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In reply refer to:
AESO/SE
02EAAZ00-2004-F-0161-R2
2022-0018822-S7-001

December 7, 2022

Ms. Jacklynn Gould, Regional Director
Bureau of Reclamation
Lower Colorado Basin Region
500 Fir Street
Boulder City, Nevada 89005

RE: Biological Opinion for Enhanced Habitat Protection and Reduction in Colorado River Flows Between Hoover Dam and Parker Dam in Excess of Flow-Related Covered Actions and Activities Provided Under the Lower Colorado Multi-Species Conservation Program (LCR MSCP)

Dear Ms. Gould:

Thank you for your request to reinitiate formal consultation with the U.S. Fish and Wildlife Service (FWS; Service) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. *et seq.*), as amended (Act). We received your March 2, 2022, request to reinitiate consultation via electronic mail. The basis of your request is to allow for increased water conservation in the Lower Colorado River Basin consistent with the requirements of the 2019 Colorado River Drought Contingency Plan and related agreements, increasing the amount of reduction in flow coverage in each of LCR MSCP Reaches 2 and 3 (from Hoover Dam to Parker Dam) up to 1.574 million (M) acre-feet per year (af/y), from the current coverage of 845,000 af/y in Reach 2 (Hoover Dam to Davis Dam) and 860,000 af/y in Reach 3 (Davis Dam to Parker Dam). The intent of increasing the reduction of flow in Reaches 2 and 3 is to increase the amount of water being stored in Lake Mead (Reach 1). This consultation concerns the possible effects of the flow reduction in Colorado River flows between Hoover Dam and Parker Dam in excess of flow-related covered actions and activities provided under the LCR MSCP and enhanced habitat protection on the federally endangered Yuma Ridgway's (clapper) rail (*Rallus obsoletus [=longirostris] yumanensis*), federally endangered bonytail (*Gila elegans*) and its critical habitat, federally endangered razorback sucker (*Xyrauchen texanus*) and its critical habitat, and federally threatened northern Mexican gartersnake (*Thamnophis eques megalops*).

You requested our concurrence with your determination that the proposed project may affect but is not likely to adversely affect razorback sucker critical habitat. We do not concur with your

determination and have determined that the proposed action will have no effect on razorback sucker critical habitat. Our determination is described in the Effects of the Action section.

You also requested our concurrence with your "no effect" determination for the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), the threatened desert tortoise (*Gopherus agassizii*), the threatened humpback chub (*Gila cypha*), and the threatened yellow-billed cuckoo (*Coccyzus americanus occidentalis*). Concurrence with, "no effect" determinations is not required, and thus these species will not be addressed further in this document; however, your rationale for doing so is in your biological assessment (BA).

We based this biological opinion on information provided in the March 2, 2022, BA, telephone conversations, meetings, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern or on other subjects considered in this opinion. A complete record of this consultation is on file at this office.

Consultation History

- December 17, 2004: Habitat Conservation Plan and Biological Assessment for Lower Colorado River Multi-Species Conservation Program finalized by Reclamation.
- March 4, 2005: Biological and Conference Opinion (BCO) on the Lower Colorado River Multi-Species Conservation Program, Arizona, California, and Nevada issued by Service (AESO/SE 02-21-04-F-0161). This BCO is incorporated herein into this BO by reference.
- April 4, 2005: Section 10(a)1(B) permit (TE-086834-0) issued to the Lower Colorado River Multi-Species Conservation Program Non-Federal Partners by the Service.
- November 28, 2017: Reclamation reinitiates consultation on the Lower Colorado River Multi-Species Conservation Program with an amendment to add the northern Mexican gartersnake as a covered species.
- February 5, 2018: Final Intra-Service Biological Opinion for the Lower Colorado River Multi-Species Conservation Program – Addition of Northern Mexican Gartersnake (*Thamnophis eques megalops*) as a covered species is issued by the Service (AESO/SE 22410-2004-F-0161-R). This BO is incorporated herein into this BO by reference.
- March 19, 2019: The Governor's representatives of the seven Colorado River Basin States and key water districts formally submitted Drought Contingency Plans to Congress for immediate implementation. These plans include conservation measures intended to alleviate the water needs during the ongoing drought in the Colorado River Basin.
- October 25, 2021: Reclamation contacted the Arizona Ecological Services Office with a notification that consultation may be reinitiated due to measures that will be taken in their Colorado River Drought Contingency Plan.
- March 2, 2022: Reclamation submitted a BA for Increased Reduction in Flow Reach 2 and 3 and Conservation Measures and reinitiates consultation.
- April 8, 2022, FWS issued a memorandum to Reclamation reinitiating consultation on April 5, 2022. The memorandum summarized our requests for additional information and Reclamation's responses culminating in the acceptance of their BA.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Regulations implementing the Act (50 CFR 402.02) define "action" as all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies of the United States or upon the high seas.

A complete description of the proposed action is in your BA and additional information provided between March 2 and April 8 intended to clarify and support the original BA. We include these documents herein by reference and provide a brief summary of the proposed action. This brief summary is followed by a description of the action area and a description of the LCR MSCP. We close this section with a detailed description of the proposed action and the associated protective measures.

In brief, Reclamation has requested to reinitiate consultation with the Service on their LCR MSCP BO (USFWS 2005) due to two new actions: (1) increasing the amount of reduction in flow[1] coverage provided under the LCR MSCP in river Reach 2 (from Hoover Dam to Davis Dam) and river Reach 3 (from Davis Dam to Parker Dam) up to 1.574 M af/y, from the current coverage of 845,000 and 860,000 af/y, respectively; and (2) implementing proposed conservation measures, including habitat creation, management, and protection, to minimize the potential effects to species associated with the requested increases in flow reductions.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). In delineating the action area, we evaluated the farthest-reaching physical, chemical, and biotic effects of the action on the environment. For clarity, the LCR MSCP BO (USFWS 2005) defines an overall "action area" and a larger "planning area" for implementation of the minimization measures in the plan. Hereafter, any mention of the term "action area" will adhere strictly to this proposed action and not to the LCR MSCP action area. However, the term "planning area" will be used in the same context as it was introduced in the LCR MSCP BO (USFWS 2005).

The area that will be directly and indirectly affected by the proposed action are Reaches 1, 2, and 3 along the Colorado River (Figure 1). Indirect effects of this action were previously addressed in the original LCR MSCP BO (USFWS 2005) and the northern Mexican gartersnake addition BO (USFWS 2018a). The action area includes the full pool elevations (the maximum lake level before water flows over the spillway) of Lakes Mead, Mohave, and Havasu to Parker Dam affected by the proposed action (Figure 1). Under the LCR MSCP, Reach 1 includes the Colorado River from Separation Canyon in the lower end of the Grand Canyon to Hoover Dam, including Lake Mead to full pool elevation. Reach 2 includes the Colorado River from Hoover Dam to Davis Dam, including the shoreline of Lake Mohave up to full pool elevation. Reach 3

[1]Increasing the reduction in flow is Reclamation's terminology for holding back more water in the reservoirs and a reducing of water flows in the river.

includes the Colorado River from Davis Dam to Parker Dam, including Lake Havasu up to full-pool elevation (Figure 1).

Lower Colorado River Multi-Species Conservation Program

The LCR MSCP is a 50-year (April 2005 through April 2055), federal/non-federal partnership among 56 entities (permittees) that provides compliance with the Act for on-going and future operations and maintenance activities on the Lower Colorado River. The Secretary of the Interior (Secretary) approved the LCR MSCP and authorized Reclamation's participation in a record of decision dated April 2, 2005. The record of decision for the LCR MSCP incorporated several program documents to guide implementation of the program over its 50-year term (LCR MSCP 2004a 2004b, 2004c; USFWS 2005, 2018). Congress subsequently recognized the Secretary's authority "to manage and implement the LCR MSCP" in accordance with the relevant program documents in the Omnibus Public Land Management Act of 2009, (Public Law No 111-11, Title IX, Subtitle E, at 123 Stat. 1327-29). The LCR MSCP has been implemented in full compliance with the program documents for the past 17 years (LCR MSCP 2021).

The LCR MSCP planning area includes the Colorado River from Separation Canyon in the Grand Canyon to the international border with Mexico, spanning over 400 miles and encompassing portions of seven counties in the three States of Arizona, California, and Nevada (Figure 1). Reclamation is the implementing agency for the LCR MSCP and shares responsibility with the permittees for completing conservation measures described in the Habitat Conservation Plan (HCP; LCR MSCP 2004a) and reasonable and prudent measures in the 2005 and 2018 BOs (USFWS 2005, 2018a). Reclamation interacts with its partners through the LCR MSCP Steering Committee, which is comprised of state and federal agencies, regional water and power users, municipalities, Native American tribes, and conservation organizations, among others, who provide collaborative input and oversight functions in support of LCR MSCP implementation.

As previously explained in the 2005 and 2018 BOs and the 2022 BA, Reclamation asserts that it remains challenging to identify and separate the various actions and activities of all the active parties, partners, stakeholders, and applicants. Given this consolidation of federal actions and non-federal activities on the river, it is not clear which parties could have specific responsibility under the Act for any potential take of federally listed species. The LCR MSCP therefore integrates Section 7 and Section 10 responsibilities under the Act, with no functional separation of effects and the resultant incidental take for the federal and non-federal covered actions. Subsequently, Congress authorized the Secretary to implement the program accordingly under Public Law No. 111-11, as discussed above. As a 50-year program that covers a wide variety of activities, the LCR MSCP provides coverage for a broad range of foreseeable future activities. Nothing in this BO changes, in any fashion, the existing, binding commitment of the federal and non-federal LCR MSCP parties to fully implement the program through 2055.

The relationship between Reclamation as an action agency, other actions, and the permit holders to the LCR MCSP Habitat Conservation Plan are described in the BA. We believe that the approach described in your BA and this consultation for managing both section 7 and section 10 compliance is appropriate, and the section 10 (a)(1)(B) permit authorization requirements are satisfied.

This consultation is a combined BO in that it satisfies the interagency cooperation Section 7 consultation requirements of Reclamation's proposed Federal action as well as the intra-agency Section 7 consultation requirements for FWS' Federal permit authorization under Section 10 (a)(1)(B) relied upon by the non-Federal permittees under the MSCP HCP. As this combined BO does manage both section 7 and section 10 compliance for Reclamation and the non-federal permit holders, it is important to note that in the standard analysis to determine the amount of incidental take in a section 7 consultation on Federal actions, the FWS determines the amount of take that would occur and provides reasonable and prudent measures with terms and conditions to minimize the amount of take. However, for issuance of a section 10(a)(1)(B) permit, the amount of incidental take must be minimized to the "maximum extent practicable." This is a more robust standard than for Federal agencies.

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

Proposed Action: Increased Reduction in Colorado River Flows

Due to the ongoing historic drought in the American Southwest (Williams et al. 2022), this project facilitates water conservation actions designed to minimize the reduction of the long-term water supply in the Lower Colorado River Basin (LCRB). When the LCR MSCP was created it provided coverage under the Act for flow-related activities including power production and changes to the points of diversion of Colorado River water and associated reduction in water releases in the LCRB. Reductions in flow of 845,000 af/y in Reach 2, 860,000 af/y Reach 3, and 1,574,000 af/y below Parker Dam to Imperial Dam (Reaches 4 and 5) are currently covered under the LCR MSCP (USFWS 2005).

In 2021, Reclamation projected Lake Mead elevations to be less than 1,075 feet on January 1, 2022, triggering the first "Tier 1 Shortage" reduction in history (Reclamation 2007, 2021). In the most recent operating plan, the minimum probable projection showed Lake Mead falling below 1,030 feet during the succeeding two-year period (Reclamation 2021). At this elevation Lake Mead contains only approximately 5.6 M acre-feet (22% of the full capacity), which would place system users at excessive risk due to water limitations. Lowered levels would impact downstream water deliveries to water users in Arizona, California, Nevada, and the Republic of Mexico. A decline in Lake Mead water elevation could also adversely affect the aquatic environment inclusive of the species present in Lake Mead and in downstream riparian and aquatic areas. Given the rapid decline in water elevations in Colorado River reservoirs, including Lake Mead, Reclamation and the LCR MSCP partners are planning to implement voluntary and compensated reductions in water use to address current and near-term risks resulting from extended drought while managing power production requirements.

