impact*).	<	<	=
TRANSBOUNDARY IMPACTS			
TRANS-1: PM10 and combustive emissions from the construction and maintenance of created conservation areas in Reach 7 could disperse to Mexico.	<[5]	<	Not Applicable
TRANSPORTATION			
Minor impact from construction traffic.	=	=	=

Table 5.1-1. Comparison of Impacts of Project Alternatives (continued)

Impacts of the Proposed Action (Alternative 1)	ACTION[1]		
	Alternative 2 No Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*

1 < Impact is less than the proposed action.
> Impact is greater than the proposed action.
= Impact is equal to the proposed action.

2 Impacts BIO-9 and BIO-10 are not included here since they are not impacts of the proposed action and would only occur in the off-site alternative areas (under Alternatives 2 and 4).

3 Air quality and noise impacts would not disproportionately affect minority and low-income populations in the off-site conservation areas. Under Alternative 2, these impacts would occur only to the extent that conservation measures were implemented in the planning area. Under Alternative 4, impacts would be associated only with the creation of 360 acres of backwaters along the LCR.

4 No tribal lands or ITAs are present in any of the off-site conservation areas. Under Alternative 2, these impacts would occur only to the extent that conservation measures were implemented in the planning area. Under Alternative 4, impacts would be associated only with the creation of 360 acres of backwaters along the LCR.

5 Transboundary impacts would not occur in any of the off-site conservation areas because these sites are not sufficiently close to Mexico. Under Alternative 2, these impacts would occur only to the extent that conservation measures were implemented in the planning area. Under Alternative 4, no transboundary impacts would occur because no construction would occur in Reach 7 of the LCR.

Table 5.2-1. Comparison of Project Alternatives to No Action

Impacts of No Action (Alternative 2)	MAGNITUDE OF IMPACTS OF PROJECT ALTERNATIVES COMPARED TO NO ACTION[1]		
	Alternative 1 Proposed Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
AESTHETICS			
AESTH-1: Construction/maintenance activities would temporarily lessen the visual quality of the conservation area establishment sites located on or near visually sensitive resources (*less than significant impact*).	>	=	>
AESTH-2: The construction of field facilities and fish-rearing facilities could be required, which could alter the visual quality of the selected sites (*less than significant impact*).	<	<	<
AESTH-3: Conservation area establishment would return sites to a more natural appearance (*beneficial impact).*	>	=	>
AGRICULTURAL RESOURCES			
AG-1: Important Farmland could be converted to a nonagricultural use (*less than significant impact*).	>	=	>
AG-2: Waterfowl attracted to established backwaters and marshes could destroy crops grown on adjacent farmland *(less than significant impact*).	=	=	=
AG-3: Runoff from established conservation areas could alter the slopes of adjoining laser-leveled fields (*significant impact*).	>	=	>
AG-4: Covered species attracted to established conservation areas could disperse to other lands within the planning area *(less than significant impact*).	>	=	>
AIR QUALITY			
AQ-1: The use of fossil fuel-fired construction equipment during construction, maintenance, and operational activities would result in intermittent combustive emissions that would not violate any air quality standard or contribute substantially to an existing or projected air quality violation (*less than significant impact*).	=	<	=
AQ-2: The development of the largest projects would produce fugitive dust emissions that could exceed an ambient 24-hour PM10 standard (*significant impact*).	=	<	=
AQ-3: Emissions from the largest prescribed burns during terrestrial vegetation establishment or maintenance activities would produce emissions that could contribute to an exceedance of an ambient 24-hour PM10 standard (*significant impact*).	=	<	=
AQ-4: Air emissions from proposed conservation area establishment activities and facility construction could exceed the MDAQMD daily NOx or PM10 emission significance thresholds, which would result in a cumulatively considerable net increase of a nonattainment pollutant (*significant impact*).	=	<	Not Applicable
AQ-5: Air emissions from the proposed conservation area establishment activities would not expose sensitive receptors to substantial pollutant concentrations (*less than significant impact*).	=	<	=

Table 5.2-1. Comparison of Project Alternatives to No Action (continued)

Impacts of No Action (Alternative 2)	MAGNITUDE OF IMPACTS OF PROJECT ALTERNATIVES COMPARED TO NO ACTION[1]		
	Alternative 1 Proposed Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
AIR QUALITY			
AQ-6: Air emissions from the proposed conservation area establishment activities would not create objectionable odors that affect a substantial number of people (*less than significant impact*).	=	<	=
BIOLOGICAL RESOURCES[2]			
BIO-2: The establishment of 7,260 acres of cottonwood-willow and honey mesquite land cover would increase the extent of cottonwood-willow riparian forest and mesquite woodland sensitive communities (*beneficial*).	>	=	>
BIO-3: Clearing, grading, planting, and site maintenance during conversion of agricultural lands to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing low value habitat used by resident and migratory wildlife, removal of weedy vegetation and crops, alteration of habitat characteristics through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	>	=	>
BIO-4: Clearing, grading, planting, and site maintenance during conversion of undeveloped lands (primarily saltcedar) to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing non-native vegetation and the habitat it provides for wildlife, short-term effects on habitat characteristics from alteration of local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	>	=	>
BIO-5: Clearing, grading, planting, and site maintenance during establishment of marsh would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	>	=	>
BIO-6: Clearing, grading, and site maintenance during establishment of backwaters would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant* or *significant short-term impacts; beneficial long-term impacts).*	>	=	>
BIO-7: Maintenance of established habitats would result in the removal of invasive non-native vegetation, alteration of habitat characteristics through changes in local hydrology, and short-term elimination or displacement of resident wildlife (*less than significant short-term impacts; less than significant or beneficial long-term impacts*).	>	=	>

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Table 5.2-1. Comparison of Project Alternatives to No Action (continued)

Impacts of No Action (Alternative 2)	MAGNITUDE OF IMPACTS OF PROJECT ALTERNATIVES COMPARED TO NO ACTION[1]		
	Alternative 1 Proposed Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
BIOLOGICAL RESOURCES			
BIO-8: Population enhancement activities for covered fish and bird species could adversely affect existing individuals or populations of covered or sensitive species (*less than significant short-term impacts; beneficial long-term impacts*).	=	=	=
BIO-9: Native land cover type establishment and maintenance could temporarily affect wetlands and waters of the U.S (*less than significant short-term impacts; beneficial long-term impacts*).	>	=	>
BIO-10: Land cover type establishment and maintenance activities could result in periodic short-term impacts on sensitive and common native fishes inhabiting the Virgin and Muddy rivers (*less than significant impact*).	Not Applicable	Not Applicable	=
BIO-11: Construction to establish/enhance native land cover types could result in the long-term loss or degradation of sensitive native fish habitats in the Virgin and Muddy rivers (*significant impact*).	Not Applicable	Not Applicable	=
CULTURAL AND HISTORIC RESOURCES			
CULT-1: Disturbance of the ground surface could directly or indirectly disturb or destroy significant archaeological or historical resources, particularly in undeveloped or previously undisturbed areas (*significant impact*).	=	<	=
CULT-2 Cultural resources may be affected by unauthorized artifact collection during construction or by a lack of awareness of cultural resource mitigation measures on the part of construction personnel (*significant impact*).	=	<	=
ENERGY AND DEPLETABLE RESOURCES			
Minor impact associated with use of diesel fuel and electrical power during construction and operations. Negligible impact to hydropower production due to consumptive use of water for conservation areas.	=	=	=
ENVIRONMENTAL JUSTICE			
EJ-1: Significant, short-term air quality impacts from construction activities and prescribed burns in or near agricultural areas could result in disproportionate impacts to minority and low-income populations.[3]	=	=	<[3]
EJ-2: Noise from construction and pumps that exceeded local standards could disproportionately affect minority and low-income populations.[3]	<	=	<[3]
EJ-3: If agricultural land were converted to conservation areas, the loss of agricultural jobs would disproportionately affect minority and low-income populations.	>	=	>
HAZARDS AND HAZARDOUS MATERIALS			
HAZ-1: The use of pesticides, lubricants, fuels, and other hazardous materials during construction, operations, and maintenance could result in localized spills, which could create a hazard to the environment (*less than significant impact*).	<	<	<

Table 5.2-1. Comparison of Project Alternatives to No Action (continued)

Impacts of No Action (Alternative 2)	MAGNITUDE OF IMPACTS OF PROJECT ALTERNATIVES COMPARED TO NO ACTION[1]		
	Alternative 1 Proposed Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
HAZARDS AND HAZARDOUS MATERIALS			
HAZ-2: The increase in riparian and backwater areas could result in an increase in vectors (*less than significant impact).*	<	<	<
HAZ-3: Construction activities could cause wildfires (*less than significant impact).*	<	=	<
HAZ-4: Fire used as a construction and maintenance tool could escape control and become a wildland fire (*less than significant impact).*	>	<	>
HAZ-5: Conservation area establishment actions implemented within an Accident Potential Zone of an airport or near a private airstrip could cause a comparatively minor increase in bird populations (*less than significant impact).*	>	<	Not Applicable
HYDROLOGY AND WATER QUALITY			
HYDRO-1: Habitat establishment activities could result in erosion-induced siltation (*less than significant impact*).	>	=	>
HYDRO-2: Habitat establishment could have a short-term adverse effect to water quality if irrigation mobilized (released) pesticides, salts, or other contaminants (*less than significant impact*).	>	=	>
HYDRO-3: Water quality in created or restored backwaters and marshes could be affected by increasing concentrations of various naturally occurring and man-made chemicals (both in the soil and the water column) that result from evaporation of water (*less than significant impact*).	=	=	=
HYDRO-4: Conservation area establishment would result in a long-term improvement to water quality if agricultural land were used (*beneficial impact*).	>	=	>
INDIAN TRUST ASSETS			
ITA-1: Implementing conservation measures on tribal land could result in changes to all classes of ITAs. [4]	>	=	<[3]
LAND USE			
No significant impacts specific to land use were identified, although significant land use conflicts were identified in the agricultural resources and noise analyses (Impacts AG-3, AG-4, NOI-1, and NOI-2).	>	=	>
NOISE			
NOI-1: Construction activities could cause a temporary, substantial increase in ambient noise levels that could exceed local standards if construction occurred in proximity to noise-sensitive receptors (*significant impact).*	<	=	<
NOI-2: Pumps located near noise-sensitive receptors could cause a substantial increase in ambient noise levels or exceed regulatory thresholds (*significant impact).*	<	=	<

Table 5.2-1. Comparison of Project Alternatives to No Action (continued)

