

**DRAFT ENVIRONMENTAL ASSESSMENT FOR THE DRAFT
AMENDMENT TO ADD NORTHERN MEXICAN
GARTERSNAKE TO THE LOWER COLORADO RIVER
MULTI-SPECIES CONSERVATION PROGRAM AS A
COVERED SPECIES**

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1.0 INTRODUCTION, PURPOSE, AND NEED

1.1 INTRODUCTION

The U.S. Fish and Wildlife Service (Service) and Bureau of Reclamation (Reclamation) have prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [USC] 4321 *et seq.*), and its implementing regulations in the Code of Federal Regulations (CFR) at 40 CFR §§ 1500, and Section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973, as amended (16 USC § 1532). Reclamation participated as a cooperating agency in preparation of this EA.

1.2 PURPOSE OF THIS EA

This EA evaluates the impacts of, and alternatives to, the Service amending the ESA Section 10(a)(1)(B) permit (Permit No. TE086834-0) (Permit) for the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) to add the northern Mexican gartersnake (*Thamnophis eques megalops*) to the LCR MSCP Permit as a covered species and the impacts of implementation of the amended LCR MSCP HCP by Reclamation, the federal implementing agency for the LCR MSCP. Amendment of the LCR MSCP Permit would be based on the Services' review of a draft amendment to the 2004 *LCR MSCP Final Habitat Conservation Plan* (LCR MSCP HCP). The draft amendment to the LCR MSCP HCP, currently titled "*LCR MSCP - Draft Habitat Conservation Plan Amendment, Addition of New Covered Species - Northern Mexican Gartersnake*" (LCR MSCP HCP Amendment) is included in Section 11 of this EA. The Service will also use this EA as supporting information for their intra-Service consultation (required under Section 7 of the ESA) for their amendment of the LCR MSCP Permit¹. The

¹ The LCR MSCP is a combined ESA Section 7 and Section 10(a)(1)(B) approach to ESA compliance for implementation of covered actions for non-Federal (Section 10) and Federal participants (Section 7). Reclamation has prepared an amendment to the LCR MSCP Biological Assessment (BA) for northern Mexican gartersnake to address Federal actions in accordance with Section 7 of the ESA. There is no parallel requirement to evaluate the environmental effects of authorizing incidental take through an incidental take statement under Section 7 of the ESA, although the Section 10 analysis of incidental take of northern Mexican gartersnake includes the effects caused by both the Federal and non-Federal actions.

Except for the effect of the authorized incidental take of covered species, which is part of the Proposed Action, this EA does not evaluate the environmental effects of the covered activities and does not revisit NEPA or California Environmental Quality Act (CEQA) authorizations for ongoing activities or provide NEPA or CEQA authorization for future activities.

purpose of this EA is to evaluate the potential impacts of the Proposed Action on the human environment and determine if the impacts will be significant, thus warranting the preparation of an Environmental Impact Statement.

1.3 FEDERAL ACTIONS/DECISIONS TO BE MADE

The Service must decide whether to amend the LCR MSCP Permit to add the northern Mexican gartersnake as a covered species based on review of the draft LCR MSCP HCP Amendment.

Reclamation must decide whether to implement the amended LCR MSCP, which combines the HCP and section 7.

If no significant impacts are identified from the Proposed Action, the Service and Reclamation would each issue a separate Finding of No Significant Impact for their respective federal actions.

1.4 LCR MSCP BACKGROUND

The LCR MSCP is a 50-year (2005 to 2055) multi-stakeholder federal and non-federal partnership which was created with the overall goal to develop and implement a plan that will:

- conserve habitat and work toward the recovery of threatened and endangered species, as well as reduce the likelihood of additional species being listed;
- accommodate present water deliveries and power production and optimize opportunities for future water and power development, to the extent consistent with law; and
- provide the basis for incidental take authorizations.

The Planning Area for the LCR MSCP comprises areas up to and including the full-pool elevation of Lakes Mead, Mohave, and Havasu and the historical floodplain of the Colorado River to the Southerly International Boundary with Mexico. The Record of Decision (ROD) described in Section 1.2 included Off-Site Conservation Areas for implementing the LCR MSCP; the Planning Area and these Off-Site Conservation Areas are shown in Figure 1.

The Conservation Plan, outlined in Chapter 5 of the LCR MSCP HCP, provides conservation measures for covered species that address the effects of all non-federal covered actions described in Chapter 2 of the LCR MSCP HCP and all federal covered actions described in the companion

LCR MSCP Biological Assessment (BA). Both general and species-specific conservation measures are identified for 26 covered species and five evaluation species. Covered species are those 26 species for which incidental take authorization² is provided that are either currently listed or proposed for listing as threatened or endangered under the ESA or are protected under Arizona, California, or Nevada law; or may become listed during the 50 year LCR MSCP term that are affected by covered activities. Evaluation species are species that could become listed in the future; however, sufficient information was not available at the time the LCR MSCP HCP was written to determine the effects of covered activities or to develop conservation measures for those species. Species currently covered under the LCR MSCP HCP include four fish, twelve birds, four mammals, two reptiles, one amphibian, one insect, and two plants. The northern Mexican gartersnake was not considered as either a covered or evaluation species at the time the HCP was completed because it was not believed to be present in the program area. Since the program's implementation the snake has been detected in the action area and conservation areas of the LCR MSCP.

A major component of the LCR MSCP is the creation and management of habitat to benefit the covered species. Cottonwood-willow, honey mesquite, marsh, and backwater are the predominant land cover types that have been created or will be created under the LCR MSCP through the development of conservation areas. Habitat creation goals include the establishment of a total of 8,132 acres of land cover including:

- 5,940 acres of cottonwood-willow
- 1,320 acres of honey mesquite
- 512 acres of marsh
- 360 acres of backwater

Land cover types are designed and managed to provide habitat for more than one 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 cover, while habitat for another may be supported by the understory vegetation (Reclamation, 2004b).

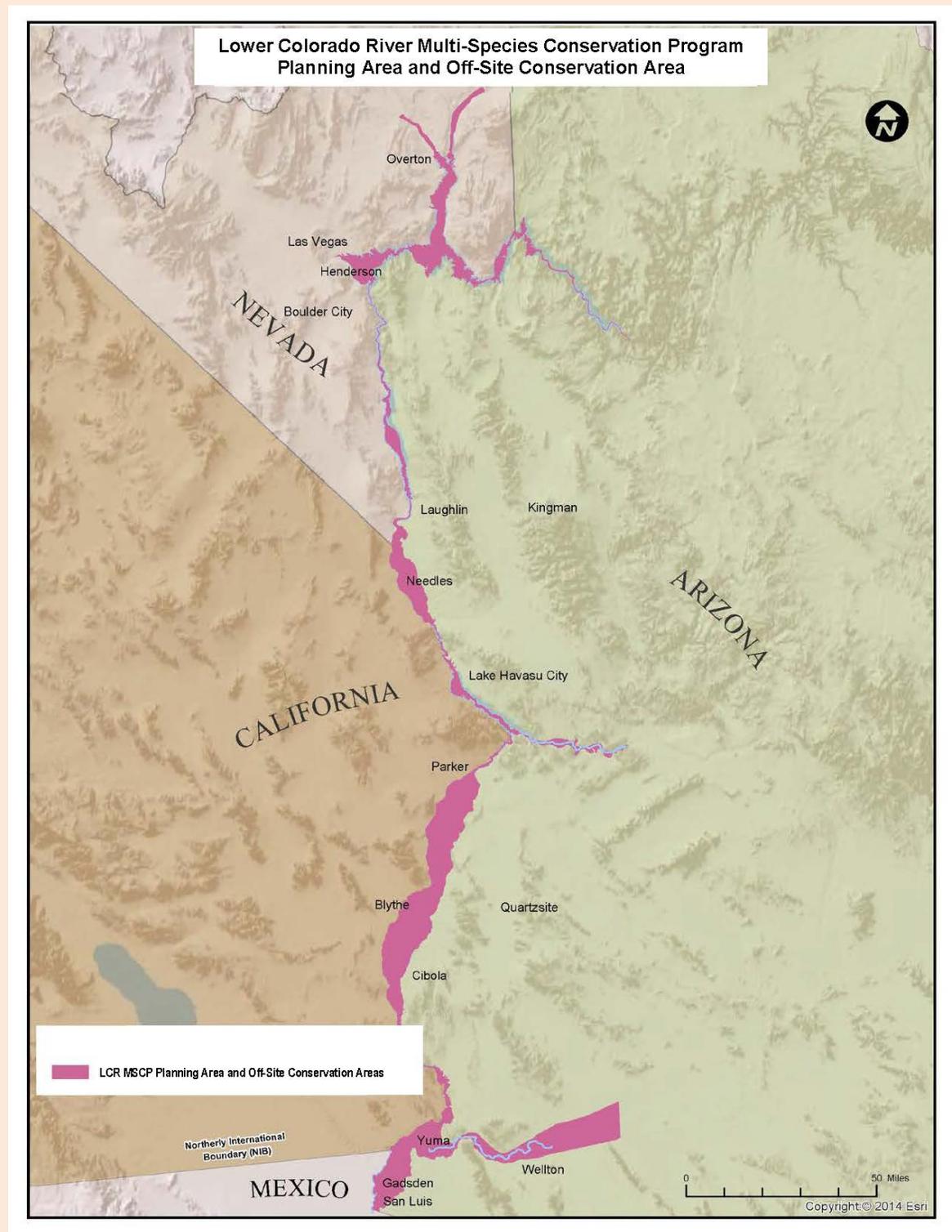
² Incidental take authorizations include, (i) the LCR MSCP Section 10 (a)(1)(B) incidental take permit and (ii) incidental take statement issued by the Service as part of the LCR MSCP BO which authorizes take by Federal agencies pursuant to the LCR MSCP.

1.5 TIERING AND INCORPORATION BY REFERENCE

The *LCR MSCP Final Programmatic Environmental Impact Statement / Environmental Impact Report* (FEIS/EIR) and subsequent ROD (Reclamation, 2004a) provided NEPA compliance for the LCR MSCP. The LCR MSCP FEIS/EIR is a programmatic document which identifies alternatives and the potential range of impacts associated with issuance of the LCR MSCP Permit and implementation of the LCR MSCP HCP. It also describes the combined ESA Section 7 and ESA Section 10 (a)(1)(B) approach in detail. Chapter 2 in the LCR MSCP FEIS/EIR provides additional information on the covered species habitat that can be provided by each land cover type. The LCR MSCP FEIS/EIR, the LCR MSCP HCP, and other implementing documents for the LCR MSCP can be found at:

https://www.lcrmscp.gov/steer_committee/regulatory_compliance.html.