Reclamation's projection triggered a mandatory consultation requirement between the United

States and the Lower Basin parties pursuant to the Congressionally approved Colorado River Drought Contingency Plan (CRDCP) Authorization Act, published April 16, 2019 (Public Law Number 116-14). Recent modeling efforts described in the BA revealed that at least 500,000 af/y need to be conserved in 2022 and again in 2023, along with a commitment to continued actions from 2024 to 2026, to meet the CRDCP to protect Lake Mead's elevation from dropping further to critically low elevations that would place the LCRB (including Mexico) at heightened risk of a water shortage. To allow for the increased water conservation in the LCRB consistent with the requirements under the CRDCP, Reclamation is seeking to increase the amount of reduction in flow coverage in Reaches 2 and 3 up to 1.574 M af/y, from the current coverage of 845,000 and 860,000 af/y, respectively. This increased coverage for reduction in flow would be equivalent to the amount of current flow coverage for Reaches 4 and 5. Attachment 4 in the BA (LCR MSCP 2022) documents the determination that increased reduction in flow to 1.574 M af/y in Reaches 2 and 3 does not impact the other LCR MSCP river reaches primarily because flow is managed in each reach by the reach's respective dam.

The 2004 LCR MSCP BA included the effects of the future flow related covered activities, including reductions in flow, on Lake Mead water surface elevations (Reach 1) from full pool down to a water surface elevation of 950 feet. This analysis demonstrated that increasing the reduction in flow in Reaches 2 and 3 would increase reservoir storage in Lake Mead above current conditions. Because high and low reservoir fluctuations would still occur, the increase in flow reductions would not have an effect beyond the effects already analyzed in the original LCR MSCP BO (USFWS 2005). Lake Mohave (Reach 2) is operated as a regulating reservoir, one that is maintained at a steady height and flow to balance water releases. Lake Mohave regulates water flow out of Hoover Dam through the lake and up to Parker Dam. An increase in the reduction of flow from 845,000 af/y to 1,574,000 af/y in Reach 2 would not result in a change in management of Lake Mohave due to this regulation, so the reservoir volume and elevation is not expected to change from existing conditions due to the proposed action. Reclamation (LCR MSCP 2022) modeled the effects of the reduction in flow on river stage elevation changes for Reach 3. Reclamation modeled these effects with rating curves, developed for flows between 845,000 af/y to 1,574,000 af/y and water surface elevations (LCR MSCP 2004b). These rating curve models were used to calculate water surface elevations at cross-sections of the river within Reach 3 which coincides with backwaters. The decrease in river stage due to the additional reduction in flow from the proposed action ranged from a low of 0.03 feet to a high of 0.6 feet during the month of April (the lowest month for average flows). The effects analysis provided by Reclamation (LCR MSCP 2004b) assumed that all cottonwood-willow land cover that provided covered species habitat would be impacted by the covered activities. Accordingly, increasing the flow reductions in Reaches 2 and 3 would not change the outcome for this land cover type, as it is already being fully minimized under the 2004 LCR MSCP BA. Additionally, the LCR MSCP Avoidance and Minimization Measure AMM2 ensures the stabilization of water levels in Topock Marsh, so backwater and marsh habitat in this area will not be affected by reductions in flow. With funding from the FWS and the LCR MSCP, a gravity water delivery system to Topock Marsh was created to insure the protection of 16 acres of marsh and backwater habitat during any reduced flow. A pumping station is being designed to supplement gravity diversions through the existing water delivery system with funding from AMM2.

Proposed Conservation Measures: Enhanced Habitat Protection

The original BA (LCR MSCP 2004c) and HCP (LCR MSCP 2004a) used a habitat-based approach as a surrogate for analyzing effects to species for compliance with Section 7(a)(2) and Section 10(a)(1)(B), respectively, of the Act due to difficulties in quantifying and detecting species effects. To implement this surrogate approach, the habitat within the action area was classified into 14 land cover types which were described under four major headings of woody riparian, marsh, aquatic, and adjacent (upland) habitats. Models were developed to estimate the amount of areal habitat for each of the covered habitats, as well as the amount of habitat impact the 2004 proposed action would affect. Species were then associated with each habitat type and then this information was used to estimate the amount of take habitat impacts for each affected threatened and endangered species. Additional information on the purpose and development of species habitat models can be found in Section 4.6.2.1 and summarized in Table 4.9 of the 2004 LCR MSCP BA.

The proposed action will be limited to Reaches 1 through 3. Reclamation has determined that the habitats affected in these reaches by the proposed action include only marsh and aquatic habitat types, and that aquatic habitat types include the river and backwater habitats. Four federally listed species that use marsh and aquatic habitat cover types in Reaches 2 and 3 may be affected by additional reductions in flow coverage. These include the endangered Yuma Ridgway's rail, endangered bonytail and its critical habitat, endangered razorback sucker and its critical habitat, and threatened northern Mexican gartersnake. Following an assessment of the proposed action and effects to listed species and their critical habitat in the action area, Reclamation proposed conservation measures to minimize the effects of the proposed action. During the 2004 LCR MSCP consultation, the FWS established minimization ratios for each land cover type affected by the proposed actions and activities. To minimize potential impacts caused by the proposed action to seven acres of marsh habitat in Reach 3, an additional 15 acres of marsh would be created and managed or protected to benefit the Yuma Ridgeway’s rail and northern Mexican gartersnake in Reach 3. To minimize the possible impacts to 15 acres of aquatic habitat (nine acres of backwater and six acres of riverine habitat) in Reach 3, an additional 15 acres of backwater would be created and managed or protected to benefit the bonytail and razorback sucker in Reach 3. These conservation measures are intended to be implemented over the term of the LCR MSCP. Water used to create marsh habitat comes from existing flows.

Existing General Conservation Measures

Reclamation’s current BA (2022, Pages 72-75) identified several existing general conservation measures that are fully described in the 2004 HCP (LCR MSCP 2004a) that further avoid and minimize the project effects of the proposed action. These general conservation measures are grouped into Avoidance and Minimization Measures (AMM), Monitoring and Research Measures (MRM), Conservation Area Management Measures (CMM), and northern Mexican gartersnake (NMGS) measures. Reclamation will utilize the following existing general conservation measures.

<u>Yuma Ridgway’s Rail</u>
AMM1: Try to avoid removal other habitats when constructing and managing created habitats

AMM2: Try to maintain water deliveries to Topock Marsh
AMM3: Try to minimize impacts of vegetation removal to bird species during breeding seasons
AMM5: Try to avoid take during operation and maintenance of dam facilities
MRM1: Conduct surveys to better define species habitat requirements
MRM2: Monitor and adaptively manage created habitats to maintain their function
MRM5: Monitor selenium in created backwater habitats
CMM1: Reduce risk of loss of habitat due to wildfire
CMM2: Replace created habitat affected by wildfire

Bonytail
AMM1, AMM5, MRM1, MRM2, MRM5
AMM4: Try to minimize contaminant loading into created habitats
AMM6: Try to minimize effects to species during river maintenance

Razorback sucker
AMM1, AMM4, AMM5, AMM6, MRM1, MRM2, MRM5

Northern Mexican Gartersnake
AMM1, AMM2, AMM4, AMM5, AMM6, MRM2
NMGS2: Implement measures to avoid and minimize take of northern Mexican gartersnakes

STATUS OF THE SPECIES AND CRITICAL HABITAT

Yuma Ridgway's Rail

The following information is a summary of the legal status, description and life history, habitat requirements and distribution, threats, population status, critical habitat, and previous consultations for the Yuma Ridgway's rail. This information was taken from the draft Recovery Plan document (USFWS 2010) and the LCR MSCP Species Status document (LCR MSCP 2005). Information in these documents is incorporated here by reference.

Legal Status

The Yuma Ridgway's (clapper) rail (*Rallus obsoletus [=longirostris] yumanensis*) was federally listed as an endangered species on March 11, 1967, under the Endangered Species Preservation Act (ESPA) of 1966 (32 FR 4001, March 6, 1967). Yuma Ridgway's rail was listed range-wide under the Endangered Species Act of 1973 (as amended). The most recent 5-year review of the species status was conducted and determined that no change was required on May 30, 2006 (70 FR 5460). A draft recovery plan for Yuma Ridgway's rail exists but has not been finalized and identified six recovery objectives including: stable to increasing populations, habitat protection, management plans, selenium threat assessment, connectivity analysis, and securing water supply for distal habitats (USFWS 2010).

Description and Life History

The Yuma Ridgway's rail is a medium-sized subspecies of the Ridgway's rail, with adults standing 20-23 centimeters (cm) (8 inches [in]) tall. Adult Yuma Ridgway's rails of both sexes are similar in plumage; they possess a long, slender, slightly de-curved bill, a laterally compressed body, and relatively long legs and toes compared to body size.

Yuma Ridgway's rails are elusive, and more often heard than seen, especially in the morning and evening hours (Eddleman 1989). They are good swimmers, and with laterally compressed bodies, can maneuver through cattails relatively quickly. They are capable of long-distance flights but are not as talented with short distance flying. Crayfish are believed to dominate the rail's diet, along with small fish, tadpoles, clams, and other aquatic invertebrates (Ohmart and Tomlinson 1977; Anderson and Ohmart 1985; Todd 1986; Eddleman 1989; Conway 1990). Crayfish (*Procambarus clarki* and *Orconectes virilis*) were introduced to the Colorado River basin in 1968 for aquatic weed control and to provide forage for sportfish (Inman et al. 1998). The spread of crayfish in the lower Colorado River may have assisted the expansion of Yuma Ridgway's rail, as crayfish provided a more abundant and secure food supply during the breeding season (Ohmart and Tomlinson 1977).

Habitat Requirements and Distribution

The Yuma Ridgway's rail occurs in habitats ranging from small patches formed by agricultural drains to large patches along river channels. Habitat quality drives the number of individuals present in a particular area. The primary components of good quality rail habitat include freshwater marshes dominated by cattail (*Typha* sp.) and bulrush (*Scirpus* ssp.) averaging greater than 2 m (6 ft) high, shallow (1-15 cm [6 in]) water and limited fluctuations during the breeding season (Anderson and Ohmart 1985; Eddleman 1989).

The Yuma Ridgway's rail is the only subspecies of Ridgway's rail primarily found in freshwater marshes. Historically, cattail/bulrush marshes in the Colorado River Delta in Sonora, Mexico, were the apparent stronghold for the species. However, the virtual elimination of freshwater flows down the lower Colorado River to the Delta due to upstream diversions from the river for agriculture, and municipal uses drastically reduced the habitat in Mexico. Rails responded by dispersing to the freshwater marshes along the lower Colorado River in the U.S. and fringes of the Salton Sea. There are five population centers across the rail's range of 14 watersheds within the Colorado River Basin. Of the five, three are considered core population areas. The first is along the lower Colorado River, with the highest densities at the Imperial, Cibola, and Havasu National Wildlife Refuges (NWR). The second large population center is at the Salton Sea in California, which includes the Salton Sea NWR and the Wellton Mohawk Irrigation District. The third major population center, the Cienega de Santa Clara in Sonora, Mexico, supports the largest marsh in the rail's U.S.-Mexico range and >70 percent of the global population (Hinojosa-Huerta et al. 2013). The two peripheral populations, which are smaller and represent the expansion of the species, occur along the lower Gila and Salt Rivers in central Arizona, and in southern Nevada along the Las Vegas Wash.

Threats

The primary factor that threatens recovery of the Yuma Ridgway's rail is the loss and

fragmentation of suitable habitat across its range, especially as a result of cattail growth. The natural succession of a cattail marsh into a monoculture makes them less suitable overtime for Yuma Ridgeway's rail and thereby requires active management. Without this management and protection of water sources to support the habitat, the areas occupied by rails could be lost. Other threats for this species include continuing land-use changes in floodplains, human activities, environmental contaminants (*e.g.,* selenium), climate change, and reductions in connectivity between habitat areas.