Impacts of No Action (Alternative 2)	MAGNITUDE OF IMPACTS OF PROJECT ALTERNATIVES COMPARED TO NO ACTION[1]		
	Alternative 1 Proposed Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*
POPULATION AND HOUSING			
No impact on population or housing.	=	=	=
PUBLIC SERVICES AND UTILITIES			
Minimal impacts to water treatment, storm drainage, and water supply from the potential construction and operation of two field facilities. Minor impacts to landfill capacity from construction and operations.	=	=	=
RECREATION			
REC-1: The implementation of certain conservation measures could result in the loss of recreational opportunities (*less than significant impact*).	>	=	>
SOCIOECONOMICS			
SOC-1: Agricultural jobs would be lost if agricultural land were converted to conservation areas.	>	=	>
SOC-2: Agricultural-related revenue would be lost if agricultural land were converted to conservation areas.	>	=	>
SOC-3: Local property tax revenues could be reduced if privately owned land were leased or acquired by the Federal or state participants in the LCR MSCP.	>	=	>
SOC-4: Local sales tax from the purchase of products related to agricultural uses would be reduced if privately owned agricultural land were placed in public ownership.	>	=	>
TOPOGRAPHY, GEOLOGY, SOILS, AND MINERAL RESOURCES			
GEO-1: Activities associated with conservation area establishment could result in erosion-induced siltation of the Colorado River (*less than significant impact*).	>	=	>
TRANSBOUNDARY IMPACTS			
TRANS-1: PM10 and combustive emissions from the construction and maintenance of created conservation areas in Reach 7 could disperse to Mexico.[5]	>	=	Not Applicable
TRANSPORTATION			
Minor impact from construction traffic.	=	=	=

Table 5.2-1. Comparison of Project Alternatives to No Action (continued)

Impacts of No Action (Alternative 2)	MAGNITUDE OF IMPACTS OF PROJECT ALTERNATIVES COMPARED TO NO ACTION[1]		
	Alternative 1 Proposed Action	*Alternative 3 Listed Species Only*	*Alternative 4 Off-Site Conservation*

1 < Impact is less than the proposed action.
> Impact is greater than the proposed action.
= Impact is equal to the proposed action.

2 Impact BIO-1 is not applicable to the No Action Alternative because no section 10(a)(1)(B) permit would be issued and the take associated with the permit would not occur.

3 Air quality and noise impacts would not disproportionately affect minority and low-income populations in the off-site conservation areas. Under Alternative 2, these impacts would occur only to the extent that conservation measures were implemented in the planning area. Under Alternative 4, impacts would be associated only with the creation of 360 acres of backwaters along the LCR.

4 No tribal lands or ITAs are present in any of the off-site conservation areas. Under Alternative 2, these impacts would occur only to the extent that conservation measures were implemented in the planning area. Under Alternative 4, impacts would be associated only with the creation of 360 acres of backwaters along the LCR.

5 Transboundary impacts would not occur in any of the off-site conservation areas because these sites are not sufficiently close to Mexico. Under Alternative 2, these impacts would occur only to the extent that conservation measures were implemented in the planning area. Under Alternative 4, no transboundary impacts would occur because no construction would occur in Reach 7 of the LCR.

6.0 OTHER SECTIONS REQUIRED BY NEPA AND/OR CEQA

6.1 GROWTH-INDUCING IMPACTS

Both NEPA and CEQA require consideration of indirect impacts of an action, including growth-inducing impacts. CEQ regulations (section 1508.8[b]) provide guidance to Federal agencies for evaluating indirect effects:

> Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

State CEQA Guidelines section 15126.2(d) gives the most specific guidance for assessing growth-inducing impacts, stating that an EIR must discuss the ways in which a project could:

- foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment;
- remove obstacles to population growth;
- require the construction of new community facilities that could cause significant environmental effects; or
- encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively.

The Conservation Plan would not foster economic growth or the construction of additional housing, nor would it create new job opportunities. Rather, as discussed in section 3.16.2.1, agricultural jobs and revenue could be lost if agricultural lands were used for the establishment of conservation areas. The implementation of the proposed action would not remove an obstacle to growth since no major infrastructure would be constructed, nor would any existing conditions that prevent growth be altered by the proposed action. New access roads and irrigation infrastructure would be sized and positioned to serve only the conservation areas or new field or fish rearing facilities. The Conservation Plan also would not require new community facilities. It is anticipated that one new law enforcement officer and one new wildland fire fighter would be provided, respectively, for every 5,000 and 2,500 acres of conserved land not already in public ownership. All new personnel would be stationed at existing facilities. Additionally, the Conservation Plan includes a number of provisions that would minimize the potential impacts from wildland fires and thus would not require the expansion of fire protection services by other agencies.

As described under the no action alternative (section 2.1.2), the covered activities likely would be implemented whether or not the Conservation Plan were carried forward. Thus, no other aspects of the proposed action would encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively.

The proposed action would not have growth-inducing impacts, nor would the other action alternatives, since they involve the implementation of a Conservation Plan with the same

general elements as the proposed action and would differ only with regard to the location and amount of conservation area established.

6.2 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA (40 CFR 1502.16) requires that an EIS include a discussion of the relationship between the short-term uses of man's environment and the maintenance and enhancement of long-term productivity. All of the alternatives would result in the long-term use of the environment for conservation area establishment. Construction of this habitat could result in short-term impacts to resources such as aesthetics, air quality, biological resources, energy, hazards, hydrology and water quality, noise, and geology. With the exception of construction-related impacts associated with air quality, including environmental justice impacts under Alternatives 1, 2, and 3, these impacts are found to be less than significant or would be mitigated to less than significant through the implementation of measures identified in this EIS/EIR. Long-term adverse impacts would be associated with the potential conversion of agricultural land to other land cover types, along with concomitant socioeconomic and environmental justice impacts. Additionally, Alternative 4 could result in significant but mitigable impacts to sensitive native fish habitat along the Virgin and Muddy rivers. To the extent that agricultural lands were converted to other land cover types, the economic productivity of these lands would be lost, but these effects are not significant.

The Conservation Plan would result in long-term benefits to biological resources, as well as more modest benefits to aesthetics and water quality. The proposed action would result in the creation of 7,260 acres of cottonwood-willow and honey mesquite land cover type, which would increase the extent of cottonwood-willow and mesquite woodland sensitive communities. The proposed action also would result in the establishment of 512 acres of marsh and 360 acres of backwaters. These actions would represent a beneficial impact for vegetation as well as for the covered and non-covered wildlife species using these habitat types. Expansion of native plant communities would provide habitat for native species, including species whose populations have declined due to loss or degradation of habitat, and help to restore the natural ecosystems that these communities can support. The establishment of additional habitat would allow population expansion for these species, a beneficial impact. The level of disturbance to wildlife by agricultural workers and machinery would be reduced. In addition, the conversion of agricultural land to riparian land cover types would lessen the input of sediment, salts, nutrients, and agricultural chemicals to the river, improving water quality and aquatic habitat conditions. The establishment of riparian vegetation along an expanded portion of the river would provide increased shading, water filtration, and nutrient and pollutant uptake, improving water quality and aquatic habitat conditions downstream. Establishing native plant communities would aid in soil stabilization, a benefit for micro-organisms and invertebrates that live in the soil as well as vertebrates that burrow in the ground. Irrigation that mimics natural hydrologic regimes would also benefit native ground-dwelling species adapted to those conditions.

Aesthetic benefits would result from returning conservation sites to a more natural appearance. Implementation of the Conservation Plan would establish and maintain over 8,100 acres of land that are currently in agricultural production or undeveloped land that is characterized by

invasive, non-native species. The proposed action also includes measures that would establish native vegetation in the event of wildfires. Currently, when fires occur, native vegetation is often supplanted by saltcedar, which is an invasive, introduced species.

Long-term water quality benefits would occur if agricultural land were converted to habitat since the conversion of agricultural land to riparian habitat would lessen the input of nutrients and agricultural chemicals to the river, improving water quality and aquatic habitat conditions. The establishment of riparian vegetation along an expanded portion of the river would provide increased shading, water filtration, and nutrient and pollutant uptake, improving water quality and aquatic habitat conditions downstream. This impact would be beneficial.

6.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

State CEQA Guidelines section 15126.2(c) requires that an EIR analyze:

> …significant irreversible environmental changes which would be caused by the Proposed Project should it be implemented. Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

The Conservation Plan would require use of a variety of construction materials for the construction of irrigation and field facilities as well as roadways. In addition, agricultural lands, including Important Farmlands, used for conservation area establishment would be committed to non-agricultural use for the 50-year duration of the LCR MSCP. After this time, however, the land could conceivably be returned to agricultural use since the soils would not be removed. Water would be required to establish and maintain habitat and would be unavailable for other purposes for the 50-year duration of the LCR MSCP. Minimal amounts of potable water would be required to serve the two field facilities should they be constructed.

6.4 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are those significant environmental effects of the proposed project that cannot be avoided or substantially lessened as required under CEQA (State CEQA Guidelines section 15091). The proposed action and alternatives would result in significant, potentially unavoidable short-term air quality impacts. Table 6.4-1 summarizes the impacts of the proposed action and alternatives, including unavoidable adverse impacts on those environmental resources evaluated pursuant to CEQA. NEPA does not require the determination of unavoidable adverse impacts.

Table 6.4-1. Summary of Impacts and Mitigation Measures

Impact	Applicable Alternative				*Mitigation Measure*[3]	*Unavoidable Adverse Impacts*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*		
Aesthetics						
AESTH-1: Construction/maintenance activities would temporarily lessen the visual quality of the conservation area establishment sites located on or near visually sensitive resources (*less than significant impact*).	X	X	X	X	None required	None
AESTH-2: The construction of field facilities and fish-rearing facilities could be required, which could alter the visual quality of the selected sites (*less than significant impact*).	X	X	X	X	None required	None
AESTH-3: Conservation area establishment would return sites to a more natural appearance (*beneficial impact)*.	X	X	X	X	None required	None
Agricultural Resources						
AG-1: Important Farmland could be converted to a nonagricultural use (*less than significant impact*).	X	X	X	X	None required	None
AG-2: Waterfowl attracted to established backwaters and marshes could destroy crops grown on adjacent farmland *(less than significant impact*).	X	X	X	X	None required	None
AG-3: Runoff from established conservation areas could alter the slopes of adjoining laser-leveled fields (*significant impact*).	X	X	X	X	AG-1: Develop grading plans for newly established conservation areas that direct runoff away from adjacent agricultural lands to ensure that flow rates from the conservation area do not exceed existing discharge rates.	None
AG-4: Covered species attracted to established conservation areas could disperse to other lands within the planning area *(less than significant impact*).	X	X	X	X	None required	None
Air Quality						
AQ-1: The use of fossil fuel-fired construction equipment during construction, maintenance, and operational activities would result in intermittent combustive emissions that would not violate any air quality standard or contribute substantially to an existing or projected air quality violation (*less than significant impact*).	X	X	X	X	None required	None