The implementing regulations for NEPA encourage both tiering and incorporation by reference. Tiering refers to the coverage of general matters in broader EIS's (such as the LCR MSCP FEIS/EIR) with subsequent narrower statements or environmental analyses incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared (40 CFR 1508.28). An EA tiered to a broad EIS need only analyze the changes to, or details of, the original proposal not previously analyzed to determine if any of the changes or details result in potentially significant impacts (40 CFR 1502.20). This EA is tiered to and incorporates by reference the LCR MSCP FEIS/EIR. To the extent that any relevant analysis in the LCR MSCP FEIS/EIR is not sufficiently comprehensive or adequate to support further decisions, this EA explains this and provides any necessary analysis (43 CFR 46.140)



• Figure 1- LCR MSCP Planning Area and Off-Site Conservation Areas

1.6 PURPOSE AND NEED

1.6.1 Purpose 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 an Endangered Species Act, Section 10(a)(1)(B) permit from the Service.

The Service's purpose in considering the Proposed Action is to fulfill our conservation obligations under the ESA, Section 10(a)(1)(B) and Section 7. The LCR MSCP HCP Amendment would provide a means by which this authority can be fulfilled while allowing the LCR MSCP Permittees³ and the Service to streamline the ESA compliance process for non-federal covered actions with the potential to impact the northern Mexican gartersnake. The Proposed Action would eliminate the need for processing individual HCPs for the non-federal Participants and ensure consistent mitigation and minimization measures for the northern Mexican gartersnake for LCR MSCP covered activities.

The Service wishes to ensure that the amendment to the LCR MSCP Permit, if approved, supports the inclusion of the northern Mexican gartersnake as a covered species under the program and the continued implementation of the amended LCR MSCP HCP, which has been developed to achieve long-term species and ecosystem conservation objectives at ecologically appropriate scales through the habitat creation goals identified within the LCR MSCP Planning and Off-Site Conservation Areas.

Reclamation's purpose for the amended LCR MSCP HCP is to ensure that appropriate conservation measures for the northern Mexican gartersnake are implemented throughout the term of the LCR MSCP.

Reclamation wishes to ensure that the conservation measures for the northern Mexican gartersnake in the amended LCR MSCP HCP are appropriate for the LCR MSCP Planning and Off-Site Conservation Areas and can be implemented throughout the term of the LCR MSCP, if approved. Implementation of these measures will help ensure the existing abundance of the species in the LCR MSCP Planning and Off-Site Conservation Areas is maintained as a result of

³ Permittees means a non-federal person, firm, or entity that has been authorized to take covered species pursuant to the Permit.

fully replacing affected habitat and maintaining existing habitat that otherwise could decline in function or be lost without management intervention.

1.6.2 Need for the Proposed Action

The northern Mexican gartersnake was not considered for coverage during the development of the LCR MSCP because it was believed to be extirpated within the Planning and Off-Site Conservation Areas. It has since been detected at one location within the Planning and Off-Site Conservation Areas.

On July 6, 2017, the Service received an application from the Permittees for an amendment to the LCR MSCP Permit. The Service's need for the Proposed Action is to fulfill these legal obligations with respect to ESA Section 10(a)(1)(B) in response to this application. The LCR MSCP HCP Amendment would provide a mechanism under which we can cover unavoidable/incidental take of the northern Mexican gartersnake by a non-federal entity engaging in otherwise lawful activities in an expedited fashion to reduce work load on federal employees and meet the needs of the stakeholders⁴.

Covered actions have the potential to result in take of northern Mexican gartersnake as discussed in the analysis in the LCR MSCP HCP Amendment. Should the Proposed Action be approved, a portion of the habitat that has been created or is planned to be created under the LCR MSCP for covered species would be managed for the northern Mexican gartersnake.

The amended LCR MSCP HCP is needed by Reclamation and the Permittees to, through the LCR MSCP; avoid, minimize, and fully mitigate adverse effects of federal and non-federal covered activities and LCR MSCP implementation on the northern Mexican gartersnake, and to contribute to its recovery.

2.0 ALTERNATIVES

The implementing regulations for NEPA require federal agencies to consider the proposed action and any alternatives that provide different ways in which to address and respond to unresolved conflicts about the proposed action with respect to alternative uses of available resources in an EA. In assessing possible alternatives, the Service should also consider its statutory requirement pursuant to

⁴ The Service also received a request from Reclamation to reinitiate consultation under Section 7 of the ESA which included an amendment to the LCR MSCP BA for the northern Mexican gartersnake to address Federal actions.

Section 10(a)(1)(B) of the ESA, whereby certain limitations are placed on the Service with respect to actions that may be undertaken.

2.1 NO-ACTION ALTERNATIVE

The No Action alternative would be to not approve the amendment to the LCR MSCP Permit. Implementation of the LCR MSCP HCP would continue without the amendment. The LCR MSCP non-federal parties would have to seek other methods to comply with the ESA for the northern Mexican gartersnake. If their activities would result in take that could not be avoided and a federal nexus exists (funded, authorized, or carried out by a federal agency), a non-federal party may receive take coverage through consultation and a BO for northern Mexican gartersnake issued by the Service to the federal action agency. If no federal nexus exists, non-federal parties could develop an HCP for northern Mexican gartersnake and apply for incidental take authorization from the Service on a project-by-project basis. Each application would require independent evaluation under NEPA.

2.2 PROPOSED ALTERNATIVE/ACTION

The Proposed Action is approving the amendment to the LCR MSCP Permit, and implementation of the amended LCR MSCP HCP. A portion of the habitat already created or planned to be created under the LCR MSCP would be managed for the northern Mexican gartersnake. The LCR MSCP Planning and Off-Site Conservation Areas, covered actions, and the total amount of habitat created under the LCR MSCP, as outlined in the LCR MSCP HCP, would not change under the amendment. Cover actions are described in the LCR MSCP Biological Assessment and HCP. In general, these covered actions include delivery, diversion, and return of 9 million acre-feet of water; operations and maintenance of facilities required to conduct these water deliveries and diversions; future changes in points of diversion of up to 1.574 million acre-feet; generation of power from six facilities; and implementation of the LCR MSCP.

The proposed LCR MSCP HCP Amendment can be found in Section 11 of this EA. The following summarizes key aspects. The analysis of impacts presented in the LCR MSCP Amendment determined that implementation of covered actions and the LCR MSCP conservation plan would result in the loss of up to 1,227 acres of northern Mexican gartersnake habitat and take of individuals.

As discussed in Section 1.1 of this EA, land cover types may benefit multiple covered species, therefore the total land cover created for the LCR MSCP will remain at 8,132 acres. Two conservation measures would be established to mitigate for the loss of northern Mexican

gartersnake habitat. Under conservation measure NMGS1 (Attachment 4, LCR MSCP HCP Amendment) 1,496 acres which have been created or will be created and managed for covered species will also function as northern Mexican gartersnake habitat. The 1,496 acres will include 512 acres of marsh and 984 acres of cottonwood-willow located near marsh. Additional northern Mexican gartersnake habitat may be provided by marsh vegetation that becomes established along margins of the 360 acres of backwaters that will be created under the LCR MSCP. These small patches of habitat may provide linkages between existing habitat and may facilitate the snake colonizing created habitats. Existing LCR MSCP HCP avoidance and minimization measures that are outlined in the LCR MSCP HCP Amendment would also apply to the northern Mexican gartersnake.

Conservation measure NMGS2 (Attachment 4, LCR MSCP HCP Amendment) provides for implementation of measures to avoid or minimize take of the northern Mexican gartersnake as provided through LCR MSCP best management practices (BMP). These measures would be incorporated into projects and activities covered under the LCR MSCP. They would include but not be limited to measures such as worker education programs, maximum speed limits, checking for northern Mexican gartersnake under vehicles, and monitoring/covering open trenches.

Including the northern Mexican gartersnake for coverage would not increase program costs since the amount of habitat being created for the LCR MSCP HCP would not be increasing, and, under Section 10.3 of the Implementing Agreement, the Service must consider and give full credit for conservation measures under the LCR MSCP HCP already being implemented that would benefit the northern Mexican gartersnake. Implementation of some of the avoidance and minimization measures may result in nominal, additional costs at conservation areas, but these costs would be included under existing program costs and reflected accordingly in the LCR MSCP Annual Implementation Report, Work Plan, and Budget.

2.3 ALTERNATIVES CONSIDERED BUT NOT EVALUATED FURTHER

The LCR MSCP represents a comprehensive species conservation approach to both federal actions and non-federal activities on the lower Colorado River. It is a habitat based program that has been successfully implemented since 2005. The LCR MSCP land cover types provide habitat for multiple species. Acres which have been created or will be created and managed for covered species under the LCR MSCP will also function as northern Mexican gartersnake habitat. Because the LCR MSCP has created or will create land cover types that will provide northern Mexican gartersnake habitat, no other locations for northern Mexican gartersnake habitat were considered.

The Service previously considered a range of project alternatives during its original LCR MSCP HCP review, concluded in 2005. so it has been determined that no additional alternatives beyond the Proposed Action and No Action alternative are being evaluated.

3.0 AFFECTED ENVIRONMENT

The LCR MSCP FEIS/EIR analyzed the impacts of implementing the LCR MSCP HCP on the resource areas as listed below. The full analysis of potential impacts in the LCR MSCP FEIS/EIR may be found at https://www.lcrmscp.gov/publications/voli_env_impact_st_dec04.pdf.

The affected environment section of this EA incorporates by reference the affected environment described in the LCR MSCP FEIS/EIR. Updates to the affected environment are provided only when the information is relevant to potential impacts of the Proposed Action.