Population Status

Yuma Ridgway's rail populations naturally fluctuate. The recorded range wide relative abundance of rails has recently increased from 432 individuals in 2015 to 839 in 2019. Recent rail habitat management and an increase in survey effort throughout the rail's range likely contributed to this increase. Suitable habitat fluctuates regularly due to effluent inflows, hydrologic changes (*i.e.,* as caused by earthquakes), episodic fires, and maintenance dredging (Hinojosa-Huerta et al. 2013). The Yuma Ridgway's rail population appears to be rebounding from a multi-year decline ending in 2019 with highest recorded count of individuals in over ten years.

Critical Habitat

There is not any designated critical habitat for the Yuma Ridgway's rail.

Bonytail

The following information is a summary of the legal status, description and life history, habitat requirements and distribution, threats, population status, critical habitat, and previous consultations for the bonytail. This information was taken from the Recovery Goals document (USFWS 2002b), the LCR MSCP Species Status document (LCR MSCP 2005), and the most recent 5-year Review of the Species (81 FR 33698). Information in these documents is incorporated here by reference.

Legal Status

The bonytail was first proposed for listing under the Act on April 24, 1978 (43 FR 17375), as an endangered species. The bonytail was listed as an endangered species throughout its range on April 23, 1980 (45 FR 27710). The 1990 Bonytail Chub Recovery Plan (USFWS 1990) was amended and supplemented by the 2002 Bonytail Recovery Goals (USFWS 2002b). The recovery goals included site specific management tasks for the LCRB that included: adequate habitat, protection from take, protection from disease, adequate regulatory mechanisms, and protections from manmade or natural factors. The most recent 5-year review of the species status determined that the bonytail remains endangered as of May 27, 2016 (81 FR 33698).

Description and Life History

The bonytail is a large cyprinid fish with a thin, pencil-like, caudal peduncle and large, falcate fins occasionally a nuchal hump may be present behind the head. Maximum length is about 600

millimeters (mm), with 300-350 mm being more common. Weights are generally less than one kilogram (kg). Bonytail are long-lived fish with some having reached at least 49 years of age. Bonytail are opportunistic feeders with a diet of terrestrial insects, plant material, and fish. They are active mostly at night, and most foraging activity likely takes place at night (Minckley and Marsh, 2009).

Habitat Requirements and Distribution

In Lake Mohave during the daytime the adult bonytail are in deeper, open waters, and at night, the fish move to shallower areas along the shoreline (Marsh and Mueller 1999). Wild-born fish are more likely to use offshore, deeper water areas than hatchery bred fish reared to subadult status in coves (Marsh and Mueller 1999). Bonytail are not found in the riverine reach below Hoover Dam or above the reservoir pool.

Bonytail are endemic to the Colorado River Basin. Today, small populations of wild bonytail exist in the UCRB in the Colorado, Green, and Yampa rivers, and in the LCRB on the Colorado. The species is believed to be functionally extinct, as the documented captures of wild bonytail in the LCRB have become less frequent with the most recent being in Lake Mohave in 2003 (data summarized in USFWS 2002b). Wild bonytail populations failed due to a lack of sufficient recruitment to maintain the populations, likely due to predation of all stages of the fish (eggs, larvae, and adults).

Threats

Predation and competition from non-native fish species introduced into the Colorado River Basin pose the greatest threat to the bonytail. Avian predation is also a rising concern to survival of adults immediately after stocking (Mueller et al., 2020; Loomis 2020). Other significant threats to the bonytail include loss of riverine habitats, fragmentation of remaining riverine habitats, changes in flows due to water development projects, and hybridization with other *Gila* species.

Population Status

Although population augmentation has been occurring for decades, survival of stocked bonytail remains very low. In the LCRB, survival of hatchery released bonytail remains low in natural systems, with less than 4 percent survival beyond 30 days post-release between 2007 and 2017 (McCall et al. 2017). These data suggests that a very small percentage of stocked bonytail survive long-term in the mainstem of the Colorado River. There are two isolated backwaters where bonytail are recruiting and are likely self-sustaining, including High Levee Pond and Imperial Ponds. These locations are managed specifically for bonytail, and nonnative fish species are excluded. Despite natural reproduction within the upper and lower basins in some managed floodplain wetlands and backwater habitat (Bestgen et al. 2017; LCR MSCP 2018), survival of larval bonytail has not been observed and no young-of-year or juvenile fish have ever been found in the rivers of the Colorado River basin. No self-sustaining populations in the rivers of the upper or lower basins have been established.

Critical Habitat

Critical habitat for the bonytail was designated on April 20, 1994, and includes portions of the Colorado, Green, and Yampa rivers in Colorado and Utah, and portions of the Colorado River in Arizona. The critical habitat primary constituent elements (PCEs) are: 1) water (a quantity of sufficient quality that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage); 2) physical habitat (areas of the Colorado River system that are inhabited or potentially habitable by bonytail for use in spawning, nursery, feeding, and rearing, or corridors between these areas); and 3) biological environment (food supply, predation, and competition) that influence all life stages. In addition, areas and habitats considered essential for reproduction and recruitment were specifically included as critical habitat.

Critical habitat for the bonytail includes the Colorado River from Hoover Dam to Davis Dam, including Lake Mohave to its full-pool elevation (Reach 2) and from the northern boundary of Havasu NWR to Parker Dam including Lake Havasu to its full-pool elevation in Arizona, California, and Nevada (Reach 3). There are 27,816 acres of bonytail critical habitat in Reach 2, and 19,962 acres of CH in Reach 3 (USFWS 1994).

Razorback sucker

The following information is a summary of the legal status, description and life history, habitat requirements and distribution, threats, population status, critical habitat, and previous consultations for the razorback sucker. This information was taken from the Recovery Goals document (USFWS 2002a), the LCR MSCP Species Status document (LCR MSCP 2005), and the Species Status Assessment Report (USFWS 2018b). Information in these documents is incorporated here by reference.

Legal Status

The razorback sucker was first proposed for listing under the Act on April 24, 1978 (43 FR 17375), as a threatened species. The proposed rule was withdrawn on May 27, 1980 (45 FR 35410), due to changes to the listing process included in the 1978 amendments to the Act. In March 1989, the Service was petitioned by a consortium of environmental groups to list the razorback sucker as an endangered species. A positive 90-day finding on the petition was published in the Federal Register on August 15, 1989 (54 FR 33586). The finding stated that a status review was in progress and provided for submission of additional information through December 15, 1989. The proposed rule to list the species as endangered was published on May 22, 1990 (55 FR 21154), and the final rule published on October 23, 1991, 56 FR 54957), with an effective date of November 22, 1991. The Razorback Sucker Recovery Plan was released in 1998 (USFWS 1998). Recovery Goals were finalized and approved in 2002 (USFWS 2002a). The recovery goals included site specific management tasks for the LCRB that included: adequate habitat, protection from take, protection from disease, adequate regulatory mechanisms, and protections from manmade or natural factors. On July 7, 2021, the razorback sucker was proposed for downlisting to threatened with an Act Section 4(d) ruling (86 FR 35708).

Description and Life History

The razorback sucker is the only representative of the genus *Xyrauchen* and was described from specimens taken from the "Colorado and New Rivers" (Abbott 1861) and Gila River (Kirsch 1889) in Arizona. This native sucker is distinguished from all others by the sharp-edged, bony keel that rises abruptly behind the head. The body is robust with a short and deep caudal peduncle (Bestgen 1990). The razorback sucker may reach lengths of 3.3 feet (1.0 m) and weigh 11 to 13 pounds (5.0 to 5.9 kg) (Minckley 1973). Adult fish in Lake Mohave reached about half this maximum size and weight (Minckley 1991). Razorback suckers are long-lived, reaching the age of at least 40 years (Minckley et al. 1991). Adult razorback suckers use most of the available riverine habitats, although there may be an avoidance of whitewater type habitats. Main channel habitats used tend to be low velocity ones such as pools, eddies, nearshore runs, and channels associated with sand or gravel bars (Bestgen 1990). Adjacent to the main channel, backwaters, oxbows, sloughs, and flooded bottomlands are also used by this species. From studies conducted in the Upper Colorado River Basin (UCRB), habitat selection by adult razorback suckers changes seasonally. They move into pools and slow eddies from November through April, runs and pools from July through October, runs and backwaters during May, and backwaters, eddies, and flooded gravel pits during June. In early spring, adults move into flooded bottomlands. They use relatively shallow water (ca. three feet [0.9 m]) during spring and deeper water (five to six feet [1.5-1.8 m]) during winter (USFWS 2002a).

Habitat Requirements and Distribution

Razorback suckers also use reservoir habitat, where the adults may survive for many years. In reservoirs, they use all habitat types, but prefer backwaters and the main impoundment (USFWS 1998). Much of the information on spawning behavior and habitat comes from fishes in reservoirs where observations can readily be made. Habitat needs of larval and juvenile razorback suckers are reasonably well known. In reservoirs, larvae are found in shallow backwater coves or inlets (USFWS 1998). In riverine habitats, captures have occurred in backwaters, creek mouths, and wetlands. These environments provide quiet, warm water where there is a potential for increased food availability. During higher flows, flooded bottomland and tributary mouths may provide these types of habitats. Razorback suckers are somewhat sedentary; however, considerable movement over a year has been noted in several studies (USFWS 1998). Spawning migrations have been observed or inferred in several locales (Jordan 1891, Minckley 1973, Osmundson and Kaeding 1989, Bestgen 1990, Tyus and Karp 1990). During the spring spawning season, razorback suckers may travel long distances in both lacustrine and riverine environments and exhibit some fidelity to specific spawning areas (USFWS 1998). Since 1997, significant new information on recruitment to the wild razorback sucker population in Lake Mead has been developed (Albrecht et al. 2008, Kegerries and Albrecht 2011) that indicates some degree of reproduction is occurring at three locations in Lake Mead, and another spawning group was documented in 2010 at the Colorado River inflow area of the lake (Albrecht et al. 2010; Kegerries and Albrecht 2011, 2012).

Threats

The range and abundance of razorback suckers have been significantly decreased due to water manipulations, habitat degradation, and importation and invasion of non-native species. Construction of dams, reservoirs, and diversions destroyed, altered, and fragmented habitats needed by the sucker. Channel modifications reduced habitat diversity, and degradation of riparian and upland areas altered stream morphology and hydrology. Finally, invasion of these degraded habitats by a host of non-native predacious and competitive species has created a hostile environment for razorback sucker larvae and juveniles. Razorback suckers can have large spawning events each year which may produce viable young. However, in most locations the eggs and larvae are consumed by non-native fish species (Minckley et al. 1991; Ehlo et al. 2017). The rangewide trend is patterned after this loss in age-classes by a continued decrease in wild populations due to a lack of sufficient recruitment coupled with loss of older individuals due to natural aging processes.

Population Status

Razorback sucker populations have been summarized by basins (UCRB and LCRB) and natal status (wild or stocked) which provides the clearest indication of population size. In the UCRB, over 560,000 razorback suckers were stocked between 2000 and 2016 (USFWS 2018b). Population estimates of wild and stocked fish in the UCRB were approximately 50,000 (USFWS 2018b). However, the LCRB populations estimates were roughly 7,000 wild and stocked fish despite annual stocking of approximately 32,000 fish since 2005 (USFWS 2018b). Population variability is low in both basins which would be expected for a K-selected species. However, population stability indicates that UCRB populations are stable to rising and LCRB populations are stable to decreasing (USFWS 2018b).

Critical Habitat

Critical habitat was designated in 15 river reaches in the historical range of the razorback sucker on March 21, 1994 (59 FR 13374), with an effective date of April 20, 1994 (USFWS 1994). Critical habitat included portions of the Colorado, Duchesne, Green, Gunnison, San Juan, White, and Yampa rivers in the UCRB, and the Colorado, Gila, Salt, and Verde rivers in the LCRB. The PCEs of critical habitat are: 1) water (a quantity of sufficient quality that is delivered to a specific location in accordance with a hydro logic regime that is required for the particular life stage); 2) habitable waters (areas of the Colorado River system that are inhabited or potentially habitable by the sucker for use in spawning, nursery, feeding, and rearing, or corridors between these areas); and 3) the biological environment (food supply, predation, and competition) that influence all life stages. Razorback sucker designated critical habitat is present in Reaches 1 and 2 but is not present in Reach 3.