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				*Mitigation Measure*[3]	*Unavoidable Adverse Impacts*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*		
Air Quality						
AQ-2: The development of the largest projects would produce fugitive dust emissions that could exceed an ambient 24-hour PM10 standard (*significant impact*).	X	X	X	X	AQ-1: Implement standard operating practices to minimize fugitive dust (PM10) emissions during construction activities.	Potentially Significant
AQ-3: Emissions from the largest prescribed burns during terrestrial vegetation establishment or maintenance activities would produce emissions that could contribute to an exceedance of an ambient 24-hour PM10 standard (*significant impact*).	X	X	X	X	AQ-2: Implement a smoke management plan for all construction and maintenance activities involving the use of fire.	Potentially Significant
AQ-4: Air emissions from proposed conservation area establishment activities and facility construction could exceed the MDAQMD daily NO_x or PM10 emission significance thresholds, which would result in a cumulatively considerable net increase of a nonattainment pollutant (*significant impact*).	X	X	X		See Mitigation Measure AQ-1.	Significant
AQ-5: Air emissions from the proposed conservation area establishment activities would not expose sensitive receptors to substantial pollutant concentrations (*less than significant impact*).	X	X	X	X	None required	None
AQ-6: Air emissions from the proposed conservation area establishment activities would not create objectionable odors that affect a substantial number of people (*less than significant impact*).	X	X	X	X	None required	None
Biological Resources						
BIO-1: Issuance of the section 10(a)(1)(B) permit would authorize the incidental take of up to 27 covered species from implementation of both the covered activities and the Conservation Plan (*less than significant impact*).		X	X	X	None required	None

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				Mitigation Measure[3]	Unavoidable Adverse Impacts
	2 No Action[1]	1 Proposed Action	3 Listed Species Only[2]	4 Off-Site Conservation		
Biological Resources						
BIO-2: The establishment of 7,260 acres of cottonwood-willow and honey mesquite land cover would increase the extent of cottonwood-willow riparian forest and mesquite woodland sensitive communities (*beneficial*).	X	X	X[4]	X	None required	None
BIO-3: Clearing, grading, planting, and site maintenance during conversion of agricultural lands to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing low value habitat used by resident and migratory wildlife, removal of weedy vegetation and crops, alteration of habitat characteristics through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required	None
BIO-4: Clearing, grading, planting, and site maintenance during conversion of undeveloped lands (primarily saltcedar) to cottonwood-willow and/or honey mesquite land cover types would result in the elimination of existing non-native vegetation and the habitat it provides for wildlife, short-term effects on habitat characteristics from alteration of local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required	None
BIO-5: Clearing, grading, planting, and site maintenance during establishment of marsh would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required	None

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				*Mitigation Measure*[3]	*Unavoidable Adverse Impacts*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*		
Biological Resources						
BIO-6: Clearing, grading, and site maintenance during establishment of backwaters would result in the long-term elimination of existing vegetation and the habitat it provides for wildlife, alteration of habitat conditions through changes in local hydrology and exposure of soil to erosion, and elimination or displacement of resident wildlife (*less than significant* or *significant short-term impacts; beneficial long-term impacts).*	X	X	X	X	BIO-1: Conduct site-specific surveys for non-covered sensitive species during selection of land cover type establishment or enhancement (e.g., existing backwaters) areas and, if any are found, then implement measures appropriate for the specific site and species to avoid or minimize impacts to the extent feasible without causing impacts on covered species. These may include measures specified in the Conservation Plan to avoid or minimize potential effects on covered species (e.g., scheduling to avoid breeding times).	None
BIO-7: Maintenance of established habitats would result in the removal of invasive non-native vegetation, alteration of habitat characteristics through changes in local hydrology, and short-term elimination or displacement of resident wildlife (*less than significant short-term impacts; less than significant or beneficial long-term impacts*).	X	X	X	X	None required	None
BIO-8: Population enhancement activities for covered fish and bird species could adversely affect existing individuals or populations of covered or sensitive species (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required	None
BIO-9: Native land cover type establishment and maintenance could temporarily affect wetlands and waters of the U.S (*less than significant short-term impacts; beneficial long-term impacts*).	X	X	X	X	None required	None
BIO-10: Land cover type establishment and maintenance activities could result in periodic short-term impacts on sensitive and common native fishes inhabiting the Virgin and Muddy rivers (*less than significant impact*).	X			X	None required	None

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				Mitigation Measure[3]	Unavoidable Adverse Impacts
	2 No Action[1]	1 Proposed Action	3 Listed Species Only[2]	4 Off-Site Conservation		
Biological Resources						
BIO-11: Construction to establish/enhance native land cover types could result in the long-term loss or degradation of sensitive native fish habitats in the Virgin and Muddy rivers (*significant impact*).	X[5]			X	BIO-2: Design site-specific land cover type establishment plans to avoid and minimize potential effects on sensitive native fish habitats along the Virgin and Muddy rivers. Preparation of the design plans shall be coordinated with and approved by the Service as part of section 7 consultation. If appropriate, design plans shall include measures to rehabilitate any affected habitat.	None
Cultural and Historic Resources						
CULT-1: Disturbance of the ground surface could directly or indirectly disturb or destroy significant archaeological or historical resources, particularly in undeveloped or previously undisturbed areas (*significant impact*).	X	X	X	X	CULT-1: Consult with the appropriate SHPO(s), tribes, and other interested parties, perform archival research, interview informants, conduct cultural resource inventories; evaluate all identified cultural resources for potential listing on the NRHP or state or local registers; modify project design, when feasible, to avoid cultural resources eligible for listing; develop and implement a pre-construction Testing and Evaluation Plan, pre-construction Data Recovery Plan, and Cultural Resources Construction Monitoring Plan (CRCMP) as appropriate; re-direct construction as needed if new cultural resources sites are found, document new discoveries, and avoid sites or implement a data recovery program; initiate consultation with any known lineal descendants and relevant Indian tribes as per NAGPRA or follow state and local laws as appropriate; incorporate these procedures into all archaeological testing and/or data recovery plans and the CRCMP.	None

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				*Mitigation Measure*[3]	*Unavoidable Adverse Impacts*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*		
Cultural and Historic Resources						
CULT-2: Cultural resources may be affected by unauthorized artifact collection during construction or by a lack of awareness of cultural resource mitigation measures on the part of construction personnel (*significant impact*).	X	X	X	X	See Mitigation Measure CULT-1	None
Energy and Depletable Resources						
Minor impact associated with use of diesel fuel and electrical power during construction and operations. Negligible impact to hydropower production due to consumptive use of water for conservation areas.	X	X	X	X	None required	None
Environmental Justice						
EJ-1. Significant, short-term air quality impacts from construction activities and prescribed burns in or near agricultural areas could result in disproportionate impacts to minority and low-income populations.	X[6]	X	X	X[6]	Implement Mitigation Measures AQ-1 and AQ-2	Not applicable
EJ-2. Noise from construction and pumps that exceeded local standards could disproportionately affect minority and low-income populations.	X[6]	X	X	X[6]	Implement Mitigation Measures NOI-1 and NOI-2	Not applicable
EJ-3: If agricultural land were converted to conservation areas, the loss of agricultural jobs would disproportionately affect minority and low-income populations.	X	X	X	X	EJ-1: Reclamation shall work with local jurisdictions and/or growers to ensure that agricultural workers are notified as soon as possible of the potential for a loss of jobs once specific project locations have been identified. Reclamation will encourage the local jurisdictions and/or growers to provide timely information and assistance to agricultural workers regarding the availability of alternative employment.	Not applicable
Hazards and Hazardous Materials						
HAZ-1: The use of pesticides, lubricants, fuels, and other hazardous materials during construction, operations, and maintenance could result in localized spills, which could create a hazard to the environment (*less than significant impact*).	X	X	X	X	None required	None

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				Mitigation Measure[3]	Unavoidable Adverse Impacts
	2 No Action[1]	1 Proposed Action	3 Listed Species Only[2]	4 Off-Site Conservation		
Hazards and Hazardous Materials						
HAZ-2: The increase in riparian and backwater areas could result in an increase in vectors (*less than significant impact).*	X	X	X	X	None required	None
HAZ-3: Construction activities could cause wildfires (*less than significant impact).*	X	X	X	X	None required	None
HAZ-4: Fire used as a construction and maintenance tool could escape control and become a wildland fire (*less than significant impact).*	X	X	X	X	None required	None
HAZ-5: Conservation area establishment actions implemented within an Accident Potential Zone of an airport or near a private airstrip could cause a comparatively minor increase in bird populations (*less than significant impact).*	X	X	X	X	None required	None
Hydrology and Water Quality						
HYDRO-1: Habitat establishment activities could result in erosion-induced siltation (*less than significant impact*).	X	X	X	X	None required	None
HYDRO-2: Habitat establishment could have a short-term adverse effect to water quality if irrigation mobilized (released) pesticides, salts, or other contaminants (*less than significant impact*).	X	X	X	X	None required	None
HYDRO-3: Water quality in created or restored backwaters and marshes could be affected by increasing concentrations of various naturally occurring and man-made chemicals (both in the soil and the water column) that result from evaporation of water (*less than significant impact*).	X	X	X	X	None required	None
HYDRO-4: Conservation area establishment would result in a long-term improvement to water quality if agricultural land were used (*beneficial impact*).	X	X	X	X	None required	None

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				*Mitigation Measure*[3]	*Unavoidable Adverse Impacts*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*		
Indian Trust Assets						
ITA-1: Implementing conservation measures on tribal land could result in changes to all classes of ITAs.	X[7]	X	X	X[7]	None required.	Not applicable
Land Use						
No significant impacts specific to land use were identified, although significant land use conflicts were identified in the agricultural resources and noise analyses (Impacts AG-3, AG-4, NOI-1, and NOI-2).	X	X	X	X	Implement Mitigation Measures AG-1, NOI-1, and NOI-2.	None
Noise						
NOI-1: Construction activities could cause a temporary, substantial increase in ambient noise levels that could exceed local standards if construction occurred in proximity to noise-sensitive receptors (*significant impact)*.	X	X	X	X	NOI-1: As needed, select quieter equipment; use noise control devices on equipment, locate equipment away from sensitive receptors; notify nearby neighbors prior to work; minimize idling, use noise barriers; and where possible, limit construction to non-mating, non-nesting seasons of noise-sensitive species.	None
NOI-2: Pumps located near noise-sensitive receptors could cause a substantial increase in ambient noise levels or exceed regulatory thresholds (*significant impact)*.	X	X	X	X	NOI-2: If pumps cannot be located at sufficient distances from sensitive receptors to avoid the exceedance of a local noise standard or a substantial increase in the ambient noise level at the sensitive receptors, construct barriers or enclosures to ensure adherence to local standards.	None
Population and Housing						
No impact on population or housing.	X	X	X	X	None required	None