3.1 AESTHETICS

Aesthetics, or the subjective perception of natural beauty in the landscape, within the Planning and Off-Site Conservation Areas is described by LCR MSCP river reaches in the LCR MSCP FEIS/EIR (Aesthetics, Section 3.1.1) and is incorporated here by reference. The LCR MSCP Conservation Areas which have been created or are in the process of being created have added to the aesthetics of the Planning and Off-Site Conservation Areas. These additions are: Big Bend Conservation Area and Beal Lake Conservation Area in Reach 3; Planet Ranch Conservation Area, Palo Verde Ecological Reserve, Cibola Valley Conservation Area, Pretty Water Conservation Area, Cibola National Wildlife Refuge Unit #1, and Hart Mine Marsh in Reach 4; Imperial Ponds Conservation Area in Reach 5; Laguna Division Conservation Area and Yuma East Wetlands in Reach 6; and Hunter's Hole in Reach 7. The remainder of the description of the affected environment for aesthetics is still valid, no further updates were determined to be necessary.

3.2 AGRICULTURAL RESOURCES

The affected environment discussion for agricultural resources in the LCR MSCP FEIS/EIR (Agricultural Resources, Section 3.2.1) includes a summary of the Important Farmland and lands subject to Williamson Act Contracts in the Planning and Off-Site Conservation Areas. Important Farmland is defined by the U.S. Department of Agriculture based on physical and chemical characteristics. The California Land Conservation Act of 1965, commonly known as the Williamson Act, allows for contracts to provide incentives to farmers to continue agriculture on

their land and are exclusive to California. The information is incorporated here by reference. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.3 AIR QUALITY

A description of the air quality in the Planning and Off-Site Conservation Areas is provided in the LCR MSCP FEIS/EIR (Air Quality, Section 3.3.1). This description focused on criteria air pollutants that were of concern in the Planning and Off-Site Conservation Areas because national or state air quality air standards were not being met. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.4 BIOLOGICAL RESOURCES

The LCR MSCP FEIS/EIR (Biological Resources, Section 3.4.1) describes land cover types for the Planning and Off-Site Conservation Areas and provided acreages of each type (LCR MSCP FEIS/EIR page 3.4-3). The LCR MSCP FEIS/EIR also describes general fish and wildlife, sensitive species, and covered and evaluation species within the Planning and Off-Site Conservation Areas. The LCR MSCP FEIS/EIR lists status information for the covered and evaluation species. The northern Mexican gartersnake is federally listed as Threatened, and is designated as an Arizona Wildlife Species of Special Concern. It is considered extirpated in Nevada and California, thus it has no protected status under the California State Endangered Species Act. Attachment 1 in the LCR MSCP HCP Amendment contains a summary of the habitat for the northern Mexican gartersnake. The land cover types described in the LCR MSCP FEIS/EIR include six structural types of cottonwood-willow and seven types of marsh. Within the LCR MSCP, all marsh types and four of the six types of adjacent cottonwood-willow are assumed to support habitat for the northern Mexican gartersnake.

Within the LCR MSCP Planning and Off-Site Conservation Areas, northern Mexican gartersnakes have been detected on the Bill Williams River and at LCR MSCP Beal Lake Conservation Area on Havasu National Wildlife Refuge.

3.5 CULTURAL RESOURCES

The LCR MSCP FEIS/EIR (Cultural Resources, Section 3.5.1) includes a summary of previously recorded cultural resource sites within the Planning and Off-Site Conservation Areas as well as an account of the tribal consultations that took place while the LCR MSCP FEIS/EIR was being prepared. This information is incorporated here by reference. This information remains valid,

there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.6 ENERGY AND DEPLETABLE RESOURCES

The LCR MSCP FEIS/EIR (Energy and Depletable Resources, Section 3.6) documents that a detailed analysis of energy and depletable resources was not performed because the implementation of the LCR MSCP would have minimal impact on those resources. This information remains valid and is incorporated here by reference.

3.7 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs federal agencies to determine whether their programs, policies, and activities have disproportionately high and adverse human health or environmental effects on minority and low-income populations.

The U.S. Department of the Interior's Environmental Justice policy requires that U.S. Department of the Interior bureaus consider the impacts of their actions and inactions on minority and low income populations and communities, as well as the equity of the distribution of benefits and risks of those decisions in NEPA documents. A description of the minority and low income populations within the Planning and Off-Site Conservation Areas is included in the LCR MSCP FEIS/EIR (Environmental Justice, Section 3.7.1) and is incorporated here by reference. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.8 HAZARDS AND HAZARDOUS MATERIALS

Descriptions of hazardous materials, potential disease vectors, wildfire causes and management, and bird-aircraft strike hazards are included in the LCR MSCP FEIS/EIR (Hazards and Hazardous Materials, Section 3.8.1) and is incorporated here by reference. This information

remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.9 HYDROLOGY AND WATER QUALITY

Surface water resources by LCR MSCP river reach as well as surface and groundwater constituents of concerns are included in the LCR MSCP FEIS/EIR (Hydrology and Water Quality, Section 3.9.1) and incorporated here by reference. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.10 INDIAN TRUST ASSETS

Indian Trust Assets (ITA) are defined as “legal interests in property held in trust by the United States for Indian tribes or individuals”. ITAs are those properties, interests, or assets of a federally-recognized Indian tribe or individual Indian over which the Federal Government also has an interest, either through administration or direct control. Examples of ITAs include lands, minerals, timber, hunting rights, fishing rights, water rights, in-stream flows, and other treaty rights. Tribal lands, water rights, and other ITAs within the Planning and Off-Site Conservation Areas are included in the LCR MSCP FEIS/EIR (Indian Trust Assets, Section 3.10.1) and are incorporated here by reference. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.11 LAND USE

Land use by LCR MSCP river reach, zoning, and land use designations, and general and comprehensive land use plans are described in the LCR MSCP FEIS/EIR (Land Use, Section 3.11.1) and are incorporated here by reference. Some of the LCR MSCP Conservation Areas listed in Section 3.1 have contributed to small scale changes in land use, for example changing the land use from agricultural to Conservation Area. These changes are not large enough to affect the overall land uses of the Planning and Off-Site Conservation Areas. The remainder of the description of the affected environment for land use is still valid, no further updates were determined to be necessary.

3.12 NOISE

Noise regulations, sources of noise, and sensitive receptors are described within the Planning and Off-Site Conservation Areas and are incorporated here by reference. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.13 POPULATION AND HOUSING

The LCR MSCP FEIS/EIR (Populations and Housing, Section 3.13) documents that a detailed analysis of population housing was not performed because the implementation of the LCR MSCP would not affect those resources. This information remains valid and is incorporated here by reference.

3.14 PUBLIC UTILITIES AND SERVICES

The LCR MSCP FEIS/EIR (Public Utilities and Services, Section 3.14) documents that a detailed analysis of public utilities and services was not performed because the implementation of the LCR MSCP would have minimal impact on those resources. This information remains valid and is incorporated here by reference.

3.15 RECREATION

The LCR MSCP FEIS/EIR (Recreation, Section 3.15.1) documents key recreation resources by LCR MSCP river reach and is incorporated here by reference. The LCR MSCP Conservation Areas listed in Section 3.1, although not specifically developed for recreation purposes, provide bird-watching and wildlife viewing opportunities that have added to the recreation resources of the Planning and Off-Site Conservation Areas. The remainder of the description of the affected environment for recreation resources is still valid, no further updates were determined to be necessary.

3.16 SOCIOECONOMICS

The LCR MSCP Planning and Off-Site Conservation Areas include portions of Imperial, Riverside, and San Bernardino counties in California; La Paz, Mohave, and Yuma counties in

Arizona; and Clark County in Nevada. The LCR MSCP FEIS/EIR (Socioeconomics, Section 3.16.1) documents socioeconomic characteristics such as employment and agricultural data within the Planning and Off-Site Conservation Areas and is incorporated here by reference. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.17 TOPOGRAPHY, GEOLOGY, SOILS, AND MINERAL RESOURCES

A general description of the topography, geology, and soils within the Planning and Off-Site Conservation Areas is provided in the LCR MSCP FEIS/EIR (Topography, Geology, Soils, and Mineral Resources, Section 3.17.1) and is incorporated here by reference. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.18 TRANSBOUNDARY IMPACTS

Environmental resources in Mexico which could be impacted by the LCR MSCP and U.S. treaty obligations to Mexico are discussed in the LCR MSCP FEIS/EIR (Transboundary Impacts, Section 3.18.1) and are incorporated here by reference. This information remains valid, there are no changes to the affected environment that are relative to potential impacts of the Proposed Action.

3.19 TRANSPORTATION

A detailed discussion of transportation in the Planning and Off-Site Conservation Areas was not included as only minimal impacts to transportation were anticipated. This information is included in the LCR MSCP FEIS/EIR (Transportation, Section 3.19.1) and remains valid and is incorporated here by reference.

4.0 ENVIRONMENTAL CONSEQUENCES

The No-Action Alternative is typically considered in an EA to provide a baseline to which the Proposed Action can be compared. However, the impacts of the No-Action Alternative

considered in this EA would differ very little from the impacts of the Proposed Action as the conservation measures already described in the LCR MSCP HCP will continue to be implemented. The LCR MSCP is a large scale program that has been underway for more than 10 years and will continue to provide ESA coverage and create habitat to meet program goals. If the amendment was not approved, the LCR MSCP parties may, on a case-by-case basis, still implement measures that would benefit the northern Mexican gartersnake when it is determined that possible take may occur from an individual project being implemented; however the measures would be developed through individual HCPs or ESA Section 7 consultations. For this reason, a separate analysis by resource area for the environmental consequences resulting from the No-Action Alternative is not included in this Environmental Consequences section with the exception of the Biological Resources section because no additional impacts are anticipated.

The LCR MSCP Planning and Off-Site Conservation Areas, covered actions, the total amount of habitat created under the LCR MSCP, and the conservation plan as outlined in the LCR MSCP HCP would not change under the Proposed Action. In accordance with 43 CFR 46.140, the conditions and environmental effects described in the LCR MSCP FES/EIR have been reviewed and determined to be still valid. The environmental consequences analysis is focused on only the potential impacts of implementing the Proposed Action and No-Action Alternatives to determine if there would be any impacts that were not adequately described in the LCR MSCP FEIS/EIR.

4.1 AESTHETICS

Potential impacts to aesthetics evaluated in the LCR MSCP FEIS/EIR (Aesthetics, Section 3.1.2) were: impacts from construction and maintenance activities associated with development of conservation areas, construction of field facilities such as fish-rearing facilities, and the contribution that conservation area development would make toward returning sites to a more natural appearance. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to aesthetics beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on aesthetics is not considered necessary.