Northern Mexican Gartersnake

The following information is a summary of the legal status, description and life history, habitat requirements and distribution, threats, population status, critical habitat, and previous consultations for the Northern Mexican Gartersnake. This information was taken from final rule for threatened status of the Northern Mexican Gartersnake published July 8, 2014 (79 FR 38678)

and the LCR MSCP Northern Mexican Gartersnake Amendment (LCR MSCP 2020). Information in these documents is incorporated here by reference.

Legal Status

The northern Mexican gartersnake was listed as threatened under the Act on July 8, 2014 (79 FR 38678). Critical habitat was proposed on July 10, 2013 (78 FR 41500), and later revised and re-proposed on April 28, 2020 (85 FR 23608) and designated as final on April 28, 2021 (86 FR 22518). Designated critical habitat for the northern Mexican gartersnake does not occur in the LCR MSCP planning area (see Action Area section for definition of planning area). No five-year review, recovery goals, or species status assessment have been formalized to date for the northern Mexican gartersnake.

Description and Life History

The northern Mexican gartersnake is a large-bodied snake, which reaches up to 44 inches total length (112 cm). Scale pigmentation ranges in color from olive to olive-brown or olive-gray with three lighter-colored stripes that run the length of the body, the middle of which darkens towards the tail. Sexual maturity in northern Mexican gartersnakes occurs at two years of age in males and at two to three years of age in females (Rosen and Schwalbe 1988). Northern Mexican gartersnakes give birth to live young. Mating has been documented in April and May followed by the birth of between 7 and 38 neonates from June through September (Rosen and Schwalbe 1988; Degenhardt et al. 1996; Nowak and Boyarski 2012). A staggered or biennial reproductive strategy is believed to be used by northern Mexican gartersnakes (Rosen and Schwalbe 1988; Boyarski *et al*. 2019). Periods of surface activity in northern Mexican gartersnakes depend on temperature. Seasonality of surface activity in individuals is expected to occur in the early spring at lower elevations and later for higher elevation populations. Longevity has not been studied intensively, however the population longevity at Bubbling Ponds Hatchery Complex, Arizona was estimated to be at least 10-11 years by Boyarski *et al*. (2019).

Habitat Requirements and Distribution

The northern Mexican gartersnake occurs most frequently in riparian habitat, but also may occur in terrestrial habitats far from a water source if suitable prey exists (Emmons and Nowak 2016). Examples of this non-aquatic activity include observation in grasslands up to a mile away from any surface water, several hundred yards from mainstem rivers, or in highly disturbed, open, developed areas devoid of vegetation or associated lengthy, dry reaches along intermittent streams. In lotic habitats, this subspecies occurs in protected backwaters, braided side channels and beaver ponds, isolated pools near the river mainstem, and edges of dense emergent vegetation that offered cover and foraging opportunities (Emmons and Nowak 2013). Dense vegetation likely plays a key role in protecting northern Mexican gartersnakes when in the presence of predatory nonnative species (Boyarski *et al.* 2015) but is likely not critical in wholly native aquatic communities. Aquatic edge habitat is frequently used, followed by terrestrial habitat (for thermoregulatory purposes such as gestation and periods of dormancy) and developed areas, with snakes documented using artificial, human-created objects as surface cover (Boyarski *et al.* 2015).

The northern Mexican gartersnake was historically found within nearly every major watershed in Arizona (except for the Little Colorado River watershed) and southwestern New Mexico including the Colorado, Verde, Salt, San Pedro, and Gila watersheds, extending south along the Mexican Plateau to near Mexico City (Jones et al. 2020). Throughout its distribution, the northern Mexican gartersnake occurs at elevations from 140 to 8,497 ft (Rossman *et al.* 1996) within a wide variety of biotic communities including Sonoran Desert scrub through Semidesert Grassland, Interior Chaparral, Madrean Evergreen Woodland, into the lower reaches of Petran Montane Conifer Forest (Brennan and Holycross 2006).

Threats

The northern Mexican gartersnake is impacted by predatory nonnative aquatic species (*e.g.,* fish in the families Centrarchidae and Ictaluridae, American bullfrogs [*Lithobates catesbeianus*] and crayfish [*O. virilis* and *P. clarki*]). Riparian and aquatic communities in both the southwestern United States and portions of Mexico have been significantly impacted by a shift in species' composition, from one of primarily native fauna, to one dominated by an expanding assemblage of predatory nonnative animal species. The occurrence of predatory nonnative species can be both a direct source of mortality and a direct source of resource competition. Secondary to predatory nonnatives but equally problematic is habitat desiccation from diminishing surface water. In riparian locations where the snake populations are highly dependent on aquatic prey, diminished surface water may render the habitat unsuitable for northern Mexican gartersnakes by reducing or eliminating their ability to meet the biological needs of their prey base.

Population Status

Within the range of the northern Mexican gartersnake, many areas where previous records occur are heavily impacted by predatory nonnative species or vulnerable to drought or human water use impacts. Existing sampling data suggest that few populations of northern Mexican gartersnakes in the United States are considered relatively dense where the species remains somewhat reliably detected, these include: 1) upper Santa Cruz River in the San Rafael Valley; 2) Verde Valley; and 3) the Page Springs and Bubbling Ponds State Fish Hatcheries adjacent to Oak Creek.

Critical Habitat

In 2021, revised critical habitat for the northern Mexican gartersnake was designated in nine units in portions of Arizona and New Mexico totaling 20,326 acres. The Lower Colorado River Unit and Bill Williams River Subunit of critical habitat were excluded from the final critical habitat designation based on conservation and management of some of these areas under the LCR MSCP published on July 26, 2019 (79 CFR 38677).

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the

consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present effects of all Federal, State, or private actions and other human activities in the action area, the anticipated effects of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the effect of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

Environmental Baseline for Reaches 1, 2, and 3 of the LCR MSCP

The biological and physical conditions existing within the Reaches 1, 2, and 3 of the LCR were previously described in the 2005 BO and the subsequent 2018 BO amendment (USFWS 2005, 2018). The LCR and its floodplain, as it existed prior to the late 1800s, has been extensively modified through human activities to such an extent that the existing conditions are more reflective of human management actions than natural hydrological or geo-morphological processes. The storied history of the effects of human activities in the action area have been described by numerous sources which are incorporated herein by reference (Reclamation 1996, 1999, 2001; LCR MSCP 2004c, 2020, 2022; USFWS 1997, 2005, 2018a, 2018b; Todd 1986; Mueller and Marsh 2002; Ohmart et al. 1988). The summary of historical conditions is provided in the following paragraphs for use in comparison with the conditions existing at the time consultation was completed in 2022.

Historically, snowmelt driven flows from the Upper Basin began in May and peaked in late June or early July along the LCR. Flows steadily declined through the later summer and fall, except for occasional pulsed flows resulting from large rainfall events in the near watersheds. Winter and spring rainfall events, again in the nearer watersheds, could raise flows somewhat as well. Outside of the long-term seasonal fluctuations and the short-term increases due to localized rainfall events, daily and weekly water levels did not fluctuate. The amount of water available each year was dependent on climatic conditions that would result in flood or drought conditions. The basic seasonal patterns would generally hold, but predictability of actual flows on a seasonal or yearly basis was very low.

The river's morphology was influenced through the processes of sediment deposition and erosion in response to changes in flows. High flows spread over the floodplain and reconnected backwaters, sloughs, and marshes isolated from the primary channel that formed at low flows. High flows could also destroy those floodplain features through erosion and sediment deposition, but they would be re-created during the low flow periods. The same cycle of creation and destruction held for the riparian forests of cottonwood (*Populus* spp.), willow (*Salix* spp.), and mesquite (*Prosopis* spp.) which occurred along the floodplain. The native aquatic vertebrate fauna comprised of nine freshwater fish species, two marine/brackish water fish species, two native turtle species, one native snake species, ten native amphibians, and three aquatic mammals (Mueller and Marsh 2002, Ohmart et al. 1988). Without any permanent barriers to movement in the action area or watershed, aquatic life could move to and from the Colorado River Delta in Mexico upstream into the upper portions of the Colorado River Basin and its tributaries well outside the action area.

Since the 1880s, the LCR has been significantly modified by human activities. Some of those actions occurred only once, such as the construction of Hoover Dam. Others, such as delivery of water to those holding water rights, have occurred continuously. The current status of the physical and biological characteristics of the action area is the result of these one-time and continuous actions occurring over the span of the last 140 years. The LCR in the action area is now a system managed to provide water and power to people in Arizona, California, Nevada, and Mexico, control floods, and provide for recreational opportunities. This transformation is the result of construction of the large water-storage dams (Hoover, Davis, and Parker dams), straightening and deepening the river channel through dredging and bank stabilization, creation of side-channel backwater areas used for boating recreation or hiking/camping recreation, and the wholesale removal of water by individuals and other entities with water rights to LCR water.

Inflows to the LCR still come from snowmelt in the Upper Basin and more localized rainfall events. However, human development in those watersheds now controls when, and if, any of these flows reach the LCR. The Colorado River Compact of 1922 and subsequent agreements, contracts, laws, and legal decisions control the amount of water that reaches Lake Mead from the main tributaries of the Upper Basin, and how that water is released to users downstream. Most of the historical inflows from the tributary rivers are significantly reduced due to upstream storage dams to hold water for upstream uses, flood control, and other water diversions that reduce or eliminate normal flows to the LCR. Only the tributaries in the Grand Canyon continue to provide flows to the LCR in a manner similar to the pre-development era. Flood events still occur, when more water enters these systems than can be managed by the infrastructure, and spills reach the LCR. Even these flood flows are managed through flood-control releases from Hoover, Davis, and Parker dams in accordance with management requirements to protect facilities along the river. With the storage space available in the large reservoirs, flood peaks can be attenuated, and flows released over a longer time period than would be possible without the reservoirs. Similarly, during drought years, water levels in the reservoirs are significantly affected due to the need to release more water than is coming in to meet downstream demands. Releases from Hoover Dam were not likely to change until shortage conditions required a reduction in the release of water. There had been no shortages declared on the LCR until August 2021, when the Secretary declared the first-ever Tier 1 shortage. Deliveries of water in excess of 7.5 M af/y have occurred during years of excess releases for flood control and when a surplus has been declared by Reclamation that frees up additional water for the holders of water contracts. The Secretary, in the Annual Operating Plan (AOP) determines whether reservoirs will be operated under surplus, normal, or shortage conditions for a specific year. As such, Reclamation manages deliveries as determined by the Secretary in a given water year.

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

with Hoover and Davis dams, releases are scheduled over the course of the day to maximize hydropower production. Over a 24-hour period, flows below the three large dams vary significantly, resulting in water-level changes in the river reaches of up to several feet (Reclamation 1996, LCR MSCP 2004c) depending on the dam and the season of release. The degree of water-level fluctuation attenuates downstream from the large dams but is present for many miles downstream at some level and causes some shallow-water gravel bars and portions of backwaters to be de-watered for at least part of a day. Flows in the LCR below Lake Mead are predictable, and only during flood events that require additional water be released from Lake Mead is there any significant variation from year to year in the amount of water released.

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

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

The result of the river stabilization efforts is that the LCR no longer meanders across its floodplain. The natural river processes that led to the creation and destruction of riparian forests, backwaters, and marshes have been largely eliminated. What remains of these important habitats is concentrated along the confined river channel. When riparian areas, backwaters, and marshes are located on lands protected from future agricultural or urban development, such as on FWS National Wildlife Refuges (NWRs), these habitats remain at significant risk of loss due to wildfire, flood events that deposit sediment in quiet water areas off the main channel and thus fill

in marshes and backwaters, and the natural aging processes that degrade and eventually eliminate backwaters and marshes and create dry land. Because even these protected areas are affected by river channelization and the decline of groundwater levels, native riparian restoration through natural processes is precluded. Active management is required to ensure that these habitats remain functional on these protected lands. For lands in Federal (BLM, Reclamation) or state ownership for parks or wildlife areas, assuming that there is protection from developmental interests, the same degree of active management is required to maintain existing habitats. Since its inception, the LCR MSCP has established 18 conservation areas along the LCR and its tributaries through agreements with landowners or agencies. Habitat has been established at three conservation areas located within the LCR floodplain between Davis and Parker Dams (Reach 3) since the 2005 BO (USFWS 2005, Reclamation 2022). These include the Beal Lake Conservation Area (BLCA), the Big Bend Conservation Area (BBCA), and the Mojave Valley Conservation Area (MVCA). Each of these sites requires active management to ensure biological functionality to meet the goals established by the LCR MSCP.