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				Mitigation Measure[3]	Unavoidable Adverse Impacts
	2 No Action[1]	1 Proposed Action	3 Listed Species Only[2]	4 Off-Site Conservation		
Public Services and Utilities						
Minimal impacts to water treatment, storm drainage, and water supply from the potential construction and operation of two field facilities. Minor impacts to landfill capacity from construction and operations.	X	X	X	X	None required	None
Recreation						
REC-1: The implementation of certain conservation measures could result in the loss of recreational opportunities (*less than significant impact*).	X	X	X	X	None required	None
Socioeconomics						
SOC-1: Agricultural jobs would be lost if agricultural land were converted to conservation areas.	X	X	X	X	None required	None
SOC-2: Agricultural-related revenue would be lost if agricultural land were converted to conservation areas.	X	X	X	X	None required	None
SOC-3: Local property tax revenues could be reduced if privately owned land were leased or acquired by the Federal or state participants in the LCR MSCP.	X	X	X	X	None required	None
Socioeconomics						
SOC-4: Local sales tax from the purchase of products related to agricultural uses would be reduced if privately owned agricultural land was placed in public ownership.	X	X	X	X	None required	None
Topography, Geology, Soils, and Mineral Resources						
GEO-1: Activities associated with conservation area establishment could result in erosion-induced siltation of the Colorado River (*less than significant impact*).	X	X	X	X	None required	None
Transboundary Impacts						
TRANS-1: PM_{10} and combustive emissions from the construction and maintenance of created conservation areas in Reach 7 could disperse to Mexico.	X[8]	X	X		None required	Not applicable

Table 6.4-1. Summary of Impacts and Mitigation Measures (continued)

Impact	Applicable Alternative				*Mitigation Measure*[3]	*Unavoidable Adverse Impacts*
	2 No Action[1]	*1 Proposed Action*	*3 Listed Species Only*[2]	*4 Off-Site Conservation*		
Transportation						
Minor impact from construction traffic.	X	X	X	X	None required	None

1 The no action alternative would result in similar types of impacts as the proposed action since similar conservation measures likely would be implemented. It is likely, however, that a smaller amount of conservation area would be established or maintained, thus reducing the intensity or magnitude of the impacts, including beneficial impacts. Some conservation could occur in the off-site conservation areas, and impacts could occur in these areas as well as in the planning area.

2 The listed species only alternative would result in the establishment of a smaller amount of conservation area than the proposed action. The same types of impacts would occur, but the intensity, or magnitude, would be reduced, including that of beneficial impacts.

3 The development and implementation of mitigation measures for the no action alternative is outside the authority of the lead agencies for this EIS/EIR. The mitigation measures included in this table are examples of measures that could be implemented to reduce impacts associated with the no action alternative.

4 Less cottonwood-willow habitat and no honey mesquite habitat would be established under this alternative.

5 These impacts could occur under the no action alternative to the extent that conservation area creation occurred in the off-site conservation areas.

6 Under Alternative 2, these impacts would not occur to the extent that conservation areas were created in the off-site conservation areas. Air quality and noise impacts would not disproportionately affect minority and low-income populations in the off-site conservation areas. Under Alternative 4, impacts would be associated only with the creation of 360 acres of backwaters along the LCR.

7 Under Alternative 2, these impacts would not occur to the extent that conservation areas were created in the off-site conservation areas. Under Alternative 4, impacts would be associated only with the creation of 360 acres of backwaters along the LCR. No tribal lands or ITAS are present in any of the off-site conservation areas.

8 Transboundary impacts would not occur if conservation occurred only in the off-site conservation areas or in Reaches 1-6.

Not applicable: CEQA does not require analysis of this resource area and NEPA does not require the determination of unavoidable adverse impacts. Thus, no determination of unavoidable adverse impacts has been provided.

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7.0 COMPLIANCE, CONSULTATION, AND COORDINATION

7.1 REGULATORY COMPLIANCE

7.1.1 Federal Laws, Regulations, and Executive Orders

Endangered Species Act of 1973, Public Law 93-205

The ESA protects threatened and endangered species (and their designated critical habitat), as listed by the Service, from unauthorized take and directs Federal agencies to ensure that their actions do not jeopardize the continued existence of such species. Section 7 of the ESA requires Federal agencies to consult with the Service to ensure that undertaking, funding, permitting, or authorizing an action is not likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat, as defined under the law. The Service may authorize take of a listed species under section 10, which also provides for the preparation of habitat conservation plans. (Refer to section 1.3 for a discussion of past compliance with the ESA for certain covered activities.)

The Conservation Plan is intended to provide long-term ESA compliance for Federal and non-Federal interests in the LCR planning area for a period of 50 years, beginning in the year 2005. As part of the proposed action, the Service would issue a section 10(a)(1)(B) permit based on a determination that the Federal action of issuing the permit and the implementation of the non-Federal covered activities would not appreciably reduce the likelihood of the survival and recovery of the covered species in the wild.

Fish and Wildlife Coordination Act, 16 U.S.C. 661-666

The Fish and Wildlife Coordination Act requires that whenever any body of water is proposed or authorized to be impounded, diverted, or otherwise controlled or modified, the lead Federal agency must consult with the Service, the state agency responsible for fish and wildlife management and, for projects affecting marine fisheries, the National Marine Fisheries Service. Section 662(b) of the Act requires the lead Federal agency to consider the Service and other agencies' recommendations. The recommendations may address wildlife conservation and development, damage to wildlife attributable to the proposed action, and measures proposed to mitigate or compensate for these damages.

Due the programmatic nature of this EIS, a Fish and Wildlife Coordination Act Report is not currently being requested for the Conservation Plan, although the LCR MSCP participants coordinated with the Service concerning the development of the Conservation Plan and potential impacts from its implementation. A determination will be made if individual conservation activities trigger the requirements of the Fish and Wildlife Coordination Act for consultation, and the need for reports for those individual conservation activities will be reviewed with the Service and the state wildlife agencies on a case-by-case basis.

Fish and Wildlife Conservation Act of 1980 (16 U.S.C. 2901)

The Fish and Wildlife Conservation Act, commonly known as the Nongame Act, authorizes financial and technical assistance to the states for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife. The Act also serves to encourage Federal agencies to utilize their statutory and administrative authority to conserve and to promote the conservation of nongame fish and wildlife and their habitats. Amendments adopted in 1988 and 1989 also direct the Secretary of the Interior to undertake certain activities to research and conserve migratory nongame birds.

The Conservation Plan is consistent with this Act because the conservation actions would promote the conservation of nongame fish and wildlife species and their habitats. Moreover, the establishment of land cover types that provide habitat for, and the conservation of, nongame migratory bird species is a central component of the Conservation Plan.

National Wildlife Refuge System Administration Act of 1966 (42 U.S.C. 668dd), as amended by the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57)

This Act provides for the administration and management of the national wildlife refuge system, including wildlife refuges, areas for the protection and conservation of fish and wildlife threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas.

The Conservation Plan would be consistent with this Act because the conservation actions would include the enhancement or maintenance of habitat areas potentially located within existing refuges.

Migratory Bird Treaty Act 1918 (16 U.S.C. 703)

The Migratory Bird Treaty Act protects migratory birds by limiting the hunting, capturing, selling, purchasing, transporting, importing, exporting, killing, or possession of these birds or their nests or eggs. The specific migratory birds covered are identified in separate agreements between the United States and Great Britain, Mexico, and Japan.

The Conservation Plan would be consistent with the Migratory Bird Treaty Act. The conservation actions would benefit migratory birds by establishing protected areas that provide habitat for bird species protected by the Act. Reclamation will consult with the Service regarding impacts to migratory birds as required by Executive Order (EO) 13186 (discussed below). The section 10(a)(1)(B) permit issued by the Service for ESA-listed birds would function as the permit required by this Act.

Migratory Bird Conservation Act of 1929 (16 U.S.C. 715)

The Migratory Bird Conservation Act, which was passed by Congress in 1929, protects migratory birds by creating the Migratory Bird Conservation Commission. The Commission's purpose is to consider and approve the purchase, rental, or other acquisition of any areas of land or water that may be recommended by the Secretary of the Interior for the purpose of establishing sanctuaries for migratory birds.

No action is required under this Act. However, the Conservation Plan would be consistent with the goals of the Act by providing protected habitat for migratory birds.

Bald Eagle Protection Act of 1940 (16 U.S.C. 4901-4918)

The Bald Eagle Protection Act imposes criminal and civil penalties on anyone in the United States or within its jurisdiction who, unless excepted, takes, possesses, sells, purchases, barters, offers to sell or purchase or barter, transports, exports or imports at any time or in any manner a bald or golden eagle, alive or dead; or any part, nest or egg of these eagles; or violates any permit or regulations issued under the Act. If compatible with the preservation of bald and golden eagles, the Secretary of the Interior may issue regulations authorizing the taking, possession and transportation of these eagles for scientific or exhibition purposes, for religious purposes of Indian Tribes or for the protection of wildlife, agricultural or other interests.

The Conservation Plan would be consistent with the Bald Eagle Protection Act because the conservation actions would not result in adverse impacts to bald eagles.

Section 176, Clean Air Act (42 U.S.C. 7506)

The purpose of the CAA is to protect the nation's air quality by regulating emissions of air pollutants. The CAA is applicable to permits and planning procedures related to activities onshore and within the territorial sea. Section 176 of the CAA prohibits Federal agencies from engaging in any activity that does not conform to the most recent EPA-approved SIP's purpose of attaining and maintaining the NAAQS. This means that Federally supported or funded activities will not (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any standard; (3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The proposed action would result in potential short-term, unavoidable impacts air quality impacts. The development of the largest projects would produce fugitive dust emissions that could exceed an ambient 24-hour PM_{10} standard; emissions from the largest prescribed burns during terrestrial vegetation establishment or maintenance activities also could produce emissions that would contribute to an exceedance of an ambient 24-hour PM_{10} standard; and air emissions from habitat establishment activities and facility construction could exceed the MDAQMD daily NO_x or PM_{10} emission significance thresholds. Mitigation Measures AQ-1 and AQ-2 have been included in this EIS/EIR and would involve implementation of standard operating practices to minimize PM_{10} emissions during construction and the implementation of a smoke management plan, respectively. These measures would reduce impacts to air quality, but impacts could remain significant, although they would last only for the duration of the construction activity. As discussed in section 3.3, Air Quality, the lead agencies would ensure that proposed construction, maintenance, and operations activities would comply with all applicable air regulations, which would in turn ensure that the proposed action would not conflict with or obstruct implementation of an applicable air quality plan. Therefore, the Conservation Plan would be consistent with this Act.

General Conformity Rule, 40 CFR, Part 51, subpart W

This rule requires that Federal projects or projects receiving Federal funding conform to SIPs developed for the purpose of reaching attainment of NAAQS. The General Conformity Rule allows a Federal agency to defer a conformity analysis for a programmatic action such as the Conservation Plan until project-specific information is available upon which to base the analysis (EPA 1993). As a result, the conformity analysis for the proposed action would occur at a future date in association with project-specific proposals.