4.2 AGRICULTURAL RESOURCES

Potential impacts to agricultural resources evaluated in the LCR MSCP FEIS/EIR (Agricultural Resources, Section 3.2.2) were: impacts to crops from potential waterfowl attraction to backwaters and marshes, alteration of slopes of adjoining laser-leveled fields from conservation area runoff, and

dispersal of covered species from conservation areas to surrounding agricultural lands.

Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to agricultural resources beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on agricultural resources is not considered necessary.

4.3 AIR QUALITY

Potential impacts to air quality evaluated in the LCR MSCP FEIS/EIR (Air Quality, Section 3.3.2) were: violations of air quality standards from the use of fossil fuel-fired construction equipment, release of particulate matter, potential exceedances of emission thresholds (e.g., Mojave Desert Air Quality Management District thresholds), and exposure of people to pollutants or odors generated from conservation area construction.

Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to air quality beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on air quality is not considered necessary.

4.4 BIOLOGICAL RESOURCES

Potential impacts to biological resources evaluated in the LCR MSCP FEIS/EIR (Biological Resources, Section 3.4.2) were: issuance of the LCR MSCP Permit would authorize the incidental take of up to 27⁵ covered species from implementation of both the covered activities and the Conservation Plan⁶; the impacts of 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; the impact that construction and maintenance activities associated with creation of cottonwood-willow, honey mesquite, marsh, and backwater would have on existing vegetation, common wildlife, non-covered sensitive species, and covered species; elimination or displacement of resident wildlife from maintenance of established habitats; impacts to covered or

⁵ The LCR MSCP FEIS/EIR analyzed 27 species but the LCR MSCP Permit covered only 26 because one of the species was ultimately designated as an evaluation rather than covered species.

⁶ The covered activities were evaluated in the LCR MSCP BA and HCP in 2005 and are not part of this Proposed Action. Their impacts were not analyzed in the LCR MSCP FEIS/EIR, or in this EA, with the exception of the incidental take that would be allowed as a result of the amendment of the LCR MSCP Permit.

sensitive species from population enhancement activities for covered fish and bird species, temporary impacts to wetlands and waters of the United States; periodic short-term impacts on sensitive and common native fish in the Virgin and Muddy rivers; and long-term loss or degradation of sensitive native fish habitats in the Virgin and Muddy rivers.

The Proposed Action would result in a change to the first impact described above, by increasing the number of covered species to 27. The description of the estimated level of incidental take associated with implementing the covered activities and the LCR MSCP Conservation Plan is summarized for the northern Mexican gartersnake in Attachment 3 of the LCR MSCP HCP Amendment.

Implementation of covered activities described in the LCR MSCP BA and the LCR MSCP Habitat Conservation Plan could result in the loss of up to 1,227 acres of marsh and associated cottonwood-willow land cover types that may provide habitat for the northern Mexican gartersnake within the LCR MSCP planning boundary over the remaining life of the 50 year program (until 2055). Some additional limited and low value habitat such as dry patches of herbaceous vegetation near marsh edges could be affected by habitat creation and maintenance activities; however, the level of take is assumed to be low because of the limited value of the potentially affected habitat to northern Mexican gartersnake. The conservation measures included in the amendment to the LCR MSCP HCP would achieve the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the northern Mexican gartersnake, and to contribute to its recovery by providing new habitat that will be managed for the northern Mexican gartersnake.

Since the northern Mexican gartersnake was not a covered species when the LCR MSCP FEIS/EIR was prepared, careful consideration was given to determining whether implementing the amended HCP could result in any additional impacts to the northern Mexican gartersnake that were not evaluated in the LCR MSCP FEIS/EIR. Since the LCR MSCP Planning and Off-Site Conservation Areas, covered actions, the total amount of habitat created under the LCR MSCP, and the conservation plan as outlined in the LCR MSCP HCP would not change under the Proposed Action; the Proposed Action would not result in any additional impacts that were not evaluated in the LCR MSCP FEIS/EIR.

Under the No-Action Alternative, the northern Mexican gartersnake would not be added as a covered species. Incidental take would not be authorized under the LCR MSCP Permit but would be authorized if needed under separate HCPs or section 7 consultations.

4.5 CULTURAL RESOURCES

Potential impacts to cultural resources evaluated in the LCR MSCP FEIS/EIR (Cultural Resources, Section 3.5.2) were: disturbance or destruction of significant cultural resources from construction and

maintenance of conservation areas and damage to cultural resources from unauthorized artifact collection or non-observance of mitigation measures during construction of conservation areas. Implementation of the Proposed Action or No-Action Alternative would not create any additional impacts to cultural resources beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on cultural resources is not considered necessary.

4.6 ENERGY AND DEPLETABLE RESOURCES

The LCR MSCP FEIS/EIR (Energy and Depletable Resources, Section 3.6) documents that a detailed analysis of energy and depletable resources was not performed because the implementation of the LCR MSCP would have minimal impact on those resources. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to energy and depletable resources. Further analysis of the effects of the alternatives on energy and depletable resources is not considered necessary.

4.7 ENVIRONMENTAL JUSTICE

Potential Environmental Justice impacts evaluated in the LCR MSCP FEIS/EIR (Environmental Justice, Section 3.7.2) were: potential air quality and noise impacts to minority and low-income populations and impacts to minority and low income populations from conversion of agricultural land to conservation areas. Implementation of the Proposed Action or No-Action Alternatives would not create Environmental Justice impacts beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the Environmental Justice effects of the alternatives is not considered necessary.

4.8 HAZARDS AND HAZARDOUS MATERIALS

Potential impacts from hazards and hazardous materials evaluated in the LCR MSCP FEIS/EIR (Hazards and Hazardous Materials, Section 3.8.2) were: environmental impacts from the use of hazardous materials during construction activities, an increase in disease vectors from increased riparian and backwater areas, construction caused wildfires, escaped prescribed fire, and bird-airstrike hazards to aircraft from increases in bird populations at conservation areas near airports. Implementation of the Proposed Action or No-Action Alternatives would not create any additional hazard and hazardous materials impacts beyond those described and fully analyzed in the LCR MSCP

FEIS/EIR. Further analysis of the effects of the alternatives on hazards and hazardous materials is not considered necessary.

4.9 HYDROLOGY AND WATER QUALITY

Potential impacts to hydrology and water quality evaluated in the LCR MSCP FEIS/EIR (Hydrology and Water Quality, Section 3.9.2) were: erosion-induced siltation from habitat establishment activities, short-term impacts to water quality from contaminants introduced by irrigation, impacts to water quality in backwaters from concentration of natural and man-made chemicals, and long-term improvements to water quality from conversion of agricultural land to riparian cover types. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to hydrology and water quality beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on hydrology and water quality is not considered necessary.

4.10 INDIAN TRUST ASSETS

The potential impact to ITAs that was evaluated in the LCR MSCP FEIS/EIR (Indian Trust Assets, Section 3.10.2) was: changes to ITAs from implementing conservation measures on tribal land. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to ITAs beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on ITAs is not considered necessary.

4.11 LAND USE

Potential impacts to land use evaluated in the LCR MSCP FEIS/EIR (Land Use, Section 3.11.2) were: whether conservation area establishment would physically divide established communities and conflicts with existing land uses, policies, or plans. Potential impacts considered for agricultural resources and noise with applicability to land use were also considered. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to land use beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on land use is not considered necessary.

4.12 NOISE

Potential noise impacts evaluated in the LCR MSCP FEIS/EIR (Noise, Section 3.12.2) were: exceedance of local noise standards from construction activities and an increase in ambient noise levels from operation of pumps. Implementation of the Proposed Action or No-Action Alternatives would not create any additional noise impacts beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the noise effects of the alternatives is not considered necessary.

4.13 POPULATION AND HOUSING

The LCR MSCP FEIS/EIR (Population and Housing, Section 3.13) documents that a detailed analysis of population and housing was not performed because the implementation of the LCR MSCP would not affect those resources. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to population and housing. Further analysis of the effects of the alternatives on population and housing is not considered necessary.

4.14 PUBLIC UTILITIES AND SERVICES

The LCR MSCP FEIS/EIR (Public Utilities and Services, Section 3.14) documents that a detailed analysis of public utilities and services was not performed because the implementation of the LCR MSCP would have minimal impact on those resources. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to public utilities and services. Further analysis of the effects of the alternatives on public utilities and services is not considered necessary.

4.15 RECREATION

Potential impacts to recreation evaluated in the LCR MSCP FEIS/EIR (Recreation, Section 3.15.2) were: loss of recreational opportunities from implementation of certain conservation measures. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to recreation beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on recreation is not considered necessary.

4.16 SOCIOECONOMICS

Potential impacts to socioeconomics evaluated in the LCR MSCP FEIS/EIR (Socioeconomics, Section 3.16.2) were: loss of agricultural jobs and agricultural related revenue from conversion of

agricultural land to conservation areas, reduced property tax revenues from lease or acquisition of private land for conservation areas, and reduced sales tax revenues that would have been generated from the purchase of products related to agricultural uses. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to socioeconomics beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on socioeconomics is not considered necessary.

4.17 TOPOGRAPHY, GEOLOGY, SOILS, AND MINERAL RESOURCES

Topographic impacts were not evaluated in detail in the LCR MSCP FEIS/EIR (Topography, Geology, Soils, and Mineral Resources, Section 3.17.1) because development of conservation areas in the historic floodplain of the Lower Colorado River would not substantially alter topography. Seismic impacts were not evaluated in detail because the number of structures constructed for conservation areas would be minimal. Minerals were not evaluated in detail because development of conservation areas would not interfere with mineral extraction operations. The analysis in the LCR MSCP FEIS/EIR focused on whether activities associated with conservation areas would result in erosion-induced siltation into the Lower Colorado River. Implementation of the Proposed Action or No-Action Alternatives would not create any additional impacts to topography, geology, soils, mineral resources, or erosion-induced siltation beyond those described or fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on topography, geology, soils, mineral resources, and erosion induced siltation is not considered necessary.

4.18 TRANSBOUNDARY IMPACTS

The potential transboundary impact evaluated in the LCR MSCP FEIS/EIR (Transboundary Impacts, Section 3.18.2) was dispersal to Mexico of particulate matter and combustion emissions from construction and maintenance of conservation areas. Implementation of the Proposed Action or No-Action Alternatives would not create any additional transboundary impacts beyond those described and fully analyzed in the LCR MSCP FEIS/EIR. Further analysis of the effects of the alternatives on transboundary impacts is not considered necessary.