Water quality in the LCR has also changed as a result of human activities. Water temperatures in the large reservoirs change seasonally, and the surface temperatures can be high. However, the deep waters of these reservoirs are cold. Water released from these levels through the dams is cold and does not vary seasonally. Cooler water temperatures persist to the upstream end of Lake Mohave, creating an underflow when it meets the warmer lake water (Paulson et al. 1980). Releases from Davis Dam are also cold (12 to 15º C), and the water gradually warms as it flows downstream to 18 to 20º C (Minckley 1979). This warming trend varies with season and flow, with solar heating the primary agent for warming the water and can be observed at least 25 miles downriver from the dam (Minckley 1979). Because its shallower depth reduces temperature stratification, Lake Havasu does not have significantly colder water at depth. Backwaters trend warmer than the main channel water temperatures, as was true prior to development of the river. Recent efforts by Reclamation to assess the relatedness of groundwater and LCR flow has found that groundwater levels are influenced seasonally but not daily by fluctuations in LCR flow (Reclamation in draft “Environmental Monitoring in the Lower Colorado Region, 2020 Annual Report”).

The native vegetation communities of the LCR have been altered by both the physical changes to the river and the introduction of non-native plant species. The most significant introduction was salt cedar (*Tamarix* spp.). This rapidly growing, invasive tree from Asia had largely replaced native cottonwoods, willows, and mesquite in the remaining floodplain areas by the initiation of the LCR MSCP (Ohmart et al. 1988). In 2014, the salt cedar leaf beetle (*Diorhabda* sp.) had become more common along the LCR following intentional introductions upstream (Nagler et al. 2021). Other non-native plant species that have adversely affected the native riparian vegetation communities include Bermuda grass (*Cynodon dactylon*), Russian thistle (*Salsola kali*), giant reed (*Arundo donax*), Eurasian water milfoil (*Myriophyllum spicatum*), parrotfeather (*M. brasiliense*) and giant salvinia (*Salvinia molesta*). Since 2000, just prior to the initiation of the LCR MSCP, and up until 2021 a marked decrease in green vegetation and evapotranspiration has been detected along Reach 3 (Nagler et al. 2021). The net result of these changes has been a reduction in native riparian vegetation (extent and diversity) between 2015 and 2020 for the riparian corridor in whole. However, it is expected that biocontrol of salt cedar by the salt cedar leaf beetles was a contributor to some reduced measures of greenness and evapotranspiration

(Nagler et al. 2021).

The aquatic fauna of the LCR has undergone the most significant changes over time. This is marked by the introduction of non-native crayfish (*O. virilis* and *P. clarki*), American bullfrogs (*L. catesbeianus)* and over 40 species of non-native fish intentionally or accidentally introduced into the LCR since 1881 (Mueller and Marsh 2002, USFWS 2005). These non-natives now dominate the aquatic riparian fauna of the LCR and have had a major impact on the status and distribution of the native species through competition and predation. Of the nine native freshwater fish species, only the bonytail, razorback, and flannelmouth sucker (*Catostomus latipinnis*) have discernable populations in the planning area (Reclamation 2022) and that of the flannelmouth represents a reintroduction in the 1970's. The flannelmouth population appears to be naturally self-sustaining (Mueller 2003, Best and Lantow 2012) while the bonytail and razorback sucker populations are maintained by augmentation of the remaining wild populations (Reclamation 2022).

Yuma Ridgway's Rail

Yuma Ridgway's rail is considered to have a high degree of threat and low recovery potential from loss of habitat due to altered river processes that would otherwise create and maintain marshes, and lack of security relative to the protection of water that provides existing habitats in the U.S. and Mexico (USFWS 2010). Historically, cattail/bulrush marshes in the Colorado River Delta were the probable habitat selected by the rail. The elimination of freshwater flows down the LCR to the Delta due to diversions from the river resulted in permanent alteration and loss of habitat. The current habitats are primarily formed along agricultural drain outflows, and behind dams and diversions on the LCR and human-made marshes and ponds including Beal Lake, Hart Mine Marsh, Imperial Ponds, the ponds at Salton Sea and the marshes at the Cienega de Santa Clara.

Yuma Ridgway's rail is not known to occur in Reach 1 or 2 due to lacking habitat. Most Yuma Ridgway's rails found in Reach 3 occur in Topock Marsh and Topock Gorge, with small populations in the marshes of the Bill Williams River Delta and Beal Lake (Kahl 2021, unpublished data Avian Knowledge Network). No population level surveys are currently conducted to determine local population estimates, however detection-based data suggest locally stable populations (LCR MSCP 2022).

Bonytail and its Critical Habitat

Since 2006 the LCR MSCP has stocked an average of 4,000 adult bonytail per year in Reach 3, from Davis Dam to Parker Dam (LCR MSCP 2004a). The LCR MSCP anticipates that 620,000 bonytail will be stocked into the LCR over the life of the program, with 200,000 bonytail being stocked into Reach 3 (LCR MSCP 2005 and 2015). The LCR MSCP has stocked bonytail into Reach 3 in December, April, and May of each year since 2007 to augment the bonytail population and to facilitate their research and monitoring programs for native fish conservation. To date, 64,000 bonytail have been stocked into Reach 3 (LCR MSCP 2021).

Spawning habitat has generally been described as relatively shallow, near-shore areas with loose substrates of various sizes. In lentic environments (e.g., reservoirs, backwaters, ponds, etc.), bonytail have been observed spawning over gravel, cobble, and rocky substrates at depths of 1.5–3.5 meters (Jonez and Sumner 1954; Mueller 2006). It is hypothesized that they spawn over similar substrates in lotic (flowing) environments, but no direct observations of bonytail spawning in riverine habitat have been reported. Bonytail have rarely been contacted following stockings in the LCR, and no observations of physical spawning condition or activity have been documented in Reach 3. There are currently no known spawning locations for bonytail in the LCR.

Results from LCR MSCP research and ongoing monitoring have suggested low levels of long-term post-stocking persistence and high mortality of bonytail. Persistence for approximately six months has been observed in the Laughlin Lagoon area and from nine to twelve months in Lake Mohave. Based on all observations, bonytail may persist for three to twelve months after stocking. Bonytail are difficult to locate/re-contact post-stocking due to their cover seeking behavior, resulting in acoustic/sonic tags signals being blocked by thick bulrush or cattail vegetation. Bonytail are thought to have small home ranges, tending to stay in a relatively small area, and thus remaining close to stocking locations. A large percentage of the stocked bonytail are also removed from the system by birds and predatory non-native fishes (Best 2020).

Critical habitat was designated for the bonytail in 1994, including the Colorado River from Hoover Dam to Davis Dam (Reach 2) and from the northern boundary of Havasu NWR to Parker Dam (Reach 3). There are 47,778 acres of designated critical habitat for bonytail in the action area (27,816 acres in Reach 2 and 19,959 acres in Reach 3). PCEs of critical habitat include: (1) water; (2) physical habitat; and (3) biological environment for each life stage (Federal Register Vol.59, No.54, 1994). Since the last BO and reinitiation there have no changes to the PCEs for bonytail.

Razorback sucker and its Critical Habitat

The storied history of past and present effects of all human activities in the action area and their impacts to razorback sucker have been described thus far by numerous sources and all are incorporated herein by reference (Marsh et al. 2003, Dowling et al. 2014, Marsh et al. 2015, Kesner et al. 2017, Miller et al. 2021).

Monitoring of razorback suckers in Lake Mead has occurred off and on since the construction of the Hoover Dam. Razorback sucker numbers, initially high in Lake Mead, became noticeably decreased in the 1970s, and none were collected during the 1980s. However, in the early 1990s, the Nevada Division of Wildlife (NDOW) was informed by local anglers that the species was still present in two localized areas of Lake Mead: Las Vegas Bay and Echo Bay. Limited sampling efforts initiated by NDOW soon confirmed the presence of remnant populations of razorback sucker in Lake Mead (Albrecht et al. 2008). The razorback sucker population in Lake Mead is small (approximately 500 adults) which is not thought to be sufficient to maintain genetic integrity over the long-term (USFWS 2018b). Still yet, these populations in Lake Mead appear to be the only known population to demonstrate recruitment in the wild (USFWS 2018b).

Monitoring of the razorback sucker population in Reach 2 has occurred on an annual basis for over 30 years. Studies conducted in the early 1990s suggested that this was the largest known population of wild razorback suckers within the species' range, with annual abundance estimates exceeding 40,000 individuals (Marsh et al. 2003). The wild population in Reach 2 experienced considerable decline since the mid-1990s (Dowling et al. 2014). A population of genetically diverse adult fish has been maintained through ongoing augmentation efforts, however there is no evidence of recruitment for this population (Marsh et al. 2015). The extant population is nearly all repatriated fish as compared to the few remaining wild individuals (now assumed to be fewer than 50) and is monitored annually (Miller et al. 2021). Population estimates with associated confidence intervals, measured from 2016 to 2020, have maintained relative overlap which is indicative of a stable population around 5,000 fish (LCR MSCP 2021).

Razorback suckers were stocked into Reach 3 in the early 1990s. Since then, razorback suckers have been documented in both backwater and riverine habitat extending upstream from Lake Havasu to Davis Dam (LCR MSCP 2021). Since 2014, over 7,000 unique razorback suckers have been captured or contacted at known and suspected spawning locations in Reach 3 (LCR MSCP 2021). As of September 2021, the LCR MSCP has released over 118,000 razorback suckers to augment the Reach 3 population however, population maintenance is wholly dependent on the stocking program and no recruitment is occurring in Reach 3 (Kesner et al. 2017). Population estimates with associated confidence intervals, measured from 2016 to 2020, have maintained relative overlap which is indicative of a stable population around 5,000 fish (LCR MSCP 2021). The total available habitat for razorback sucker in Reach 3 is estimated to be approximately 23,745 acres (LCR MSCP 2004a Table 3-8).

Spawning habitat for razorback suckers is characterized by relatively shallow, flat to gently sloping shoreline areas with clean gravel, cobble, or mixed substrates (Bestgen 1990; Mueller and Marsh 2002; Kegerries et al. 2009; Kesner et al. 2012; Albrecht et al. 2013). Spawning typically occurs in 0.5–2 meters of water, but it has also been reported at depths of 10–20 meters in LCR reservoirs (Minckley et al. 1991; Holden et al. 1997, 1999; Valdez et al .2012). Four known spawning locations (i.e., areas attracting spawning groups of > 100 razorback suckers) are monitored in Reach 2 on an annual basis. In Reach 3, razorback suckers are confirmed or suspected of spawning in the river and its associated backwaters from Laughlin, Nevada downstream to Topock Gorge. Six known spawning locations are monitored on an annual basis (Reclamation 2022).

Critical habitat was designated for the razorback sucker in 1994, including the Colorado River from Separation Canyon to Hoover Dam (Reach 1) and from Hoover Dam to Davis Dam (Reach 2). Primary constituent elements (PCEs) of critical habitat include: (1) water; (2) physical habitat; and (3) biological environment for each life stage (Federal Register Vol.59, No.54, 1994). Since the last BO and reinitiation there have no changes to the PCEs for razorback sucker due to the nature of water flow in covered critical habitat as a result of the 1994 Memorandum.