Executive Order 13352, Facilitation of Cooperative Conservation

EO 13352 was issued on August 26, 2004. The purpose of this order is to ensure that the Departments of Interior, Agriculture, Commerce, and Defense and the EPA implement laws relating to the environment and natural resources in a manner that promotes cooperative conservation, with an emphasis on appropriate inclusion of local participation in Federal decisionmaking, in accordance with their respective agency missions, policies, and regulations. Cooperative conservation is defined as "actions that relate to use, enhancement, and enjoyment of natural resources, protection of the environment, or both, and that involve collaborative activity among Federal, State, local, and tribal governments, private for-profit and nonprofit institutions, other nongovernmental entities and individuals." The above-referenced agencies are directed to carry out their efforts in a manner that:

- facilitates cooperative conservation;
- takes appropriate account of and respects the interests of persons with ownership or other legally recognized interests in land and other natural resources;
- properly accommodates local participation in Federal decisionmaking; and
- provides that the programs, projects, and activities are consistent with protecting public health and safety.

The proposed action is consistent with the principles of cooperative conservation. The LCR MSCP is intended to be a coordinated program and has been developed by a partnership of state, Federal, and other public and private stakeholders in Arizona, California, and Nevada with interests in managing the water and related resources of the LCR. The members of this partnership also would be responsible for implementing and funding the proposed Conservation Plan. The LCR MSCP participants have taken appropriate account of and respect the interests of persons with ownership or other legally recognized interests in land and other natural resources; all land would be acquired on a voluntary basis, and siting criteria and mitigation measures identified in this EIS/EIR would be sufficient to reduce or avoid potential adverse impacts of the proposed action (with the exception of potential short-term air quality impacts). As discussed in section 3.8 of this EIS/EIR, the LCR MSCP activities would be implemented in a manner that is consistent with protecting public health and safety.

Executive Order 11988, Floodplain Management

EO 11988 states that each [Federal] agency shall avoid development in floodplain areas to the extent practicable, in order to reduce the risk of flood loss, to minimize the impact of floods on

human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Federal agencies are directed to determine whether a proposed action will occur in a floodplain and, if so, to consider alternatives to avoid adverse effects and incompatible development in the floodplain. If development in a floodplain is deemed necessary, the Federal agency must prepare and circulate a notice explaining why the action is proposed for the floodplain area. Agencies are to provide opportunity for early public review of any proposed actions in floodplains.

The conservation actions would be consistent with the EO because they would not increase the risk of flood loss; or affect the impact of floods on human safety, health, and welfare. It would, however, preserve the natural and beneficial values served by floodplains by establishing native habitat. Development in the floodplain is necessary in order to adequately mitigate the impacts of the covered activities, which would affect sensitive species that inhabit the historic floodplain of the LCR.

Executive Order 11990, Protection of Wetlands

EO 11990 states that each [Federal] agency shall provide leadership and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. The EO does not apply to Federal agencies' issuance of permits, licenses, or allocations to private parties for activities involving wetlands on non-Federal property. Federal agencies are to provide opportunity for early public review of any proposed plans or proposals for new construction in wetlands.

The Conservation Plan includes some actions likely to involve dredging, excavation, or placement of structures in Waters of the U.S., including wetlands. Such actions would require permits under section 404 of the CWA and/or section 10 of the Rivers and Harbors Act. The implementing parties would consult with the Corps to ensure that permitting requirements are met, including due consideration of alternative locations and methods that could accomplish the same objectives. The conservation actions would utilize locations and methods that preserve and enhance the natural and beneficial values of those wetlands. Moreover, the Conservation Plan would result in the establishment of 512 acres of marsh. The Conservation Plan would not conflict with EO 11990 and includes measures to preserve and enhance the natural and beneficial values of wetlands, as directed.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

This EO mandates that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

Section 3.7, Environmental Justice, identifies environmental justice impacts associated with short-term air quality emissions during construction, noise from construction activities and operations, and the loss of agricultural jobs. The implementation of Mitigation Measures AQ-1 and AQ-2 would reduce potential air quality impacts, but they could remain substantial and

adverse for the duration of individual construction projects. The implementation of Mitigation Measures NOI-1 and NOI-2 would effectively reduce noise impacts to low income and minority populations. The implementation of Mitigation Measure EJ-1 would effectively reduce the impact associated with the loss of agricultural jobs.

Executive Order 12962, Recreational Fisheries

EO 12962 states that each [Federal] agency shall, and in cooperation with states and tribes, improve the quantity, function, sustainable productivity, and distribution of the United States' aquatic resources for increased recreational fishing opportunities.

The Conservation Plan would not adversely impact recreational fisheries. Therefore, the conservation actions would be consistent with EO 12962.

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

This EO is primarily intended to assist Federal agencies in complying with the Migratory Bird Treaty Act and to reduce the risk to Federal agencies associated with unintentional take of migratory birds. It encourages agencies to carry out certain actions, as appropriate and practicable, to promote the conservation of migratory birds, such as restoring and enhancing migratory bird habitat; designing migratory bird habitat conservation measures and practices into agency plans; evaluating impacts of proposed Federal actions upon migratory birds in conjunction with complying with NEPA; and minimizing potential take of migratory birds in cooperation with the Service. Implementation of the Conservation Plan meets the intent of the EO.

Clean Water Act (33 U.S.C. 1341, 1342, 1344)

Section 404 of the CWA identifies conditions under which a permit is required for construction projects that result in the discharge of fill or dredged materials into Waters of the U.S. Construction activities associated with implementation of the proposed action may require a permit under section 404, depending on the location and nature of the construction.

The Conservation Plan includes some actions likely to involve dredging, excavation, or placement of structures in Waters of the U.S., including wetlands. Such actions would require permits under section 404 of the CWA. The implementing parties would consult with the Corps to ensure that permitting requirements are met, including due consideration [as required under section 404(b)(1)] of alternative locations and methods that could accomplish the same objectives. The conservation actions would utilize locations and methods that preserve and enhance the natural and beneficial values of those wetlands. The Conservation Plan would comply with the provisions of the CWA.

Section 10, Rivers and Harbor Act of 1899, (33 U.S.C. 403)

Section 10 of the Rivers and Harbors Act prohibits the obstruction or alteration of navigable waters of the Unites States without a permit from the Corps. Navigable waters are defined in 33 C.F.R. Part 329 as those water that are subject to the ebb and flow of the tide and/or have been used in the past, or may be used in the future to transport interstate or foreign commerce.

Hence, section 10 (and Corps) jurisdiction extends to the historic limits of navigability, including historic tidelands that have been diked and drained. This Act, in conjunction with the Fish and Wildlife Coordination Act (16 U.S.C. 661-666) and NEPA of 1969 (42 U.S.C. 4331-4347), permits the Corps to refuse on conservation grounds to grant a permit to dredge or fill in navigable waters.

The Conservation Plan includes some actions likely to involve dredging, excavation, or placement of structures in Waters of the U.S., including wetlands. Such actions would require permits under section 404 of the CWA and/or section 10 of the Rivers and Harbors Act. The implementing parties would consult with the Corps to ensure that permitting requirements are met. This would include due consideration of alternative locations and methods that could accomplish the same objectives. The conservation actions would utilize locations and methods that preserve and enhance the natural and beneficial values of those wetlands. The Conservation Plan would comply with the Act.

National Historic Preservation Act (16 U.S.C. 470)

Federally funded undertakings that have the potential to impact historic properties are subject to section 106 of the NHPA. Under this Act, Federal agencies are responsible for the identification, management, and nomination to the NRHP of cultural resources that would be impacted by Federal actions. Compliance with this Act is documented in section 3.5. Each individual project would have separate NEPA and NHPA compliance as needed before it is implemented.

American Indian Religious Freedom Act (42 U.S.C. 1996)

The American Indian Religious Freedom Act establishes as United States policy the protection and preservation for American Indians of their inherent right to freely believe, express, and practice their traditional religions, which includes, but is not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites. Federal agencies are required to make a good faith effort to learn about Indian religious practices, consult with Indian leaders and religious practitioners, and consider any adverse impacts on Indian religious practices during decisionmaking.

Implementation of the proposed action would not conflict with these requirements. Any use of tribal lands for conservation area establishment would be based on the voluntary consent of the tribe.

Native American Graves Protection and Repatriation Act (24 U.S.C. 3001)

NAGPRA assigns ownership to Native Americans of human burials and associated grave goods, which are excavated or discovered on Federal or tribal lands. It requires Federally sponsored museums to conduct inventories of their collections, and requires a 30-day delay in project work when human remains are discovered on Federal lands. If human remains are discovered on Federal lands during the implementation of the Conservation Plan, a 30-day delay in project work activities is required.

Implementation of the mitigation measures identified in section 3.5 of this EIS/EIR would ensure compliance with this Act.

Executive Order 13007 Regarding Indian Sacred Sites

Pursuant to EO 13007, Federal agencies must consider the effects of their actions on the physical integrity of sacred sites, and access to and ceremonial use of such sites by Indian religious practitioners. EO 13007 defines a "sacred site" as follows:

> …any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.

EO 13007 directs Federal agencies "…to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions," to accommodate access to and use of such sites by Native American traditional religious practitioners, and to avoid affecting their physical integrity. As described in section 3.5, in 2000 the Federal government initiated government-to-government consultation with tribes on whose reservations conservation efforts might be implemented. All tribal representatives declined to provide information on sacred sites and Traditional Cultural Properties until more information is available regarding the locations and potential impacts of specific conservation projects. The Federal government will continue the consultation process in compliance with EO 13007.

Antiquities Act (16 U.S.C. 431)

The Antiquities Act of 1906 provides for the protection of historic and prehistoric remains or any object of antiquity on Federal lands; establishes criminal penalties for unauthorized destruction or appropriation of antiquities; and authorizes scientific investigation of antiquities on Federal land, subject to permit and regulations.

The proposed action would be in compliance with this Act.

Archaeological Resources Protection Act (16 U.S.C. 470)

The Archaeological Resources Policy Act of 1979 provides for the protection of archaeological resources on public and Indian lands. Protection of archaeological resources, under the guidelines of this Act, includes consideration of excavation and removal of resources, enforcement of the Act, and confidentiality of information concerning the nature and location of archaeological resources. It also provides substantial criminal and civil penalties for those who violate the terms of the Act. The proposed action would be in compliance with this Act.

Farmland Protection Policy Act (7 U.S.C. 4201)

This Act is the Federal statute that provides the basis for the policy of avoiding impacts from Federal programs. The Act does not prohibit Federal agencies from undertaking actions that convert farmland to nonagricultural use, but only requires that Federal agencies "identify and take into account the adverse effects of Federal programs on the preservation of farmland; consider alternative actions, as appropriate, that could lessen such adverse effects; and assure

that such Federal programs, to the extent practicable, are compatible with State (and local) programs and policies to protect farmland" (7 U.S.C. section 4202[b]).