4.19 TRANSPORTATION

The LCR MSCP FEIS/EIR (Transportation, Section 3.19.2) did not evaluate transportation impacts in detail because the minor amounts of traffic that would be generated would not affect roadway

capacity, road congestion, or cause inadequate emergency access. Implementation of the Proposed Action or No-Action Alternatives would not create any additional transportation impacts. Further analysis of the effects of the alternatives on transportation is not considered necessary.

5.0 CUMULATIVE IMPACTS

Cumulative impacts are the incremental impact of activities associated with implementing the Proposed Action when added to other past, present, and reasonably foreseeable future activities regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative impacts are most likely to arise when a relationship exists between a proposed alternative and other actions that have occurred or are expected to occur in a similar location or time period, or that involve similar actions. Projects in close proximity to the Proposed Action would be expected to have more potential for cumulative impacts than those more geographically separated.

The LCR MSCP FEIS/EIR (Cumulative Impacts, Section 4.0) includes a detailed cumulative impact analysis that evaluates cumulative impacts both on a project and individual resource basis during the 50 year term of the LCR MSCP. Past actions within the Planning and Off-Site Conservation Areas were considered in the context of the affected environment and resulting impact analysis since the affected environment was influenced by past and present actions. Present and reasonably-foreseeable future actions were described in detail when specific project information was available, but also in general terms for categories of ongoing activities, such as habitat enhancement. Since some new specific projects have been identified in the Planning and Off-Site Conservation Areas since the completion of the LCR MSCP FEIS/EIR, the potential for new cumulative impacts was also considered. The cumulative impacts analysis in the LCR MSCP FEIS/EIR considered both specific projects and general categories of projects, therefore evaluating a wide range of potential impacts from construction, agricultural, restoration, and flow-related activities. Although there are new site specific projects within the Planning and Off-Site Conservation Areas, their impacts would be within the range of the potential impacts of the general categories evaluated in the LCR MSCP FEIS/EIR.

As detailed in Sections 4.1- 4.19 of this EA, the Proposed Action would result in changes to only one resource area evaluated in the LCR MSCP FEIS/EIR, Biological Resources. The conservation measures included in the amendment to the LCR MSCP HCP would achieve the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the northern Mexican gartersnake, and to contribute to its

recovery; therefore there would be no negative cumulative impacts resulting from the Proposed Action, and no change to the cumulative impacts analyzed in the LCR MSCP FEIS/EIR. No further cumulative impact analysis was found to be necessary.

6.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

CEQ regulations at 40 CFR 1502.16 require that the discussion of environmental consequences include “any irreversible or irretrievable commitments of resources which would be involved with the proposal should it be implemented.” Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that this use could have on future generations. Irreversible effects primarily result from the use or destruction of specific resources that cannot be replaced within a reasonable time frame, such as energy or minerals. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action, such as extinction of a threatened or endangered species or the disturbance of a cultural resource.

The LCR MSCP FEIS/EIR (Irreversible and Irretrievable Commitments of Resources, Section 6.3) identified the use of construction materials as an irreversible and irretrievable commitment of resources. It also noted that agricultural lands and water used for conservation areas would not be available for other uses during the term of the LCR MSCP. Implementation of the Proposed Action would not create any additional impacts relative to this topic, therefore further analysis is not considered necessary.

7.0 SHORT-TERM USE OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

This section supports CEQ regulations (40 CFR 1502.16) and provides a discussion of the long-term effects of the amendment by evaluating the relationship between the short-term uses of the environment and the maintenance and enhancement of long-term productivity. The LCR MSCP FEIS/EIR (Relationship between Short-term uses and Long-term Productivity, Section 6.2) includes an evaluation of the relationship between short-term uses and long-term productivity. It points out potential impacts to resources that were identified, and highlights the long-term benefits of establishment of conservation areas. Implementation of the Proposed Action would not create any additional impacts relative to this topic, therefore further analysis is not considered necessary.

8.0 LIST OF PREPARERS

U.S. Fish and Wildlife Service
Bureau of Reclamation

9.0 CONSULTATION AND COORDINATION

A Notice of Availability of the draft EA announcing a 30-day public review period was published in the Federal Register. A news release regarding the draft EA was issued to Arizona, California, and Nevada media. The following entities were notified of the availability of the draft EA:

LCR MSCP STEERING COMMITTEE

A list of Participant Groups may be found at:
https://www.lcrmscp.gov/steer_committee/governance.html

STATE GOVERNORS AND MEMBERS OF U.S. CONGRESS

Arizona

Governor Doug Ducey
Senator John McCain
Senator Jeff Flake
Representative Raul Grijalva, 3rd District
Representative Paul Gosar, 4th District

California

Governor Edmund J. Brown
Senator Dianne Feinstein
Senator Kamala Harris
Representative Paul Cook, 8th District
Representative Raul Ruiz, 36th District
Representative Duncan Hunter, 50th District
Representative Juan Vargas, 51st District

Nevada

Governor Brian Sandoval
Senator Catherine Cortez-Masto
Senator Dean Heller

Representative Dina Titus, 1st District
Representative Jackie Rosen, 3rd District

STATE WILDLIFE AGENCIES

Director Ty Gray, Arizona Game and Fish Department
Director Charlton H. Bonham, California Department of Fish and Wildlife
Director Tony Wasley, Nevada Department of Wildlife

TRIBES

A letter announcing the availability of the draft EA was sent to the following tribes:

Campo Band of Diegueno Mission Indians, Chairman Ralph Goff
Chemehuevi Indian Tribe, Chairman Charles Wood
Cocopah Tribe of Arizona, Chairwoman Sherry Cordova
Colorado River Indian Tribes, Chairman Dennis Patch
Fort McDowell Yavapai Nation, President Bernadine Burnette
Fort Mohave Indian Tribe, Chairman Timothy Williams
Gila River Indian Community, Governor Stephen Lewis
Havasupai Tribe, Chairman Don Watahomigie
Hopi Tribe, Chairman Herman G. Honanie
Hualapai Indian Tribe, Chairman Damon Clarke
Kaibab Band of Paiute Indians, Chairman Roland Maldonado
Las Vegas Tribe of Paiute Indians, Chairperson Benny Tso
Moapa Band of Paiute Indians, Chairman Robert Tom
Navajo Nation, President Russell Begaye
Paiute Indian Tribe of Utah, Chairperson Corrina Bow
Quechan Tribe, President Keeny Escalanti, Sr.
Salt River Pima-Maricopa Indian Community, President Delbert Ray, Sr.
San Juan Southern Paiute Tribe of Arizona, Chairperson Carlene Yellowhair
Shivwits Band of Paiutes, Chairman Patrick Charles
Tohono O'odham Nation, Chairman Edward D. Manuel
Yavapai-Apache Nation, Chairwoman Jane Russell-Winiecki
Yavapai-Prescott Indian Tribe, President Ernest Jones, Sr.
Zuni Tribe, Governor Val R. Panteah, Sr.

10.0 REFERENCES

U.S. Bureau of Reclamation. 2004a. Lower Colorado River Multi-Species Conservation Program, Volume I. Programmatic Environmental Impact statement/Environmental Impact Report. December 17. Sacramento, CA.

_____. 2004b. Lower Colorado River Multi-Species Conservation Program, Volume II. Habitat Conservation Plan. Final. December 17. Sacramento, CA.

11.0 PROPOSED LCR MSCP HCP AMENDMENT

Lower Colorado River Multi-Species Conservation Program

Draft Habitat Conservation Plan Amendment Addition of New Covered Species – Northern Mexican Gartersnake

Background and Appendix Format

The northern Mexican gartersnake (*Thamnophis eques megalops*) was not considered for coverage during the 2005 development of the LCR MSCP Habitat Conservation Plan (HCP), because it was believed to be extirpated within the planning area. However based on a number of events, as described below, the LCR MSCP is now seeking to add the northern Mexican gartersnake to the list of covered species under the program.

- On July 10, 2013, the U. S. Fish and Wildlife Service (USFWS) published in the *Federal Register* a proposed rule to list the northern Mexican gartersnake as Threatened under the Endangered Species Act and a proposed rule for critical habitat designation (USFWS 2013a; USFWS 2013b). The final rule listing the northern Mexican gartersnake as Threatened under the Endangered Species Act was published on July 8, 2014 (USFWS 2014). Habitat identified for critical habitat was proposed on the Bill Williams River in Arizona (the proposed Bill Williams River Unit) within the LCR MSCP implementation area between Alamo Dam and the confluence of the Colorado River and Bill Williams River.
- In 2012, personnel of the Arizona Game and Fish Department (AGFD) discovered northern Mexican gartersnakes on the Bill Williams River in Arizona between Planet Ranch and Alamo Dam while conducting amphibian surveys. This portion of the Bill Williams River is within the LCR MSCP implementation area (Reach 3). In December 2015, the Planet Ranch Conservation Area was included in the program. The conservation area includes existing agricultural fields, the active floodplain of the Bill Williams River where flows are normally subsurface, and a portion of the Bill Williams River adjacent to the Bill Williams River National Wildlife Refuge where perennial surface water occurs. LCR MSCP habitat creation at Planet Ranch may result in creation of habitat that could be colonized by lowland leopard frogs and Colorado River toads, and now, northern Mexican gartersnakes.
- In 2015, a northern Mexican gartersnake was confirmed at the LCR MSCP's Beal Lake Conservation Area in the riparian field next to Willow Marsh on Havasu National Wildlife Refuge near Needles, California in LCR Reach 3. The Bureau of Reclamation (Reclamation) initiated a consultation with the USFWS for maintenance and

infrastructure improvements at the Beal Lake Conservation Area and received a Biological Opinion in November 2015.

- In addition to being listed as threatened under the federal Endangered Species Act, the northern Mexican gartersnake is also designated as an Arizona Species of Greatest Conservation Need. There is no special regulatory designation for the species in California or Nevada. It is considered extirpated in California.

Information about the northern Mexican gartersnake contained in the attachments to this appendix are formatted for the HCP. For example, Attachment 1 provides additional text appended to the end of Table 3-9 from the HCP. The format for the new information presented herein is an extension of the original HCP text.