Northern Mexican Gartersnake

Status of the northern Mexican gartersnake has not been confirmed in Reach 1 due to potentially lacking habitat or Reach 2 due to lack of surveys. They may have historically occurred just beyond Black Canyon prior to the development of the dams in lower lying backwaters and

marshes now under Lake Mohave in Reach 2 (Jones et al. 2020). 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 NWR east of and across the river from Needles, California in Reach 3 (Figure 1). Subsequently in 2019, FWS conducted a study at six sites in Havasu NWR within Topock Marsh and Beal Lake Conservation Area and detected 15 individual northern Mexican gartersnakes, seven at Beal Lake Conservation Area in Willow Marsh, and eight at the Glory Hole site on Topock Marsh (Bourne and Hammer 2020). There is little known about the extent of the population at Havasu NWR. Of the fifteen snakes that were captured in 2019, two were juveniles which is suggestive of recruitment. However, at all trapping locations non-native predators of gartersnakes (bullfrogs and crayfish) were detected (Bourne and Hammer 2020). Populations of northern Mexican gartersnakes occur in the Bill Williams River drainage (Sullivan et al. 2015, O'Donnell et al. 2016) and not far (~15 miles) from its confluence with the LCR (O'Donnell and Leavitt 2017) though they have not been recorded within the Bill Williams River NWR in Reach 3.

EFFECTS OF THE ACTION

In accordance with 50 CFR 402.02, effects of the action are all consequences to listed species or critical habitat that the proposed action causes, including the consequences of all other activities that are caused by the proposed action. The proposed action causes a consequence if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see §402.17).

Yuma Ridgway's Rail

Implementation of the increased reduction in flow and conservation measures is likely to adversely affect the Yuma Ridgway's rail. Implementation of the increased reduction in flow and proposed conservation measures found in Reclamation's 2022 BA could affect a proportion of Yuma Ridgway's rail marsh habitat over the term of the LCR MSCP. The effects of the increased reduction in flow and proposed conservation measures found in Reclamation's 2022 BA on the distribution and status of the Yuma Ridgway's rail will be minimized through implementation of general conservation measures listed in the 2004 LCR MSCP HCP (and described previously in the proposed action) and creation of habitat to replace affected habitat (which are the conservation measures found in Reclamation's 2022 BA). Creation of habitat through implementation of the conservation measures in this proposed action is expected to result in beneficial effects for Yuma Ridgway's rail.

Dewatering of marsh habitat as a result of lower expected river water elevations and associated potential decreases in groundwater elevations may result in loss of marsh vegetation used by the rail. Rail marsh habitat loss can also result from the change in vegetation as water availability changes. Cattail successional changes discussed in the Status of the Species is an example of a threat to suitable rail habitat. Using their habitat analysis model described above in the project description and in their 2005 and 2022 BAs, Reclamation has estimated that as much as seven acres of marsh habitat in Reach 3 may no longer function as suitable rail marsh habitat. Loss of marsh rail habitat would result in an adverse effect to Yuma Ridgway's rail including non-lethal

take due to stress of using changing habitat or marginally suitable habitat and associated increased difficulties in nesting or finding a suitable quantity and quality of prey, or the stress of habitat abandonment. Adverse effects could include shortened life spans resulting in mortality due to the stress of using changing habitat or marginally suitable habitat, as well as potentially lower fecundity and lower egg output, lower young survivability, or nest abandonment.

Reservoir elevations in Reach 3 would not be affected by lower river stage elevations because Lake Mohave is a regulating reservoir. Consequently, increased reduction in flow is not expected to affect marsh habitat in the Bill Williams Delta. The LCR MSCP will avoid the potential effects of lowering groundwater elevations on an additional 16 acres of habitat at Topock Marsh by maintaining water deliveries to Topock Marsh, thereby maintaining water levels and existing habitat conditions.

Construction-related activities associated with establishing and managing created species habitat may have an adverse effect to Yuma Ridgway's rail. Construction activities such as equipment operation and ground disturbance could result in temporary and short-term disturbance of rail marsh habitat. Construction noise could result in harassment of individuals if they are present at the time activities are implemented. We expect construction related activities associated with establishing and maintaining created habitat to result in non-lethal take like that described in the second paragraph of this section.

To minimize impacts to 7 acres of Yuma Ridgway's rail habitat caused by the proposed action, Reclamation would create and manage or protect 15 acres of marsh from existing, degraded, or former marsh that may convert low-value habitat to fully functioning marsh that provides high-value Yuma Ridgway's rail habitat. Some additional limited and low-value habitat (such as dry patches of herbaceous vegetation near marsh edges) could be converted to habitat to benefit other threatened and endangered species; however, with implementation of the general conservation measures described in the 2004 LCR MSCP HCP (and described previously in the proposed action), along with the implementation of the conservation measures proposed in the 2022 BA, improvement of these low-quality habitats is expected to provide a beneficial effect to Yuma Ridgway's rail.

Habitat management activities associated with the general conservation measures (described previously in the proposed action as AMM3), such as operating equipment to remove vegetation and maintaining open water in backwaters and burning decaying marsh vegetation to stimulate vegetation growth at least once every five years according to the known cycle of cattail marshes and prevent buildup of decadent cattail. This could result in temporary loss of habitat and harassment of individuals. To the extent practicable, these activities would be conducted when nesting adults and young birds are not present, to avoid injury or mortality. The maximum extent of habitat that could be affected by habitat management activities is estimated to be 15 acres (the extent of marsh land cover to be created and managed as habitat for associated threatened and endangered species) over the term of the LCR MSCP. Since these general conservation measures are not strictly adhered to (applied when practicable), the temporary loss of rail marsh habitat from habitat management activities could have an adverse effect to Yuma Ridgway's rail even with the general conservation measures in place. These affects could result in non-lethal and lethal take as described in the second paragraph of this section. In addition, the likelihood of take

is expected to increase over the term of the LCR MSCP if the abundance of Yuma Ridgway's rail increases in the LCR MSCP planning area as a result of implementing conservation measures for this species. The level of adverse effects on habitats and individuals will depend on the type and extent of habitat management activities undertaken in species habitat while they are occupying the habitat.

Bonytail and Critical Habitat

Implementation of the increased reduction in flow and conservation measures would decrease flows and water levels in bonytail riverine habitat along the LCR in Reach 3. We do not expect this increased reduction in flow to effect bonytail riverine habitat in Reach 2 because Reclamation has determined in their BA that these effects would be immeasurable and therefore insignificant. The increased flow reductions could affect the future distribution and status of razorback suckers in Reach 3 compared to existing conditions. The degree to which changes in flow reductions would affect the future distribution and status of bonytail in Reach 3 compared to existing conditions is uncertain. Conservation measures to replace affected bonytail habitat are intended to minimize effects to habitat.

Implementation of the increased reduction in flow and associated conservation measures is likely to adversely affect the bonytail. Reduced flow in Reach 3 would result in the loss of 15 acres of habitat between the northern boundary of Havasu NWR and Lake Havasu (Reclamation 2022). Implementation of increased reduction in flow would reduce river flow in Reach 3. River operations related to hydropower generation will not change (Reclamation 2022) though the range of high and low flows will be lower than under existing conditions. Changes to the water elevations below Davis Dam differ seasonally and range between –0.60 and –0.03 feet in Reach 3. The pattern of fluctuations does not change from baseline conditions, and once reduced flows are implemented, no additional changes to elevations would be expected. The result of these changes is not substantial, and it relates to the existing condition and was previously evaluated in the 2004 LCR MSCP B.O. (Service 2005).

The increased reduction in flow is expected to increase the potential for fish mortality through stranding and desiccation. Fish may become stranded as water levels decrease. Increased reduction in flow may also have adverse effects to bonytail in the form of stress to individuals as well as a potential loss of fecundity. Implementing the increased reduction in flow would reduce river depth during the spawning period. This could result in non-lethal take from stress to individuals as they adapt to changing conditions. The lower depth could reduce potential spawning habitat area as well as result in an increased potential for egg desiccation leading to egg mortality and take. Bonytail prefer backwaters and occupy pools and eddies away from strong currents (Pimentel and Bulkley 1983; Vanicek 1967). Backwaters are warmer and offer more primary productivity than the main river channel which may support faster growth rates. In addition, backwaters with emergent vegetation provide cover and refuge from predators. Reduced flow, and the consequent shallower depth, could reduce rearing habitat area in the river and backwaters. A reduction in rearing habitat could lead to non-lethal take from stress to individuals as they adapt to changing conditions, as well as lethal take if individuals become stranded.

Based on known entrainment of razorback suckers in water diversions (Reclamation 1996), it is

possible that reductions in flow in Reach 3 may similarly entrain bonytail. Entrainment of bonytail under implementation of the reduction in flow will be no different from baseline conditions as the area with measurable velocity toward the diversion intake is not expected to change. However, any entrainment of bonytail could affect the local population because of its low population density. The effects of entrainment for the bonytail are wide ranging though all point to likely mortality due to lacking habitat conditions and/or population density of predators.

Construction-related activities associated with establishing and managing 15 acres of created species habitat in Reach 3 may result in adverse effects to bonytail. Impacts to habitat as a result of habitat creation construction and maintenance activities on bonytail would be temporary, generally occurring during the period of construction. During habitat creation construction activities bonytail may temporarily avoid using affected habitat, due to the disturbance. During construction the substrate will be disturbed and could cause sedimentation of spawning and rearing habitat, which could suffocate eggs and larvae and temporarily reduce the local production and availability of food. Further, this disturbance may accidentally discharge contaminants or resuspend contaminants trapped in sediments, which could adversely affect the survival, growth, and reproduction of bonytail in all life stages. The extent of habitat disturbed would be proportionately small in relation to the available habitat and the disturbance would be temporary thus the effects would be minimal. Therefore, we expect that construction and maintenance activities during construction of created backwaters could result in a minor amount of lethal take as well as non-lethal take during all life stages. However, creation of 15 acres of backwater habitat is expected to result in a long-term beneficial effect to bonytail because of the additional habitat that would be available for the species.

In 1994, the FWS proposed critical habitat for the bonytail. Designated critical habitat for bonytail in the LCR MSCP planning area includes the Colorado River from Hoover Dam to Davis Dam, including Lake Mohave up to its full-pool elevation (Reach 2) and the Colorado River from the northern boundary of Havasu NWR to Parker Dam, including Lake Havasu up to its full-pool elevation (Reach 3). As discussed previously in the proposed action, Reclamation determined that the impacts to riverine and backwater habitats of implementing increased reduction in flow was so small as to be immeasurable in Reach 2, including Lake Mohave. Increased reduction in flow would affect environmental conditions in Reach 3 by changing river flow in the segment upstream of Lake Havasu and changing diversion in Lake Havasu, which would result in the loss of 15 acres of habitat. Implementation of conservation measures could also affect environmental conditions in Reach 3 but is not expected to result in the loss of habitat because of the additional habitat that would be available for the species.

According to Reclamation habitat modeling in the BA, the amount of riverine and backwater habitat being affected in Reach 3 by the proposed action is 15 acres. There are 47,778 acres (27,816 acres in Reach 2 and 19,959 acres in Reach 3) of total available bonytail critical habitat in Reaches 2 and 3. However, because Reach 2 is a regulating reservoir and will be maintained as one during this action we do not believe there will be any impacts to bonytail critical habitat in Reach 2. Still, the proposed action would affect 0.08% of the existing bonytail habitat in Reach 3 (15 acres divided by 19,959 acres times 100 equals 0.08%). We see this as an extremely small amount of habitat compared to the overall amount of critical habitat available. While we believe the effects of the proposed action to 0.08% of designated critical habitat in Reach 3 do not

appreciably diminish the overall value of critical habitat available for species conservation and essential for reproduction and recruitment, we do believe the proposed action will not adversely affect critical habitat for bonytail because of the very small amount of habitat being affected and the large amount of functional habitat still available.