The analysis in section 3.2 of this EIS/EIR identifies and takes into account the potential effects of the Conservation Plan on farmland in the whole planning area, considers alternative actions that could lessen those effects, and also assures that the Conservation Plan is compatible with state and local programs "to the extent practicable." This analysis meets the requirements of the Farmland Protection Policy Act on a programmatic basis.

Pollution Prevention Act of 1990 (42 U.S.C. 13101)

The Pollution Prevention Act of 1990 was enacted to focus industry, government, and the public on source reduction (pollution prevention) rather than upon treatment and disposal. The national policy of the United States is that (1) pollution should be prevented or reduced at the source, whenever feasible; (2) pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; (3) pollution that cannot be prevented or recycled should be treated in an environmentally safe manner, whenever feasible; and (4) disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

The Conservation Plan would contribute only minor amounts of pollution, primarily during the construction phase and during maintenance activities. Moreover, only minimal amounts of solid waste requiring disposal would be generated during construction and operations and would be disposed of in an environmentally safe manner. The Conservation Plan would be consistent with this Act.

7.1.2 State of Arizona Laws and Regulations

House Bill 2426

The U.S. EPA issued regulations in 1990 authorizing the creation of a NPDES permitting system for stormwater discharges. In Arizona, House Bill 2426, which became effective on Aug. 9, 2001, created the Arizona Pollutant Discharge Elimination System (AZPDES) Program. Under the AZPDES Permit Program, all facilities that discharge pollutants from any point source, including stormwater runoff, into Waters of the U.S. (navigable waters) are required to get an AZPDES permit.

Permits would be required as appropriate. The Conservation Plan would be consistent with this regulation.

Senate Bill 1525 (2001) Chapter 23: Military Airports; Preservation

Senate Bill 1525 precludes development or improvements potentially impairing visibility or otherwise interfering with operational aircraft. Water areas, sanitary landfills, or maintenance of feeding stations attractive to birds and waterfowl are impermissible in clear zones, accident potential zones, and high noise zones.

The proposed action would establish only a small amount of aquatic land cover types in relation to that which already exists and would not appreciably increase the risk of bird-airstrikes. In addition, conservation areas would be developed in compliance with FAA guidelines. Thus, the proposed action would comply with this law.

Protection of Cultural Resources

Chapter 4.2 of the Arizona Revised Statutes addresses historic preservation issues. While a specific historic preservation compliance process is not identified, the preamble to Article 1 states:

> B. It is the intent of the legislature that this state, in cooperation with the political subdivisions of this state, Federal agencies, Indian tribes, and other persons….
>
> 2. Provide leadership in the identification and preservation of the prehistoric and historic resources of this state.
>
> 3. Administer state owned, administered or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations.

Chapter 4.2, Article 1, goes on to assign responsibility for preservation of historic properties owned and controlled by the agency, to the chief administrator of each agency (Section 41-861). All state agencies are directed to cooperate with the state historic preservation officer in developing a program to locate, inventory, and nominate to the Arizona register of historic places all properties under the agency's ownership or control that appear to meet the criteria for inclusion on the register (Section 41-862). In the event a direct action or one assisted by a state agency will result in substantial alteration to or destruction of an historic property, state agencies are directed to initiate measures to document the property to the standards established by the state historic preservation officer (Section 41-863). And lastly, Section 41-864 accords the state historic preservation officer 30 days:

> …to review and comment on any plans of a state agency which involve property which is included on or may qualify for inclusion on the Arizona register of historic places, including any construction project, sale, lease, or acquisition of historic properties, to ensure that the prehistorical, historical, architectural or culturally significant values will be preserved or enhanced.

The LCR MSCP participants would comply with this statute while implementing the Conservation Plan.

7.1.3 State of California Laws and Regulations

California Endangered Species Act (Fish and Game Code secs. 2050-2097)

CESA provides for the recognition and protection of rare, threatened, and endangered species of plants and animals. The Act prohibits the taking of listed species without authorization from the CDFG. CDFG may authorize the taking of a listed species through a Memorandum of Understanding that establishes the extent of take permitted by CDFG and sets forth the

required mitigation. The California participants in the LCR MSCP will comply with CESA to the extent it applies to their covered activities.

State laws governing treatment of Native American remains (P.R.C. secs. 5097.94, 5097.98, 5097.99; Health and Safety Code sec. 7050.5)

These laws protect Native American religion, places of social significance, and cemeteries or places of worship, etc., from interference, construction, or damage and prohibits the possession or take of Native American grave-related artifacts or human remains taken from graves or cairns.

Implementation of the mitigation measures identified in section 3.5 of this EIS/EIR would ensure compliance with these laws.

California Land Conservation Act (Williamson Act) Govt. Code sec. 51200

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, established the state's primary program for the retention of private land in agriculture and open space use. The Williamson Act is a voluntary, locally administered program that offers reduced property taxes on lands that have enforceable restrictions on their use via contracts between individual land owners and local governments.

Lands subject to Williamson Act contracts would not be acquired for the Conservation Plan unless the local agency agreed that the contract terms allow the establishment and maintenance of conservation areas as a compatible use, and that there is no significant adverse impact from the use of non-contract lands within an agricultural preserve because fish and wildlife enhancement and preservation is a compatible use of such lands. The proposed action would comply with this Act.

Porter-Cologne Water Quality Control Act (Division 7, California Water Code)

The Porter-Cologne Water Quality Control Act is the primary state regulation that addresses water quality. The requirements of the Act are implemented by the SWRCB at the state level and, at the local level, by the RWQCBs. Under the direction of the SWRCB, the RWQCBs carry out planning, permitting, and enforcement activities related to water quality in California. The regional boards prepare water quality plans (called basin plans) for their regions. Basin plans identify the beneficial uses of water that should be protected, establish water quality objectives (limits or levels of water constituents based on both state and Federal laws), and define an implementation program to meet water quality objectives. The area that would be affected by the implementation of the project lies within the boundaries of the Colorado River Basin (Region 7) RWQCB. The proposed action would potentially have only minor, temporary impacts to water quality and would not conflict with this Basin Plan.

7.1.4 State of Nevada Laws and Regulations

Nevada Water Pollution Control Law (N.R.S. 445A.300 to 445A.730)

The intent of the Nevada Water Pollution Control Law is to (1) maintain the quality of the waters of the state consistent with the public health and enjoyment, the propagation and protection of terrestrial and aquatic life, the operation of existing industries, the pursuit of agriculture, and the economic development of the state; and (2) to encourage and promote the use of methods of waste collection and pollution control for all significant sources of water pollution (including point and diffuse [non-point] sources). Except as authorized by a permit issued by the department pursuant to the provisions of N.R.S. 445A.300 to 445A.730 inclusive, and regulations adopted by the commission, it is unlawful for any person to discharge from any point source any pollutant into any waters of the state. Discharge permits would by obtained by the LCR MSCP as required.

Protection of Cultural Resources

N.R.S. Chapter 383 addresses historic preservation and archaeology. N.R.S. 383.021 provided for the establishment of the Office of Historic Preservation (OHP). A specific historic preservation compliance process is not identified. However, N.R.S. 383.121 states:

1. All departments, commissions, boards, and other agencies of the state and its political subdivisions shall cooperate with the office [i.e., OHP] in order to salvage or preserve historic, prehistoric, or paleoenvironmental evidence located on property owned or controlled by the United States, the State of Nevada, or its political subdivisions.

2. When any agency of the state or its political subdivisions is preparing or has contracted to excavate or perform work of any kind on property owned or controlled by the United States, the State of Nevada, or its political subdivisions which may endanger historic, prehistoric or paleoenvironmental evidence found on the property, or when any artifact, site or other historic or prehistoric evidence is discovered during the course of such excavation or work, the agency or the contractor hired by the agency shall notify the office and cooperate with the office to the fullest extent practicable, within the appropriations available to the agency or political subdivision for that purpose, to preserve or permit study of such evidence before its destruction, displacement, or removal.

The LCR MSCP participants would comply with this statute while implementing the Conservation Plan.

7.1.5 Tribal Laws and Regulations

If the Conservation Plan were implemented on tribal lands, all appropriate regulations and standards would be followed.

7.2 CONSULTATION AND COORDINATION

7.2.1 Public Involvement

Reclamation, the Service, and Metropolitan, with input from other LCR MSCP participants, have prepared a PIP in support of this EIS/EIR. The PIP is a dynamic document that has continued to evolve as affected individuals, agencies, organizations, and governmental entities have been consulted and included in the environmental review process. It has been reviewed periodically to ensure that its goals have been met and that the needs of the public and affected agencies have been addressed.

The PIP has been prepared in accordance with Reclamation's guidelines for developing public involvement plans (USBR Public Involvement Manual [1980] and USBR Draft NEPA Handbook, 2000a). The activities carried out in accordance with the PIP are consistent with and satisfy the public involvement requirements and policies of NEPA and the Federal CEQ Guidelines (40 C.F.R. 1500 et. seq.), and CEQA and the California State CEQA Guidelines (14 C.C.R. 15000 et. seq.). These activities are also consistent with Executive Order 11988, Floodplain Management, which requires public review of plans or proposals in floodplains.

To date, a number of different outreach activities have been carried out, including compiling and using mailing lists for distribution of project information; issuing newsletters and press releases; developing a website containing information about the LCR MSCP; publishing official notices; and conducting public meetings and hearings. A summary of these activities is presented below; additional information on outreach activities is available in the PIP.

An LCR MSCP mailing list has been developed that identifies interested individuals, local media, community and interest groups, cities and counties, environmental organizations, and cooperating, responsible, and trustee agencies, and other affected agencies. As new, interested parties have been identified, they have been added to the mailing list, which will be kept current during the course of the process. Anyone requesting information and/or notice regarding the LCR MSCP or the environmental review process will be added to the mailing list. Parties with written requests to be removed from the mailing list will be deleted from it. Copies of relevant documents, such as the NOI/NOP for the EIS/EIR and the EIS/EIR, will be maintained at Reclamation's office in Boulder City, Nevada; the Service's office in Phoenix, Arizona; and MWD's office in Los Angeles, California. Copies of the EIS/EIR have been provided to local libraries in Yuma and Phoenix, Arizona; Boulder City, Henderson, Laughlin, and Las Vegas, Nevada; and Blythe and Ontario, California.

The media and public have been kept informed about key project milestones, such as the issuance of draft documents, through periodic newsletters. Newsletters are intended to explain technical information or publicize meetings or other key activities.