Species Habitat Model

Covered species habitats had not been directly field delineated in the LCR MSCP planning area. Rather, species habitats were defined in the HCP by application of species habitat models based on the likelihood for each land cover type to support species habitat. For these species, the analysis of the extent of their habitat began with a definition of the land cover types used for the species models. The land cover type classification system used in the LCR MSCP was derived from previous classifications developed by Anderson and Ohmart (1976, 1984) and Younker and Anderson (1986). For riparian species, land cover types were classified by plant community and structural type. For marsh species, land cover types were classified by plant community and characteristics.

Attachment 1 provides a summary of the habitat used by the northern Mexican gartersnake. The land cover types that this species can use as habitat are marsh (Marsh Types 1-7) and adjacent riparian habitat. Riparian habitat associated with marsh that was assessed to be impacted in the 2005 HCP is CW I-IV.

The buffer distance to define the riparian habitat for northern Mexican gartersnake is proposed at 600 feet from the edge of the marsh. This is based on the main area of activity observed in radio tracking studies and trapping studies which range from 50 feet to 528 feet from the water's edge (Emmons 2014; Nowak et al. 2011; Emmons and Nowak 2016; Rosen and Schwalbe 1988; USFWS 2013b). Activities included foraging, seeking mates, gestation, and terrestrial movements of various distances. Additionally, the current draft proposed critical habitat (USFWS 2013b) uses a 600-foot buffer.

It is recognized that the northern Mexican gartersnake may be found, though less frequently, in additional upland areas up to 1 mile from known water sources (Cogan pers. comm.). In these situations it is hypothesized that they are opportunistically moving between foraging habitat patches and using upland cover sites such as burrows, rock structure, etc. (Gloyd 1937; Rosen and Schwalbe 1988). However, the majority of activities that may result in incidental take and the areas where most of the northern Mexican gartersnake activity will be is within marshes and within 600 feet of open water aquatic habitat.

Analysis of Impacts and Level of Take

Since the covered activities are not changing with the addition of the northern Mexican gartersnake, the conservation plan as outlined in the HCP will not change. A portion of the habitat already planned to be created will be managed for the gartersnake. Attachment 2 shows the amount of northern Mexican gartersnake habitat that will be impacted by the covered activities for reaches of the river. Since the covered actions have not changed, the impacts to Marsh 1-7 are the same as already described in the HCP.

To calculate the impacts for the riparian buffer and to be sure that the impact analysis was consistent, the LCR vegetation layer, from the 1997 vegetation mapping from the original impact analysis, was used. A 600-foot buffer was generated around each marsh expected to be affected by covered activities in Reaches 3, 4, and 5. These buffers were then intersected with all cottonwood-willow vegetation polygons in the vegetation layers. Whole cottonwood-willow polygons were not included, just the resultant intersecting area between the 600-foot marsh buffers and the cottonwood-willow polygons.

Attachment 3 describes the effects of the flow-related covered activities, the non-flow-related covered activities, and the effects of LCR MSCP implementation on northern Mexican gartersnake habitat. For Reaches 1-7, 243 acres of marsh and 984 acres of adjacent cottonwood-willow habitat could be impacted by implementation of covered activities. As noted in Attachment 3 – Effects of Flow-Related Covered Activities, periodic loss of ephemeral marshes and adjacent cottonwood-willow habitat in Lake Mead (Reach 1) could result in a low level of take.

Conservation Measures

Attachment 4 outlines the conservation measures. To mitigate the effects of the covered activities, conservation measure NMGS1 states that 512 acres of marsh will be created to provide northern Mexican gartersnake habitat. This created habitat will also be habitat for the Yuma clapper rail (HCP conservation measure CLRA1). Of the 5,940 acres of LCR MSCP-created cottonwood-willow I-IV, 984 acres will be managed near marshes to provide northern Mexican gartersnake habitat. Marsh associated with backwaters that are disconnected from the LCR channel are of higher value to NMGS than connected backwaters on the LCR and are the preferred type to achieve LCR MSCP conservation goals for this species. Marsh associated with disconnected backwaters are managed to reduce and limit non-native predatory species. Conservation measure NMGS2 provides for implementation of measures to avoid or minimize take of the northern Mexican gartersnake as provided through LCR MSCP best management practices. These practices will be developed in coordination with the USFWS and may include measures addressing worker education programs, speed limits, seasonal restrictions, backfilling or covering trenches overnight, and effects of non-natives species. The following avoidance and minimization measures (AMM) outlined in the HCP would also apply to the gartersnake: AMM1, AMM2, AMM4, AMM5, and AMM6. These measures are ongoing and will be implemented to benefit the northern Mexican gartersnake, except where implementation would negatively affect other covered species. Since the measures are beneficial to all of the covered

species, there may be temporary negative impacts that rise to the level of take, but overall will benefit the northern Mexican gartersnake. In addition, monitoring and research measure MRM2 would also apply.

Including the northern Mexican gartersnake for coverage would not increase program costs since the amount of habitat being created for the HCP would not be increasing, and, under Section 10.3 of the Implementing Agreement, the USFWS must consider and give full credit for conservation measures under the HCP already being implemented that would benefit the northern Mexican gartersnake. Implementation of some of the avoidance and minimization measures may result in nominal, additional costs at conservation areas, but these costs would be included under existing program costs and reflected accordingly in the LCR MSCP annual Implementation Report, Work Plan and Budget. Additional information on the northern Mexican gartersnake status is included in Attachment 5.

Attachment 1
Additional Text Added to Table 3-9 Beginning on Page 3-22 of the HCP

Table 3-9. LCR MSCP Habitat Models for Selected Species

Covered Species	Assumed Distribution by River Reach							Summary Habitat Description	LCR MSCP Land Cover Types Assumed to Support Species Habitat
	1	2	3	4	5	6	7		
Selected Threatened and Endangered Species									
Northern Mexican gartersnake	X		X	X	X	X	X	Associated with: 1. Aquatic or riparian habitat that includes: <ul style="list-style-type: none"> · Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in-channel pools, off-channel pools, or backwater habitat, and that possess a preferred natural, unregulated flow regime · Lentic wetlands such as livestock tanks, springs, and cienegas; and · Shoreline habitat with adequate organic and inorganic structural complexity to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (e.g., boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter); and 2. Adequate terrestrial space, 600 ft lateral extent to either side of bankfull stage, adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation.	Marsh types 1-7 and adjacent cottonwood willow I-IV

Attachment 2

Additional Text Added to Table 4-5 Beginning on Page 4-32 of the HCP

Table 4-5. Summary of Estimated Extent of Covered Species Habitat Affected with Implementation of the Covered Activities, Including Reduction in Annual Flow of 0.860 Million Acre-Feet in Reach 3 and of 1.574 Million Acre-Feet in Reaches 4 and 5 (acres)

Covered Species	Impacts of Non-Federal Covered Activities on Species Habitat			Impacts of Federal Non-Flow-Related Covered Activities	Total Impacts on Species Habitat
	Removed (Non-Flow-Related)	Degraded (Flow-Related)	Total Impacts of Implementation on Species Habitat		
Northern Mexican gartersnake	50	1,081	1,131	96	1,227

Attachment 3
Additional Text Added on Page 4-81 of the HCP

4.5.28 Northern Mexican Gartersnake

The potential effects of implementing covered activities and LCR MSCP conservation measures on the rangewide distribution and status of the northern Mexican gartersnake are expected to be minor, affecting a relatively small number of individuals and proportion of its habitat throughout its range over the term of the LCR MSCP. The LCR MSCP Conservation plan includes conservation measures to avoid and minimize direct effects of implementing covered activities and the LCR MSCP on the northern Mexican gartersnake, and the potential effects of habitat loss expected to be minimized with the creation of replacement habitat.

4.5.28.1 Effects of Flow-Related Covered Activities

Flow-related activities may result in take of the northern Mexican gartersnake. Changes in points of diversion in Reaches 3-5 will lower groundwater levels sufficiently in these reaches to reduce the extent of 1,081 acres of habitat (see Table 4-5) provided by marshes associated with backwaters and adjacent cottonwood-willow. Reservoir elevations in Reaches 3-5 would not be affected by lower river stage elevations. Consequently, flow-related activities are not expected to affect habitat associated with marshes maintained by reservoirs (e.g., Bill Williams Delta - Reach 3) or that are managed to support marsh vegetation (e.g., Imperial NWR - Reach 5). Through implementation of AMM2, the LCR MSCP will avoid potential effects of lowering groundwater elevations on an additional 149 (16 acres of marsh and a maximum of 133 acres of cottonwood-willow) acres of habitat at Topock Marsh by maintaining water deliveries to Topock Marsh for maintenance of water levels and existing habitat conditions (see Table 4-3). Lowering groundwater elevations could cause direct loss of these habitats through desiccation, fragmentation, or reduction in the extent of habitat patches.

As described in Section 4.2.3.3 and Section 4.2.3.2, implementation of flow-related covered activities may affect marsh vegetation and adjacent cottonwood-willow that provides northern Mexican gartersnake habitat that periodically establish at inflow points of Lake Mead (e.g., Colorado River delta, Virgin River delta, Muddy River delta) when Lake Mead water surface elevations are below full pool. Marsh habitat below the full pool elevation will be created and lost based on water surface elevations. For example, marsh vegetation established at a certain elevation may be lost if the water surface elevation declines so that groundwater elevations drop below the rooting depths of emergent vegetation. Alternatively, established marsh vegetation would be inundated and lost during wetter periods, when Lake Mead reservoir elevations rise. The frequency,

extent, and value of habitat and attendant species benefits that could be periodically created and subsequently lost as a result of changes in reservoir elevations over the term of the LCR MSCP cannot be predicted based on the available information. The periodic loss of these ephemeral marshes, however, could result in a low level of take of the northern Mexican gartersnake over the term of the LCR MSCP.

As described in Section 4.2.2.3, effects of ongoing flow-related covered activities could contribute to a minimal and unquantifiable level of degradation of marshes that provide habitat over the term of the LCR MSCP.