Implementation of the increased reduction in flow and river water elevations, as well as implementation of proposed conservation measures, could affect all PCEs of bonytail critical habitat. Effects on critical habitat for the bonytail are confined to Reach 3 from the upper end of Lake Havasu to the upper end of Havasu NWR. Lake Havasu operations are not expected to change with the implementation of the increased reduction in flow. Implementation of increased reduction in flow would reduce river depth during the spawning period, with effects to all 3 PCEs. Reduced depth could affect PCE 1 by reducing the availability of water. Reduced depth could affect PCE 2 by reducing potential spawning habitat area and associated backwaters. Bonytail are believed to prefer backwaters and occupy pools and eddies away from strong currents at all ages (Pimentel and Bulkley 1983; Vanicek 1967) however, the species was extirpated from its native range prior to extensive surveys (USFWS 2002b). Reduced flow, and subsequent shallower depth, could reduce rearing habitat area in the river and backwaters. Backwaters are warmer and more productive nursery habitats than the main river channel, potentially supporting faster growth rates (USFWS 2002b). Reduced depth could affect PCE 3 by reducing adequate food supply or increasing predation. Backwaters with emergent vegetation provide cover and potential refuges from predators. Although the increased reduction in flow may have impacts on bonytail critical habitat, the factor limiting the abundance of bonytail is competition from non-native fish species and predation by non-native fish species and piscivorous birds. We believe that the effects to PC1 (reduced availability of water), PCE2 (reduced potential spawning and habitat area), and PCE3 (reduced adequacy of food supply or increased predation) will not significantly affect the functionality of bonytail critical habitat in Reach 3 because of the small amount (0.08%) of critical habitat being affected and the large amount of functional habitat still available. For this reason, the effects on the PCEs of bonytail critical habitat resulting from the increased reduction in flow is not expected to appreciably diminish the value of critical habitat for species' conservation or survival.

The LCR MSCP includes proposed conservation measures specific to constructing or managing critical habitat for the bonytail within its designated critical habitat. The created habitat within designated critical habitat will be managed for the PCEs of critical habitat (water, physical habitat, and biological environment) for the bonytail. The implementation of the increased reduction in flow and the conservation measures will not diminish capacity of bonytail critical habitat present within the LCR MSCP planning area to a level that will preclude future achievement of the bonytail recovery goals (USFWS 2002a) because recovery goals like ensuring adequate habitat are being supported by the proposed action and the creation of habitat to minimize effects. The LCR MSCP provides for the continued adaptive management of conservation measures to ensure that implementation of the increased reduction in flow will not diminish the value of critical habitat for conservation. Existing general conservation measures, such as the measure to monitor and manage created habitats to maintain their function (MRM2) will further minimize the effects of the proposed action by assuring availability of quality habitat. The survival of bonytail will not be compromised by the possible effects on critical habitat resulting from increased reduction in flow because the construction and management of

backwaters within designated critical habitat to provide bonytail habitat will replace the value of affected habitat.

Razorback Sucker and Critical Habitat

Implementation of the increased reduction in flow and conservation measures could affect razorback suckers and their critical habitat. The increased flow reductions could affect the future distribution and status of razorback suckers in Reach 3 compared to existing conditions. The replacement of affected razorback sucker habitat is a proposed conservation measure associated with this action and is intended to minimize effects of this action on razorback suckers. Existing general conservation measures, such as the measure to monitor and manage created habitats to maintain their function (MRM2) will further minimize the effects of the proposed action by assuring availability of quality habitat. Implementation of both the increased reduction in flow and implementation of conservation measures is likely to adversely affect the razorback sucker as described below.

The increased reduction of flow may affect razorback suckers in Reach 1, but those effects have been discussed and analyzed in the previous BOs (USFWS 2005 p.32-35, 2018a p.17). The increased reductions in flow will not affect the managed water elevations in Reach 2. The managed water affects for Reach 2 were discussed and analyzed in the previous BOs (USFWS 2005 p. 33, 76, 2018a p. 17). The increased reduction in flow may adversely affect razorback sucker in Reach 3 through the loss of up to 15 acres of available habitat in Reach 3 (LCR MSCP 2022). Razorback suckers use relatively shallow water during spring spawning periods and deeper water during winter (USFWS 2002a). Implementing increased reduction in flow would reduce river depth during the spawning period. When the river depth is reduced this could result in a reduction of potential spawning habitat area. Rearing habitat for larval and juvenile razorback sucker consists of connected backwaters and low-velocity channel types, such as pool edges and side channels. During the spring spawning season, razorback suckers may travel long distances in both lacustrine and riverine environments and exhibit some fidelity to specific spawning areas (USFWS 1998). Reduced flow, and the resulting shallower depth, could reduce rearing habitat area for razorback suckers in both the river and its backwaters.

Implementation of the increased reductions in flow would reduce river flow, though river operations related to hydropower generation will not change (Reclamation 2022). Consequently, the range of high and low flows will be lower than under existing conditions. Changes to the water elevations will differ seasonally and range between –0.60 and –0.03 feet below Davis Dam. The pattern of fluctuations does not change, and once reduced flows are implemented, no additional changes to elevations would be expected. The result of these changes in flow is not substantial as it relates to the existing condition and was previously evaluated in the 2004 LCR MSCP analysis (Service 2005). The increased reduction in flow is expected to increase the potential for fish mortality through stranding and desiccation. Fish may become stranded as water levels decrease. However, these results are expected to have adverse effects to razorback sucker in the form of stress to individuals as well as potential reduced fecundity. Implementing the increased reduction in flow would reduce river depth during the spawning period. This could result in non-lethal take from stress to individuals as they adapt to changing conditions. The lower water depths could reduce potential spawning habitat area as well potential egg desiccation

leading to egg mortality and take resulting from the initial flow reductions. In addition, backwaters with emergent vegetation provide cover and refuge from predators. Reduced flow, and the consequent shallower depth, could reduce rearing habitat area in the river and backwaters. A reduction in rearing habitat could lead to non-lethal take from stress to individuals as they adapt to changing conditions, as well as lethal take if individuals become stranded.

Entrainment of razorback suckers in water diversions is known to occur (Reclamation 1996). Entrainment of razorback suckers under implementation of the reduction in flow will be no different from baseline conditions as the area with measurable velocity toward the diversion intake is not expected to change. However, any entrainment of razorback suckers could affect the local population because of its low population density. The effects of entrainment for the razorback suckers are wide ranging though all point to likely mortality due to lacking habitat conditions and/or population density of predators.

Construction activities associated with establishing and managing new habitat in Reach 3 may result in adverse effects to razorback sucker. Impacts to habitat as a result of construction and maintenance activities on razorback sucker would be temporary, generally occurring during the period of construction. During habitat creation construction activities razorback sucker may temporarily avoid using affected habitat, due to the disturbance. During construction substrate will be disturbed and could cause sedimentation of spawning and rearing habitat, which could suffocate eggs and larvae and temporarily reduce the local production and availability of food. Further, this disturbance may accidentally discharge contaminants or resuspend contaminants trapped in sediments, which could adversely affect the survival, growth, and reproduction of razorback sucker in all life stages. The extent of habitat disturbed would be proportionately small (15 of 23,745 acres or 0.06% of Reach 3) in relation to the available habitat and the disturbance would be temporary thus the effects would be minimal. Therefore, we expect that construction and maintenance activities during construction of created backwaters could result in a minor amount of lethal take as well as non-lethal take during all life stages. However, creation of 15 acres of backwater habitat, is expected to result in net beneficial effects to razorback sucker because additional habitat can be utilized by fish at all life stages.

In 1994, the FWS proposed critical habitat for the razorback sucker. Designated critical habitat for razorback sucker in the LCR MSCP planning area includes Lake Mead up to its full-pool elevation (Reach 1), the Colorado River and its 100-year floodplain from Hoover Dam to Davis Dam, including Lake Mohave up to its full-pool elevation (Reach 2), and the Colorado River and its 100-year floodplain from Parker Dam to Imperial Dam, including Imperial Reservoir to the full-pool elevation or 100-year floodplain, whichever is greater (i.e., Reaches 4 and 5). Implementation of the increased reduction in flows would not affect environmental conditions in Reach 1 or Reach 2, including Lake Mohave, or downstream in Reaches 4 and 5 (as discussed in Reclamation's 2022 BA). Therefore, we conclude that effects to razorback sucker critical habitat and its PCEs (water, physical habitat, and biological environment) in the action area would not be affected by this activity. We come to this conclusion because razorback sucker critical habitat in Lake Mead (Reach 1) and Lake Mohave (Reach 2) are not expected to be further affected beyond that which was analyzed in the 2005 BO (USFWS 2005). As we stated in the Status of the Species, razorback sucker critical habitat was not designated in Reach 3.

Northern Mexican Gartersnake

Implementation of the increased reduction in flow and conservation measures is likely to adversely affect the northern Mexican gartersnake. Implementation of increased reduction in flow and proposed conservation measures in Reach 3 in Reclamation's 2022 BA for the northern Mexican gartersnake could affect a small number of individuals and proportion of its habitat over the term of the LCR MSCP. The effects of the increased in reduction in flow to northern Mexican gartersnake will be minimized through the existing general conservation measures listed in the 2004 LCR MSCP HCP (and described previously in the proposed action), and the 2018 amendment to the HCP. These effects to northern Mexican gartersnake will also be minimized by the creation of marsh habitat, which are the proposed conservation measures found in Reclamation's 2022 BA. Creation of habitat through implementation of the conservation measures is expected to result in beneficial effects for the northern Mexican gartersnake.

Reservoir elevations in Reach 3 would not be affected by lower river stage elevations (Reclamation 2022). Consequently, the increased reduction in flow is not expected to affect marsh habitat associated with marshes maintained by reservoirs (e.g., Bill Williams Delta). Through implementation of minimization measures described in Reclamation's 2022 BA, the LCR MSCP may minimize 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. The proposed reduction in flow in Reach 3 may lower groundwater levels sufficiently in this reach to reduce the extent of 7 acres of habitat provided by marshes associated with backwaters. Lowering groundwater elevations could cause direct loss of marsh habitat through desiccation, fragmentation, or reduction in the extent of habitat patches. This reduction in habitat would adversely affect gartersnakes in the form of stress to individuals as well as potential loss of fecundity. Individuals could experience stress associated with finding more suitable habitat for foraging, refuge, and nesting. Loss of foraging and refuge habitat add stress in the form of nutritional input versus energy expended, ability to rest, and the ability to nest. This could result in non-lethal take of individuals as they adapt to changing conditions.

Activities associated with creating and maintaining habitat for threatened and endangered species may result in adverse effects to the northern Mexican gartersnake. Habitat creation activities include the use of construction equipment in the field as well as the associated noise. The impacts 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.

In the 2018 Biological Opinion that amended the 2004 LCR MSCP HCP to include the northern Mexican gartersnake as a covered species, the Permittees were required to create or protect two acres of marsh habitat for every acre affected by covered actions and activities. To minimize impacts to 7 acres of northern Mexican gartersnake habitat caused by the proposed action, Reclamation would create, manage, or protect 15 acres of marsh habitat to fully functioning marsh that may provide northern Mexican gartersnake habitat. Some additional limited or low-value habitat (such as dry patches of herbaceous vegetation near marsh edges) could be converted to habitat to benefit other threatened and endangered species; however, with

implementation of the general conservation measures described in the 2017 LCR MSCP HCP Amendment (and described previously in the proposed action), conversion 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 northern Mexican gartersnake.

Habitat management activities associated with the general conservation measures described in the proposed action, such as operation of equipment to remove vegetation and maintain open water in backwaters, burning decayed 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 15 acres (i.e., the extent of marsh land cover to be created as habitat for associated threatened and endangered species) over the term of the LCR MSCP. Since these general conservation measures are not strictly adhered to (applied when practicable), the temporary loss of marsh habitat during habitat creation or management activities could have an adverse effect to northern Mexican gartersnake even with general conservation measures in place. These affects could result in non-lethal and lethal take of individual gartersnakes due to their cryptic behavior and color pattern. In addition, 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 conservation measures for this species. The level of adverse effects on habitats and individuals will depend on the type and extent of habitat management activities that are undertaken in species habitat while they are occupying the habitat.

CUMULATIVE EFFECTS

Cumulative effects are those effects of future State or private activities, not involving federal activities, that are reasonably certain to occur within the action area considered in this biological opinion (50 CFR 402.02).

The 2004 BA contains an analysis of the types of future non-Federal actions that may have cumulative effects to covered species and their habitats in the action area. This information is incorporated by reference. These actions are generally related to increasing human population of the action area, with subsequent increases in economic development, recreation and visitation (including risks of accidental or intentional non-native species introduction and human-caused wildfire), and introduction of environmental contaminants. Because of the long-term nature of this consultation, most of the specific actions that may have cumulative effects have not been identified; however, the general types of effects were identified in the 2005 BCO (USFWS 2005). As was the case then, we do not believe that there would be significant effects to covered species or critical habitat from cumulative effects.