Information repositories have been established at the offices of Reclamation, the Service, and Metropolitan and contain materials accessible to the public, including newsletters, reports, and meeting notices. Meeting notices and other important documents have been posted to the website (www.lcrmscp.org), which has been established to make information about the EIS/EIR process available to a wider audience. The website includes a description of the LCR MSCP, current participants, files available to download, meeting schedules, past meeting notes, news

and interest items, and links to other sites. Reclamation also maintains LCR MSCP information and related documents at www.lc.usbr.gov. This website includes the entire PIP, notices, public scoping summaries and other information intended to help keep the public informed about the LCR MSCP. Each website has a link to the other.

Public notices of EIS/EIR preparation and public hearings to obtain input into the environmental review process are described in section 1.5, Scoping and Public Involvement. These notices are included in Appendix B, and scoping summary reports are included in Appendix C.

A Notice of Availability (NOA) and a Notice of Completion (NOC) were prepared as a combined notice and distributed to the parties on the mailing list. These documents published the fact that the Draft EIS/EIR was completed and available for public review and comment. Copies of the notices were sent to all parties on the LCR MSCP mailing list. The NOA/NOC also was sent to cooperating, responsible, and trustee agencies, published in the Federal Register, published in local newspapers in the affected areas, and posted on the website. The NOA/NOC was filed with the California Office of Planning and Research, as required by CEQA. There was a 60-day review period for the public and agencies to review the Draft EIS/EIR and provide comments. The review period formally ended on August 18, 2004; however, comments received within a reasonable timeframe after that date have been responded to in the Final EIS/EIR. A news release also announced the availability of the Draft EIS/EIR.

During the 60-day review period, public hearings were conducted in Phoenix, Arizona; Blythe, California; and Henderson, Nevada in order to receive public comments on the Draft EIS/EIR, Draft HCP, Draft BA, and appendices to these documents. These hearings were held in the evening to facilitate participation by members of the public, and meetings were held in urban and rural communities to obtain input from the varied populations that could be affected by the LCR MSCP. Copies of these documents were sent out approximately 30 days prior to the public hearings, which were held on July 20-22, 2004. Notices of the hearings were published in the local newspapers and posted on the LCR MSCP website. Informational handouts were available that included the LCR MSCP Fact Sheet, map, Summary of Alternatives, and the Federal Register notice. Public comment forms were available at the meetings. No public comment forms were submitted at the meetings, but written comments were received later.

A summary of the complete comments and responses has been posted on the LCR MSCP website. The Final EIS/EIR will be published, distributed, made available in local libraries, and at the offices of Reclamation, the Service, and state agencies.

The Federal lead agencies will review the Final EIS/EIR and prepare a Record of Decision (ROD). If comments are received on the Final EIS/EIR, they will address significant comments in the ROD. As the lead agency under CEQA, Metropolitan will independently evaluate and, if appropriate, certify this EIR and make CEQA findings.

7.2.2 Federal, State, and Local Agency Consultation and Coordination

All Federal, state, and local agencies with interests in managing the water and related resources of the LCR were contacted early in the development of the Conservation Plan and asked to

participate in the planning process. Consequently, the LCR MSCP is a partnership of many agencies that have been actively involved in the development of the Conservation Plan and accompanying environmental and regulatory compliance documents. Other agencies, such as the Corps, USIBWC, and EPA, were invited to meetings to obtain their input to these documents. The LCR MSCP also has involved consultation as required under the ESA and NHPA. Federal, state, and local agencies were notified of EIS/EIR milestones through public notifications and were provided copies of the document to review (refer to section 7.2.1). They also were contacted to obtain information regarding projects to include in the cumulative impacts analysis (Chapter 4), and contacts were made with local planning officials to obtain information included in the resource-specific analyses contained in Chapter 3. All necessary contacts have and will continue to be made.

7.2.3 Tribal Consultation and Coordination

Reclamation, as part of its government-to-government consultation requirements (EO 13084), contacted Native American tribes within the planning area. Letters initiating consultation were sent to all potentially affected tribes informing them of the intent to prepare an EIS/EIR for the LCR MSCP in June 1999. A follow-up briefing with the tribes was held in conjunction with the initial scoping meetings for the EIS/EIR. Additional meetings were held with each of the on-river tribes in 2000 during supplemental scoping for the EIS/EIR. A formal consultation meeting with the on-river tribes was conducted in June 2001 to discuss specific tribal concerns.

In spring 2001, the LCR MSCP met with the tribes to obtain input on the development of the Conservation Plan and to discuss LCR MSCP issues specific to the tribes. In addition, the LCR MSCP offered to provide the tribes with support in developing tribal conservation areas as part of the LCR MSCP. The tribes expressed interest, and conservation opportunity reports were developed for most of the tribes. In fall 2001, meetings were held with each of the Tribal Councils to determine further interest in pursuing conservation partnerships. Follow-up work has been initiated with each of the tribes.

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9.0 PERSONS AND AGENCIES CONTACTED

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10.0 ACRONYMS & GLOSSARY OF TERMS

10.1 ACRONYMS

AAC	All-American Canal
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADWR	Arizona Department of Water Resources
af	acre-feet
afy	acre-feet per year
AGFD	Arizona Game and Fish Department
AGL	above ground level
AGS	Arizona Geological Survey
AMM	Avoidance and minimization measure
APE	Area of Potential Effect
AZPDES	Arizona Pollutant Discharge Elimination System
BA	Biological Assessment
BACT	Best Available Control Technology
BASH	Bird-Aircraft Strike Hazards
BCPA	Boulder Canyon Project Act
BIA	U.S. Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
BLMYFO	U.S. Bureau of Land Management Yuma Field Office
BMPs	Best Management Practices
BO	Biological Opinion
BWC	Basic Water Company
CAA	Clean Air Act

CAAQS	California Ambient Air Quality Standards
CADHS	California Department of Health Services
CAP	Central Arizona Project
CARB	California Air Resources Board
CCR	California Code of Regulations
CDC	Centers for Disease Control
CDFG	California Department of Fish and Game
CDOC	California Department of Conservation
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMM	Conservation area management measure
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
COA	Conservation Opportunity Area
COC	Community of Comparison
Corps	U.S. Army Corps of Engineers
CRA	Colorado River Aqueduct
CRIT	Colorado River Indian Tribes
CRWQCB	California Regional Water Quality Control Board
CRZ	Colorado River Zone
CU	Consumptive Use

CWA	Clean Water Act
cy	cubic yards
dB	decibel, a unit for measuring relative amplitude of sound
dBA	A-weighted sound, a measure of sound amplitude which gives greater weight to the frequencies of sound to which the human ear is most sensitive.
DCP	Desert Conservation Plan
DOF	California Department of Finance
DOI	U. S. Department of Interior
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ET	evapotranspiration
FAA	Federal Aviation Administration
GAP	Gap Analysis Program
GIS	Geographic Information Systems
GLO	Government Land Office
HCP	Habitat Conservation Plan
I-15	Interstate 15
IBWC	International Boundary and Water Commission
IID	Imperial Irrigation District
ISC	Interim Surplus Criteria
ITA	Indian Trust Asset
IFT	Interagency Fire Team

kaf	thousand acre-feet
kafy	thousand acre-feet per year
kWh	kilowatt-hour
LCR	lower Colorado River
LCRAS	Lower Colorado River Accounting System
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
L_{dn}	Day/Night Average Sound Level
L_{eq}	a common unit to measure environmental sounds, based on an average level of sound.
LIM	Land Inventory and Monitoring
maf	million acre-feet
mafy	million acre-feet per year
MAPS	Monitor Avian Productivity and Survival
MCAS	Marine Corps Air Station
MDAQMD	Mojave Desert Air Quality Management District
Metropolitan	The Metropolitan Water District of Southern California
mgd	million gallons per day
mg/L	milligrams/Liter
MRM	Monitoring and research measure
MSCP	Multi-Species Conservation Program
MSHCP	Multi-Species Habitat Conservation Program
msl	mean sea level
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NBAPC	Nevada Bureau of Air Pollution Control

NBMG	Nevada Bureau of Mines and Geology
NBWPC	Nevada Bureau of Water Pollution Control
NDEP	Nevada Department of Environmental Protection
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NECO	Northern and Eastern Colorado Desert Coordinated Management Plan
NEMO	Northern and Eastern Mojave Desert Management Plan
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NMDGF	New Mexico Department of Game and Fish
NNHP	Nevada Natural Heritage Program
NIB	Northerly International Boundary
NOA	Notice of Availability
NOC	Notice of Completion
NOI	Notice of Intent
NOP	Notice of Preparation
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System.
NPS	U.S. National Park Service
NRA	National Recreation Area
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	National Resources Inventory
NRS	Nevada Revised Statues

NWR	National Wildlife Refuge
O_3	ozone
OHP	Office of Historic Preservation
OHV	off-highway vehicle
PEIR	Program Environmental Impact Report
PIP	Public Involvement Plan
PM_{10}	particulate matter less than 10 microns in diameter
ppm	parts per million
PPR	Present Perfected Right
PRC	Public Resources Code
PVID	Palo Verde Irrigation District
QSA	Quantification Settlement Agreement
Reclamation	U.S. Bureau of Reclamation
RM	river mile
ROD	Record of Decision
ROI	region of influence
RPA	Reasonable and Prudent Alternative
RPM	Reasonably Prudent Measure
RWQCB	Regional Water Quality Control Board
SCS	Soil Conservation Service
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Officer
SIA	Secretarial Implementation Agreement
SIP	State Implementation Plan
SHPO	State Office of Historic Preservation

SIB	Southerly International Boundary
SLE	St. Louis encephalitis
SNPLMA	Southern Nevada Public Land Management Act
SNWA	Southern Nevada Water Authority
SRA	State Recreation Area
SRI	Statistical Research, Inc.
SWRCB	State Water Resources Control Board
TCP	Traditional Cultural Property
TDS	Total Dissolved Solids
THPO	Tribal Historic Preservation Officer
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TSS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USC	United States Code
USDA	U.S. Department of Agriculture
USIBWC	International Boundary and Water Commission, United States Section
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile organic compound
WAPA	Western Area Power Administration
WEE	Western equine encephalitis
Western	Western Area Power Administration
WNV	West Nile virus

WWTP	Wastewater treatment plant
YEW	Yuma East Wetlands Restoration Project
YIA	Yuma International Airport
YWW	Yuma West Wetlands

10.2 GLOSSARY OF TERMS

Accident Potential Zone	An Accident Potential Zone is defined for each airport and is intended to encompass the most critical land areas (generally the arrival and departure corridors around the airport). In APZs due to the greater risk of an aircraft incident, development is typically prohibited.
Acre-foot	Volume of water (43,560 cubic feet) that would cover one acre to a depth of one foot.
Adaptive management	A method for examining alternative strategies for meeting measurable biological goals and objectives, and then if necessary, adjusting future conservation management actions according to what is learned.
Affected environment	Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as a result of a proposed human action.
Allocation, allotment	Refers to a distribution of water through which means specific persons or legal entities are assigned individual rights to consume pro rata shares of a specific quantity of water under legal entitlements. For example, a specific quantity of Colorado River water is distributed for use within each Lower Division State through an apportionment. The water available for consumptive use in that state is further distributed among water users in that state through the allocation. An allocation does not establish and entitlement; the entitlement is normally established by a written contract with the Unites States government.
Apportionment	Refers to the distribution of water available to each Lower Division state in normal, surplus, or shortage years, as set forth, respectively, in Articles II (B)(1), II (B)(2), and II (B)(3) of the Decree in *Arizona v. California*.
Appropriative rights	The right to divert a specified quantity of water at a specified point of diversion for reasonable and beneficial uses at a specified place of use for a specified manner of use. Appropriative rights are generally "first-in-time, first-in-right"; that is, one appropriative right has priority over appropriative rights established later.