4.5.28.2 Effects of Non-Flow-Related Covered Activities

Proposed activities related to habitat restoration and maintenance projects, facilities and infrastructure maintenance, may result in take of the northern Mexican gartersnake. The likelihood for take is expected to increase over the term of the LCR MSCP if the abundance of the northern Mexican gartersnake increases in the LCR MSCP planning area as a result of implementing LCR MSCP conservation measures for this species. Restoration-related activities that effect surface habitat, such as operation of equipment to remove vegetation, could result in temporary or permanent loss of habitat and harassment or mortality of individuals. These activities, however, would be conducted when individuals are least likely to be active on the ground surface. Restoration-related activities that effect sub-surface habitat or potential cover sites (ground-disturbing projects with heavy equipment, etc.), would be conducted during the times of year when individuals are most likely to be surface active and can move out of harm's way. Effects on habitat would be temporary for restoration projects that restore or improve existing northern Mexican gartersnake habitat. The probability for permanent loss of habitat is considered minimal because restoration projects undertaken in existing northern Mexican gartersnake habitat will be designed to maintain or improve its habitat, and it is unlikely that state fish and wildlife agencies would remove northern Mexican gartersnake habitat to restore habitat for other species. However, because habitat restoration sites have not yet been identified, it is assumed that up to 10 acres of degraded or former marsh and up to 10 acres of degraded cottonwood-willow land cover that provides low-value habitat could be removed over the term of the LCR MSCP to restore habitat for other species (see Table 4-5).

Activities associated with maintaining facilities and infrastructure may result in the periodic removal of emergent vegetation growing in canals and drains that may provide northern Mexican gartersnake habitat. Up to 557 miles of canals and drains that could support some patches of emergent vegetation could be subject to periodic maintenance activities that would remove emergent vegetation over the term of the LCR MSCP. As described in Section 4.2.3.1, it is unlikely that maintenance of canals would measurably affect the extent of species habitat. Periodic maintenance of the 244 miles of drains in the LCR MSCP planning area, however, could result in the removal of up to 30 acres of emergent vegetation that could provide habitat. Implementation of Federal non-flow-

related covered activities addressed in the LCR MSCP BA could result in the loss of an additional 96 acres of species habitat (see Table 4-5).

As described in Section 4.2.2.3, implementation of ongoing non-flow-related covered activities are not expected to result in indirect effects on the northern Mexican gartersnake.

4.5.28.3 Effects of LCR MSCP Implementation

Activities associated with creating and maintaining habitat for covered species may result in take of the northern Mexican gartersnake. LCR MSCP habitat creation-related activities could result in temporary disturbance of habitat and harassment of individuals if they are present at the time activities are implemented, but these activities will avoid removal of primary habitat to establish habitat for other covered species. Up to 512 acres of existing degraded or former marsh that may provide low-value habitat could be converted to fully functioning marsh that provides high-value northern Mexican gartersnake habitat. Some additional limited and low-value (e.g., dry patches of herbaceous vegetation near marsh edges) habitat could be converted to habitat to benefit other covered species; however, with implementation of the AMM's described in Section 5.6.1, "Avoidance and Minimization Measures", removal of these low-quality habitats is not expected to result in harm (i.e., injury or mortality of individuals) and, therefore, is not expected to result in take of the northern Mexican gartersnake.

Habitat management-related activities, such as operation of equipment to remove vegetation and maintain open water in backwaters, burning decadent marsh vegetation to stimulate vegetation growth, periodic removal of trees in patches of created habitat to encourage stand regeneration, and operation of equipment to maintain roads, could result in temporary loss of habitat and harassment, injury, or mortality of individuals. The maximum extent of habitat that could be affected by habitat management activities is estimated to be 1,496 acres (i.e., the extent of marsh and cottonwood-willow land cover to be created as habitat for associated covered species) over the term of the LCR MSCP. The likelihood for take is expected to increase over the term of the LCR MSCP if the abundance of the northern Mexican gartersnake increases in the LCR MSCP planning area as a result of implementing LCR MSCP conservation measures for this species. The level of adverse effects on habitats and individuals will depend on the type and extent of LCR MSCP habitat management activities that are undertaken in species habitat.

Attachment 4
Additional Text Added on Page 5-73 of the HCP

5.7.28 Northern Mexican Gartersnake

5.7.28.1 Summary of Effects

Implementation of covered activities and LCR MSCP conservation measures could result in the loss of up to 1,131 acres of northern Mexican gartersnake habitat and take of individuals. Implementation of Federal non-flow-related covered activities addressed in the amendment to the LCR MSCP BA could result in the loss of an additional 96 acres of habitat. Some additional limited and low value habitat (e.g., dry patches of herbaceous vegetation near marsh edges) could be affected by habitat creation and maintenance activities; however, the level of take is assumed to be low because of the limited value of the potentially affected habitat.

5.7.28.2 Conservation Measures

NMGS1—Create 1,496 acres of northern Mexican gartersnake habitat. Create and manage 512 acres of marsh to provide northern Mexican gartersnake habitat. This created habitat will also be habitat for the Yuma clapper rail (conservation measure CLRA1). Of the 5,940 acres of LCR MSCP created cottonwood-willow I-IV, 984 acres will be created and managed near marshes to provide northern Mexican gartersnake habitat. Additional northern Mexican gartersnake habitat may be provided by marsh vegetation that becomes established along margins of the 360 acres of backwaters that will be created. These small patches of habitat may provide linkages between existing habitat and may facilitate the colonization of created habitats. Marsh associated with backwaters that are disconnected from the LCR channel are of higher value to northern Mexican gartersnake than connected backwaters on the LCR and are the preferred type to achieve LCR MSCP conservation goals for this species. Marsh associated with disconnected backwaters are managed to reduce or limit non-native predatory species. The design and management criteria described in the conservation measures for Yuma clapper rail (HCP Section 5.7.1), California black rail (HCP Section 5.7.13), southwestern willow flycatcher (HCP Section 5.7.2) and yellow-billed cuckoo (HCP Section 5.7.14) will ensure that created cottonwood-willow and marsh areas will also provide other habitat requirements for this species.

NMGS2—Implement conservation measures to avoid or minimize take of northern Mexican gartersnakes. Implement measures to avoid or minimize take of northern Mexican gartersnakes. These measures could include worker education programs and other practices in accordance with LCR MSCP best management practices.

5.7.28.3 Expected Outcomes with Implementation of Conservation Measures

Implementation of the LCR MSCP conservation measures, including creation of 1,496 acres of habitat, achieves the LCR MSCP goal to avoid, minimize, and fully mitigate adverse effects of covered activities and LCR MSCP implementation on the northern Mexican gartersnake, and to contribute to its recovery. Implementation of these measures will help ensure that the existing abundance of the species in the LCR MSCP planning area is maintained as a result of fully replacing affected habitat and maintaining existing habitat that otherwise could decline in function or be lost without management intervention. In addition, implementation of the conservation measures will benefit the northern Mexican gartersnake by increasing the amount of new habitat in the LCR MSCP planning area by 269 acres, in addition to replacing the extent of affected habitat.

Attachment 5
Additional Text Added on Page I-29 of Appendix I of the HCP

L1.1.7 Northern Mexican Gartersnake (*Thamnophis eques megalops*)

Legal Status

The northern Mexican gartersnake is a subspecies of the Mexican gartersnake (*Thamnophis eques*); the only subspecies that occurs in the United States and is listed as a Threatened species under the ESA. The USFWS also proposed designation of critical habitat for this species in July, 2013 (USFWS 2013b). The USFWS has not yet published a final rule on critical habitat.

Other Status

- G4T3 (global rank) in NatureServe and 1A (state rank) in the Arizona Heritage Data Management System.
- A wildlife species of special concern in Arizona
- Not listed in the CNDDDB (there are apparently no records of this species from the California counties along the Colorado River)
- Not listed in the Nevada Natural Heritage Program. It is noted as a historic species.

Species Distribution

At the time the LCR MSCP was established in 2005, the northern Mexican gartersnake was considered extirpated from the area surrounding the mainstem of the LCR and had not been considered as a potential covered species. The species was re-documented in 2012 below Alamo Dam on the Bill Williams River and later in its largest tributaries. More recently, it was documented on the Havasu National Wildlife Refuge within Beal Lake Conservation Area in Mohave County, Arizona.

AGFD conducted surveys for the Colorado River toad (*Bufo alvarius*) and the lowland leopard frog (*Rana yavapaiensis*) in potential habitat within the LCR MSCP planning area from south of Davis Dam to the Southerly International Boundary and the Bill Williams River from east of Planet Ranch west to the confluence with Lake Havasu from 2011-2013 (Cotten 2011; Cotten and Grandmaison 2012). Lentic (of, relating of, or

living in still waters such as lakes, ponds, or swamps) and lotic (of, relating to, or living in actively moving water) backwaters and desert washes that appeared to provide suitable habitat for the toad and frog were surveyed using funnel trap arrays, visual encounter surveys, and nocturnal audio surveys (Cotten 2011; Cotten and Grandmaison 2012). During these surveys, ten northern Mexican gartersnakes were captured in funnel traps along the Bill Williams River upstream of Planet Ranch in 2012 (Cotten 2011; Cotten and Grandmaison 2012).

The northern Mexican gartersnake can be secretive and difficult to detect especially if present in low densities (Emmons and Nowak 2013; Cotten pers. comm.). The surveys from 2011-2013 were targeted for the frog and toad, not the northern Mexican gartersnake; methods, trap placement, location, and timing would be different depending upon the targeted species (Cotten pers. comm.).

Habitat Requirements and Species Considerations

Habitat

In Arizona, Rosen and Schwalbe (1988) found that the most important habitat characteristics for the northern Mexican gartersnake were permanent water, dense bankline vegetation, and an abundance of prey species. Surveys and observations of northern Mexican gartersnakes in Mexico suggested that dense vegetation is most important as protective cover where the gartersnake occurs with harmful nonnative species, but in largely or wholly native communities, vegetation density is much less important to survival (Burger 2007). Individuals often remain concealed under surface cover or subsurface in burrows and are found in areas with protected backwaters, braided side channels, beaver ponds, isolated pools near the main stem of the river, edges of dense emergent vegetation, dried up channels, ample downed and vegetative cover, and flooded areas (Emmons and Nowak 2013). Surveys in Mexico for the northern Mexican gartersnake found the species to be abundant in areas where habitat was severely degraded with no or low vegetation cover but had few or no harmful nonnative species present and maintained a suitable native prey base, suggesting that in the absence of harmful nonnative species, dense vegetation is less important in maintaining healthy gartersnake populations (Burger 2007; Servoss pers. comm.). While actively foraging, studies have shown that northern Mexican gartersnakes usually stay within 15 meters of a water source (a direct function of preferred prey) but will move farther away on occasion for gestation, periods of dormancy, ecdysis (shedding) cycles, etc. (Rosen and Schwalbe 1988). They have been observed from over 500 feet (Emmons 2014) to over one mile away (Cogan pers. comm.) from the water for sheltering purposes, foraging on land, and moving to other water sources or hibernation sites (Nowak et al. 2011; Rosen and Schwalbe 1988; USFWS 2013b).