Backwater	A relatively small, generally shallow area of a river with little or no current.
Best Management Practice	Any program, technology, process, siting criterion, operating method, measure, or device that controls, prevents, removes, or reduces pollution.
Biological assessment	To facilitate compliance with section 7(a)(2), Federal agencies must prepare a BA, pursuant to section 7(c)(1) that identifies the likely effects of the Federal action on threatened and endangered species.
Biological opinion	Document stating the U.S. Fish and Wildlife Service's opinion as to whether a Federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of critical habitat.
Candidate species	Plant or animal species not yet officially listed as threatened or endangered under the ESA, but which is undergoing status review by the Service.
Class I inventory survey	A literature search conducted to characterize the potential conservation areas in terms of known cultural resources and the nature, location and adequacy of previous cultural resource studies. A Class II survey would extend to a field sampling of the conservation areas, and a Class III survey would involve a 100 percent field survey.
CNEL	Community Noise Equivalent Level, a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 P.M. to 10:00 P.M.) and a 10 dB addition to nocturnal (10:00 P.M. to 7:00 A.M.) noise levels.
Colorado River Basin	The drainage basin of the Colorado River in the United States.
Consumptive use	The total water diversions from the Colorado River, less return flows to the river.
Contractors	Contractors consist of the Federal government, states, Indian tribes, and various public and private entities that are recognized under the Decree, hold a Section 5 Contract with the Secretary, or have a Secretarial reservation of water. Those who hold entitlements to Colorado River water are referred to as Contractors.

Covered species	Those species addressed in the LCR MSCP conservation plan for which conservation measures would be implemented and for which authorization for take is being requested under section 10 of the ESA.
Critical habitat	Specific areas with physical or biological features essential to the conservation of a listed species and that may require special management considerations or protection. These areas have been legally designated via *Federal Register* notices.
Cultural resource	Building, site, district, structure, or object significant in history, architecture, archeology, culture, or science.
dB	decibel, a unit for measuring relative amplitude of sound
dBA	A-weighted sound, a measure of sound amplitude which gives greater weight to the frequencies of sound to which the human ear is most sensitive.
Designated groundwater basins	Basins where permitted groundwater rights approach or exceed the estimated average annual recharge and where the water resources are being depleted or require additional administration.
Endangered species	A species or subspecies whose survival is in danger of extinction throughout all or a significant portion of its range.
Endangered Species Act	The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544), as amended, under section 9, provides for the prohibition of "take" of any fish or wildlife species listed as threatened or endangered under the ESA unless specifically authorized by regulation.
Entitlement	Refers to an authorization to beneficially consume Colorado River water pursuant to (1) a decreed right, (2) a contract with the United States through the Secretary of the Interior, or (3) a Secretarial reservation of water.
Flow	Volume of water passing a given point per unit of time expressed in cfs.
	Peak flow – Maximum instantaneous flow in a specified period of time.

	Return flow – Portion of water previously diverted from a stream and subsequently returned to that stream or to another body of water.
Full Domestic Surplus determination	A water supply determination made by the Secretary that governs the amount of water available for consumptive use by the Lower Division states for a specific calendar year. Under a Full Domestic Surplus determination the amount of water available to domestic water users and specifically to Metropolitan, SNWA and domestic users in the State of Arizona is greater than the amount that would be available under a Normal determination.
Full pool	Volume of water in a reservoir at maximum design elevation.
Gaging station	Specific location on a stream where systematic observations of hydrologic data are obtained through mechanical or electrical means.
Habitat Conservation Plan	Per section 10(a)(2)(A) of the ESA, a Habitat Conservation Plan (HCP) is a planning document that is a mandatory component of an incidental take permit application. An HCP specifies, among other things, the impacts that are likely to result from the taking and the measures the permit applicant will undertake to minimize and mitigate such impacts.
Headwater	The source and upper part of a stream.
Impaired water body	An "impaired" water body is defined under section 303(d) of the CWA. These are identified stream segments and water bodies where constituent concentrations "impair" the designated beneficial uses of the water body.
Important Farmland	As defined by the USDA NRCS (formerly the Soil Conservation Service), Important Farmlands include Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Importance. The categorization of farmland is based upon a soil classification system which accounts for the physical and chemical characteristics of the land and the suitability of the land for producing crops. Important Farmlands are afforded special protection due to their importance to agricultural production.

Incidental take	"Incidental take" is defined by the ESA as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (50 CFR 17.22 and 17.32).
Indian Trust Assets	Indian Trust Assets "are 'legal interests' in 'assets' held in 'trust' by the Federal Government for Federally recognized Indian tribes or individual Indians."
Kilowatt hour (kWh)	One thousand watt-hours of electrical energy.
Lacustrine habitat	Habitat associated with lakes.
Land cover type	A classification system to describe vegetation and other habitat types (e.g., cotton-wood willow, honey mesquite type III, marsh, etc.).
Law of the River	As applied to the Colorado River, a combination of Federal and state statutes, interstate compacts, court decisions and decrees, Federal contracts, an international treaty with Mexico, and formally determined operating criteria.
L_{dn}	The Day/Night Average Sound Level (L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this 3-hour period are grouped into the daytime period.
Lead agency	A lead agency is an agency initiating and overseeing the preparation of an environmental impact report or environmental impact statement. For this project, Reclamation and the Service are the lead agencies for compliance with NEPA, and Metropolitan is the lead agency for compliance with CEQA.
Lee Ferry	A reference point marking division between the Upper and Lower Colorado River Basins. The point is located in the mainstream of the Colorado River 1 mile below the mouth of the Paria River in Arizona.
Lee's Ferry	Location of Colorado River crossings (1873 to 1928) and site of the USGS stream gage above the Paria River confluence.
L_{eq}	L_{eq} is an energy-equivalent sound/noise descriptor that is described in terms of an average level that has the same acoustical energy as the summation of all the

	time-varying events. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.
Lower Basin	The part of the Colorado River watershed below Lee Ferry, Arizona; covers parts of Arizona, California, Nevada, New Mexico, and Utah.
Lower Colorado River Accounting System	A method that estimates and distributes consumptive use by vegetation to water users along the LCR.
Lower Division	A division of the Colorado River system that includes the states of Arizona, Nevada, and California.
Lower Division states	Arizona, California, and Nevada as defined by Article II of the Colorado River Compact of 1922.
Mean sea level	The average height of the sea surface for all stages of the tide, serving as the reference surface for all altitudes in atmospheric studies.
Minute 242	Minute 242, August 30, 1973, of the United States Section, International Boundary and Water Commission, pursuant to the 1944 Water Treaty. Similar to an amendment.
Monotypic	In taxonomy, having only one subordinate unit, as a genus with a single species.
National Register of Historic Places	The nation's official list of cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture.
Normal determination	A water supply determination made by the Secretary that governs the amount of water available for consumptive use by the Lower Division states for a specific calendar year. Under a Normal determination consumptive use within the Lower Division states is limited to 7.5 MAF.
Piscivorous	Habitually feeding on fish.

PM_{10}	Particulate matter less than 10 microns in mean diameter.
Present Perfected Right	With respect to the Colorado River, a water right exercised by the actual diversion of a specific quantity of water, prior to June 25, 1929, the effective date of the Boulder Canyon Project.
Priority	A ranking with respect to diversion of water relative to other water users.
Reach	A specified segment of a stream, channel, or other water conveyance. For the purposes of the LCR MSCP analysis, the planning area is divided into seven reaches, defined by water surface elevations and river miles.
Riparian	Of, on, or pertaining to the bank of a river, pond, or lake.
River mile	River miles are numbered along the thalweg of the LCR channel south to north starting with RM 0.0 at the Southerly International Border (SIB) with Mexico. Backwaters are identified by river mile by using the first letter of the state the backwater is located in (Arizona, California, or Nevada) and the river mile distance from the SIB to the point of connection between the backwater and the river (e.g., C60.7). Dam locations are noted at their respective river miles.
River stage	Water surface elevation above a datum.
Salinity	A term used to refer to the dissolved minerals in water also referred to as total dissolved solids.
Section 10(a)(1)(B) permit	Section 10(a)(1)(B) of the ESA authorizes the Service to issue non-Federal entities a permit for the incidental take of endangered and threatened wildlife species. This permit allows the non-Federal entity to proceed with an activity that is legal in all other respects, but that results in the "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."
Secretary	Secretary of the Interior
Sediment	Unconsolidated solid material that comes from weathering of rock and is carried by, suspended in, or deposited by water or wind.

Seral	Relating to a series of biological communities succeeding one another in the biotic development of an area.
Structural types	As used in the classification of vegetation along the LCR, "structural type" is based on the prevalence of vegetation in different layers or height categories. Roman numerals I through VI are used to distinguish six structural types that range from dense forest to open shrublands, and variations in between.
Take	As defined by the ESA, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (16 U.S.C. section 1531[18]).
Threatened species	A species or subspecies that is likely to become endangered in the foreseeable future.
Total dissolved solid	A measure of the inorganic or mineral content of water, commonly expressed in milligrams per liter.
Tributary	River or stream flowing into a larger river or stream.
Upper Basin	The part of the Colorado River watershed above Lee Ferry, Arizona that covers parts of Arizona, Colorado, New Mexico, Utah, and Wyoming.
Waters of the U.S.	Per the Clean Water Act, "Waters of the U.S." include: (1) all waters which may be susceptible to use in interstate or foreign commerce; (2) all interstate waters including interstate wetlands; (3) all other waters such as intrastate lakes rivers, streams (including intermittent streams), mud flats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters; (4) all impoundments of waters otherwise defined as waters of the United States; (5) tributaries of waters identified in this section; (6) the territorial seas; and (7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in this section.
Watershed	The drainage area upstream of a specified point on a stream.

Williamson Act	The Williamson Act is a voluntary, locally administered program in California that offers reduced property taxes on lands that have enforceable restrictions on their use via contracts between individual land owners and local governments.
Xeric habitats	Habitats characterized by minimal water.

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12.0 INDEX

An index for this document was not generated because most of the key terms are used frequently throughout the document. The Table of Contents provides the best index for locating information.

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