Sheltering Habitat

Northern Mexican gartersnakes take shelter or cover in dense herbaceous vegetation, dense emergent vegetation, holes, root crevices, submergent vegetation, debris dams, downed logs or trees, rocky areas or rock piles, animal burrows, and man-made cover such as riprap or debris piles (Conant 2003; Emmons and Nowak 2013; Nowak et al. 2011; Rosen and Schwalbe 1988; Cotten pers. comm.). The presence of small diameter trees provides additional habitat complexity, thermoregulatory opportunities, and cover for the northern Mexican gartersnake (USFWS 2014).

Habitat Used During Prolonged Inactivity

The northern Mexican gartersnake will use areas of cover with optimal thermal requirements for cover during periods of prolonged inactivity (Cotten pers. comm.). Steep hills, river banks, upland burrows, and cliffs adjacent to riparian areas near permanent water sources can provide such areas for the species (Nowak et al. 2011). Individuals will also use small mammal burrows, packrat middens, debris piles, flood debris drifts, rock piles, and retaining wall rip-rap (Cotten pers. comm.).

Diet

Potential prey along the main stem of the LCR include the Woodhouse's toad (*Anaxyrus woodhousii*), Pacific tree frog (*Hyla regilla*), invertebrates, lizards, and small mammals (Cotten 2011; Cotten and Grandmaison 2012; Rorabaugh et al. 2004).

Potential prey species found along the Bill Williams River are the Arizona toad (*Anaxyrus microschaphus*), red-spotted toad (*Anaxyrus punctatus*), longfin dace (*Agosia chrysogaster*), invertebrates, lizards, and small mammals (Cotten 2011; Cotten and Grandmaison 2012). Small size classes of harmful nonnative fish may also be used as prey including largemouth bass (*Micropterus* sp.), black bullheads (*Ameiurus melas*), and American bullfrogs (*Lithobates catesbeianus*) (Emmons and Nowak 2016b).

Breeding

Exact timing of breeding events vary with elevation (Rosen and Schwalbe 1988). Mating occurs in fall and spring, and females store the sperm until ovulation in late March or early April (Rosen and Schwalbe 1988). Northern Mexican gartersnake females give birth to live young from late May through early July (Brennan and Holycross 2006; Rosen and Schwalbe 1988; Wallace 2002). Manjarrez (1998) noticed that births were positively correlated with temperature.

Females can have up to 38 young during one breeding season (Nowak and Boyarski 2012) and the size of the litter is positively correlated with the length of the female (Manjarrez 1998; Rosen and Schwalbe 1988). Female northern Mexican gartersnakes have been found to bear young in warm microenvironments 5 to 15 meters from the water, using rock walls, the ground, and sun-warmed sacaton tussocks (Rosen and Schwalbe 1988), but may give birth in a variety of microhabitats and distances from

water. The breeding season in this area is estimated to occur between March and July (March-May mating; May-August live birth).

Behavior

The northern Mexican gartersnake is considered a terrestrial and aquatic generalist (USFWS 2013b). The northern Mexican gartersnake is active during the warmer months of the year; they are the most active from May to September (Degenhardt et al. 1996; Emmons and Nowak 2013; Manjarrez 1998), but surface activity patterns may depend heavily on elevation and climate, with longer windows of activity at lower elevations. Northern Mexican gartersnakes will bask on any substrate, natural or artificial, including on reeds, stones, the ground, and rocks (Rosen 1991; Conant 2003).

The northern Mexican gartersnake forages along watercourses and seeks shelter in thick streamside vegetation (Degenhardt et al. 1996), burrows, under debris, rocks, etc. The northern Mexican gartersnake was observed demonstrating a wide variety of foraging methods including ambushing prey in water and on land, active foraging in riffles, vegetation mats, grass, and open water, and feeding in areas where there are temporary concentrations of prey (Rosen and Schwalbe 1988). The Mexican gartersnake, including the northern subspecies, primarily forages along the shoreline of the water source but occasionally dives in water, forages away from the shoreline, and forages on the pond's surface (Drummond and Garcia 1989). Mexican gartersnakes have been observed hanging from holes between the rocks with their head in the water and catching fish as they swam by and by floating in the water wiggling their tails to catch fish (Conant 2003 page 16).

The northern Mexican gartersnake can be difficult to detect due to their secretive nature, their ability to quickly escape underwater, and their ability to persist in low population densities (USFWS 2013b). Additionally, the northern Mexican gartersnake coexists with other species of gartersnakes across their distribution (Rosen and Schwalbe 1988; Tanner 1959).

Regionally Significant Populations in the LCR MSCP Planning Area

In the spring of 2015, the LCR MSCP was notified by Great Basin Bird Observatory that they may have sighted a northern Mexican gartersnake at Beal Lake Conservation Area on the Havasu National Wildlife Refuge in Arizona during riparian bird monitoring. The AGFD, USFWS, and U.S. Geological Survey (USGS) were notified and five photographs were provided for identification. A gartersnake was observed on May 4, 2015, in the same area and two additional photographs were taken for identification. The USFWS notified the LCR MSCP on June 1, 2015, that the species was confirmed as a northern

Mexican gartersnake by Taylor Cotten and Tom Jones of AGFD and Jeff Servoss of the USFWS.

Northern Mexican gartersnake distribution and abundance within the Beal Lake Conservation Area is not well known at this time. From the photographs, it is likely that the sightings described above were of the same individual. The snake may have come from Topock Marsh as it was found on a road about 275 meters from Topock Marsh to the north and well over 800 meters from open water of the backwater to the south. However, due to the cryptic nature of the species and ineffectiveness of species specific surveys, species presence and absence determinations can be unreliable. The LCR MSCP has reviewed the existing literature and coordinated with biologists knowledgeable of the species to predict the potential for encountering gartersnakes based on the habitat type and species preferences. It is also important to note that due to the mild winter temperatures in the area (rarely below freezing for long periods of time) and preliminary findings from telemetry research along the Verde River, the snakes may exhibit more surface activity than previously suspected and may be more active in the winter months compared to other locations.

Population Status and Reasons for Decline

The population is listed under the ESA as Threatened. Reductions in range and population densities have affected the status of the northern Mexican gartersnake significantly in the last 30 years. The subspecies occurs at low to very low population densities or may even be extirpated in as much as 90 percent of the northern Mexican gartersnake's historical distribution in the United States. As of 2016, there were only five northern Mexican gartersnake populations in the United States where the subspecies remains reliably detected and is considered viable, and all are located in Arizona. The five known populations are: (1) The Page Springs and Bubbling Ponds State Fish Hatcheries along Oak Creek; (2) lower Tonto Creek; (3) the upper Santa Cruz River in the San Rafael Valley; (4) the Bill Williams River; and (5) the upper and middle Verde River. As many as 23 of 33 known northern Mexican gartersnake localities in the United States (70 percent) are likely not viable and may exist at low population densities that could be threatened with extirpation or may already be extirpated. (Servoss pers. comm.)

Northern Mexican gartersnake populations have declined primarily from interactions with harmful nonnative species such as bullfrogs, crayfish, and predatory fish. These nonnative species prey upon, or compete with the gartersnakes and the native prey species that are vital to their existence. Human activities that diminish surface water or degrade streamside (riparian) vegetation are also significant threats, but particularly where they co-occur in the presence of nonnative species (USFWS 2014).

Current Threats to Species Survival

The presence of harmful nonnative species constitutes the most significant threat to the gartersnake. Harmful nonnative species directly prey upon the gartersnake and compete with them for prey. Landscape-level effects from the continued expansion of harmful nonnative species have changed the spatial orientation of the gartersnakes' distribution, creating greater isolation between populations. The prey base of these gartersnakes includes native amphibians and fish populations. Declines in their prey base have led to subsequent declines in the distribution and density of gartersnake populations. In most areas across their range, prey base declines are largely attributed to the introduction and expansion of harmful nonnative species (USFWS 2014).

Human activities that diminish surface water or degrade streamside (riparian) vegetation urbanization and road construction and use are also significant threats, but particularly where they co-occur in the presence of nonnative species (USFWS 2014).

Management Needs

The creation or restoration of marshes for Yuma clapper rail and creation of cottonwood-willow habitat for southwestern willow flycatcher will benefit the northern Mexican gartersnake. Marsh associated with backwaters that are disconnected from the LCR channel are of higher value to northern Mexican gartersnake than connected backwaters on the LCR and are the preferred type to achieve LCR MSCP conservation goals for this species. Marsh associated with disconnected backwaters are managed to reduce or limit non-native predatory species

Existing Management Actions

No existing management actions have been identified for the northern Mexican gartersnake. The AGFD's conservation and mitigation program (CAMP; implemented under an existing section 7 incidental take permit) has committed to either stocking (with captive-bred stock) or securing two populations each of northern Mexican and narrow-headed gartersnakes to help minimize adverse effects to these species from their sport fish stocking program through 2021 (USFWS 2011, Appendix C). Other CAMP commitments include: (1) Developing a gartersnake monitoring, research, and restocking plan to guide CAMP activities to establish or secure populations; (2) developing outreach material to reduce the deliberate killing or injuring of gartersnakes (placed in high angler access areas); (3) ensuring that chemically renovated streams are quickly restocked with native fish as gartersnake prey; (4) conducting a live bait assessment team to develop recommendations to amend live bait management; (5) reviewing and updating outreach

programs on the risks to native aquatic species from the transport of nonnative aquatic species; (6) developing and implementing a public education program on gartersnakes; and (7) working with the New Mexico Department of Game and Fish to examine the roll of escaped rainbow trout from Luna Lake into tributaries to the San Francisco River in supporting narrow-headed gartersnakes.

Recovery Goals

The recovery plan for the northern Mexican gartersnake has not yet been prepared; there are no agency-mandated recovery goals for the northern Mexican gartersnake at this time.

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