Other types of actions that will likely occur in the action area include maintenance of the waterway (e.g., periodic dredging), maintenance of the dams, maintenance of existing aquatic structures (e.g., piers, marinas, and ramps) and the likely new construction of aquatic structures and activities. We are not aware of specific projects, but many of these actions will require a Federal authorization and therefore the actions will likely be considered individually through

Section 7 consultation with the authorizing Federal action agency (i.e., the U.S. Army Corps of Engineers).

We are aware that if drought conditions continue to worsen as they have been observed to do over the last 20 years, additional water conservation actions (as identified by the CRDCP Act) will continue to be implemented by entities with legal water rights. These water conservation actions will be associated with the reduced water inputs into the system associated with drought and prioritized legal water rights. These water conservation actions would most likely have a beneficial effect to the species and critical habitat considered herein because less water removal from the LCR would serve to stop or slow the effects to species and critical habitat that are considered in this BO associated with reduced river water flows and reduced river water levels.

JEOPARDY AND ADVERSE MODIFICATION ANALYSIS

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

Jeopardy Analysis Framework

Our jeopardy analysis relies on the following:

"Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). The following analysis relies on four components:

(1) Status of the Species, which evaluates the range-wide condition of the listed species addressed, the factors responsible for that condition, and the species' survival and recovery needs;

(2) Environmental Baseline, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species;

(3) Effects of the Action (including those from conservation measures), which determines the direct and indirect effects of the proposed federal action and the effects of any interrelated or interdependent activities on the species; and,

(4) Cumulative Effects, which evaluates the effects of future, non-federal activities in the action area on the species.

The jeopardy analysis in this biological opinion emphasizes the range-wide survival and recovery needs of the listed species and the role of the action area in providing for those needs. We evaluate the significance of the proposed Federal action within this context, taken together

with cumulative effects, for making the jeopardy determination.

Destruction/Adverse Modification Analysis Framework

The final rule revising the regulatory definition of "destruction or adverse modification of critical habitat" became effective on March 14, 2016 (81 FR 7214). The revised definition states: "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

Similar to our jeopardy analysis, our adverse modification analysis of critical habitat relies on the following four components:

(1) the Status of Critical Habitat, which evaluates the range-wide condition of designated critical habitat in terms of PCEs], the factors responsible for that condition, and the intended recovery function of the critical habitat overall;

(2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area;

(3) the Effects of the Action, which determine the direct and indirect effects of the proposed federal action and the effects of any interrelated or interdependent activities on the PCEs and how they will influence the recovery role of affected critical habitat units; and,

(4) Cumulative Effects, which evaluate the effects of future, non-federal activities in the action area on the PCEs and how they will influence the recovery role of affected critical habitat units.

Conclusion

After reviewing the current status of the Yuma Ridgway's rail, bonytail and its critical habitat, the razorback sucker and its critical habitat, and the northern Mexican gartersnake, the environmental baseline for the action area, the effects of the action, as proposed, and the cumulative effects, it is our biological opinion that enhanced habitat protection and reduction in Colorado River flows, as proposed, are not likely to jeopardize the continued existence of the Yuma Ridgway's rail, bonytail, razorback sucker, or the northern Mexican gartersnake and is not likely to destroy or adversely modify designated critical habitat for bonytail.

We base this conclusion on the following:

- We identified adverse effects associated with permanent and temporary loss of habitat, non-lethal take, and stress for Yuma Ridgway's rail. These adverse effects may reduce survivorship and recovery by reducing reproduction, numbers, and distribution of Yuma

Ridgway's rail. As we discussed in the Status of the Species and Environmental Baseline, rails occur in riparian areas throughout AZ, while less is known about them in the action area. The proposed action will employ general conservation measures, such as maintaining open waters to backwaters and removal of decaying marsh vegetation (AMM3), that will avoid or minimize the effects of the proposed action. The proposed action also includes creation and maintenance a total of 15 acres of marsh habitat. This habitat will have a beneficial effect since it is creating two acres of habitat for each acre of habitat lost as a result of the proposed action. Additionally, the LCR MSCP will minimize the potential effects of lowering groundwater elevations on an additional 16 acres of habitat at Topock Marsh by maintaining water deliveries to Topock Marsh, thereby maintaining water levels and existing habitat conditions. With all of this taken into consideration, we do not believe the proposed action will appreciably reduce the rail's ability to reproduce, appreciably reduce population numbers, or appreciably reduce the rail's distribution. Therefore, we do not believe that the proposed action will jeopardize the continued existence of the Yuma Ridgway's rail. Furthermore, we do not believe that the proposed action will push the species over the tipping point that would place recovery of the species at risk and will not impede the recovery objectives described in the Status of the Species section because the proposed action promotes the recovery objectives of additional habitat protection and management.

- We identified adverse effects associated with permanent loss of habitat, non-lethal take, and stress for bonytail. These adverse effects may reduce survivorship and recovery by reducing reproduction, numbers, and distribution of bonytail. As we discussed in the Status of the Species and Environmental Baseline, bonytail occur in the UCRB but are believed to be functionally extinct in the LCRB due to lack of recruitment and low survivorship and they are being maintained in the system by the LCR MSCP stocking program. Existing general conservation measures, such as the measure to monitor and manage created habitats to maintain their function (MRM2) will further minimize the effects of the proposed action by assuring availability of quality habitat. The proposed action also includes the creation and maintenance backwater habitat. This created habitat will have a beneficial effect for bonytail because it is creating an acre of habitat for each acre of habitat lost as a result the proposed action. With all of this taken into consideration, we do not believe the proposed action will appreciably reduce the bonytail's ability to reproduce, appreciably reduce population numbers, or appreciably reduce the bonytail's distribution. Therefore, we do not believe that the proposed action will jeopardize the continued existence of the bonytail. Furthermore, we do not believe that the proposed action will push the species over the tipping point that would place recovery of the species at risk and will not impede the recovery objectives described in the Status of the Species section, because the proposed action promotes the recovery objective of adequate habitat by creating new habitat for bonytail.

- There are 47,778 acres of bonytail critical habitat within the proposed action area. However, we do not believe that there will be direct or indirect effects that will appreciably diminish the value of critical habitat for bonytail. We base this conclusion on the small overall proportion of bonytail critical habitat that may be affected as a result of this action (0.08%). In Reach 2, because Lake Mohave is a regulating reservoir, the

impacts to its 27,816 acres of critical habitat are immeasurable. In Reach 3, 15 acres of aquatic habitat will be altered as a result of this activity however, the remaining acreages (19,944 ac or 99.92% of the critical habitat) contain the PCEs of critical habitat for bonytail. Based on the extremely small portion of critical habitat (0.08%) being adversely affected by the proposed action, we conclude the proposed action will not adversely modify bonytail critical habitat. Furthermore, we do not believe that the loss of this small area (15 acres) affected by the proposed action will push bonytail over the tipping point causing it to no longer provide functional valued habitat for the species because of the large amount (19,944 acres) of functional critical habitat still available in Reach 3.

- We identified adverse effects associated with permanent loss of habitat, non-lethal take, and stress for razorback sucker. These adverse effects may reduce survivorship and recovery by reducing reproduction, numbers, and distribution of razorback sucker. As we discussed in the Status of the Species and Environmental Baseline, razorback sucker populations occur in the UCRB and occur in the LCRB below Hoover Dam due the LCR MSCP stocking program and have suffered lack of recruitment for decades. The amount of razorback sucker habitat impacted by this activity will be small (15 acres) in relation to the total available in Reach 3 (23,745 acres). The proposed action also proposes creation and maintenance of backwater habitat. This created habitat will have a beneficial effect since it is creating an acre of habitat for each acre of habitat lost as a result of the increased reduction in flows central to the proposed action. Existing general conservation measures, such as the measure to monitor and manage created habitats to maintain their function (MRM2) will further minimize the effects of the proposed action by assuring availability of quality habitat. With all of this taken into consideration, we do not believe the proposed action will appreciably reduce the razorback sucker's ability to reproduce, appreciably reduce population numbers, or appreciably reduce the razorback sucker's distribution. Therefore, we do not believe that the proposed action will jeopardize the continued existence of the razorback sucker. Furthermore, we do not believe that the proposed action will push the species over the tipping point that would place recovery of the species at risk and will not impede the recovery objectives described in the Status of the Species section, because the proposed action promotes the recovery objective of adequate habitat by creating new habitat for razorback sucker.

- We identified adverse effects associated with permanent and temporary loss of habitat, non-lethal take, and stress for Northern Mexican gartersnake. These adverse effects may reduce survivorship and recovery by reducing reproduction, numbers, and distribution of northern Mexican gartersnake. As we discussed in the Status of the Species and Environmental Baseline, northern Mexican gartersnakes have several populations in several riparian areas throughout the state, while less is known about them in the action area. The proposed action proposes to create and maintain a total of 15 acres of marsh habitat. This created habitat will have a beneficial effect since it is creating two acres of habitat for each acre of habitat lost as a result of the increased reduction in flows central to the proposed action. Additionally, the LCR MSCP will avoid the potential effects of lowering groundwater elevations on an additional 16 acres of habitat at Topock Marsh by maintaining water deliveries to Topock Marsh, thereby maintaining water levels and existing habitat conditions. Existing general conservation measures, such as the measure

to monitor and manage created habitats to maintain their function (MRM2) will further minimize the effects of the proposed action by assuring availability of quality habitat. With all of this taken into consideration, we do not believe the proposed action will appreciably reduce the northern Mexican gartersnake's ability to reproduce, appreciably reduce population numbers, or appreciably reduce the northern Mexican gartersnake's distribution. Therefore, we do not believe that the proposed action will jeopardize the continued existence of the northern Mexican gartersnake. Furthermore, we do not believe that the proposed action will push the species over the tipping point that would place recovery of the species at risk and will not impede recovery because the proposed action minimizes effect through the creation of marsh habitat.

We based the conclusions of this biological opinion on full implementation of the project as presented in the Description of the Proposed Action section of this document.

INCIDENTAL TAKE STATEMENT

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

AMOUNT OR EXTENT OF TAKE

The FWS anticipates incidental take of Yuma Ridgway's rail, bonytail, razorback sucker, and northern Mexican gartersnake will be difficult to detect and monitor due to the amount of habitat they could occupy, the mobility of each species, scavenging of carcasses by other species, and difficulty of encountering them in the wild. According to our regulations at 50 CFR 402.14(i)(1)(i): "A surrogate (e.g., similarly affected species or habitat or ecological conditions) may be used to express the amount or extent of anticipated take provided that the biological opinion or incidental take statement: Describes the causal link between the surrogate and take of the listed species, explains why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals of the listed species, and sets a clear standard for determining when the level of anticipated take has been exceeded." We have chosen to use habitat as a surrogate for take for all four species. Specifically, we are using marsh habitat as a surrogate for analyzing take for Yuma Ridgway's rail and northern Mexican gartersnake, and riverine and backwater habitats as a surrogate for analyzing take for bonytail

and razorback sucker. Reclamation's analysis of effects was based on calculating habitat loss for each of these habitat types. It is conservative to consider that habitat loss would result in the incidental take of individual species due to the critical link between survivorship of a species and its habitat. It is difficult to monitor and detect the loss of any of the four species as a result of the implementing the proposed action because of the large action area, the species mobility, and difficulty of encountering each species in the wild. The causal link between the surrogates and take of the listed species is that each species relies upon marsh, riverine and backwater habitats for their survival and recovery and the loss of these types of habitats would affect the species throughout its entire life cycle. Therefore, we are using each habitat type as a surrogate for counting take of individual species. Since it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals of each species, the clear standard for determining when the level of take has been exceeded is to use loss of marsh habitat as a surrogate for Yuma Ridgway's rail and northern Mexican gartersnake, and riverine and backwater habitat as a surrogate for bonytail and razorback sucker, as described below.

The amount or extent of non-lethal and lethal incidental take of Yuma Ridgway's rail and northern Mexican gartersnake will be considered exceeded if the proposed action results in more than 15 acres of marsh habitat loss in Reach 3. The amount or extent of non-lethal and lethal incidental take of bonytail, and razorback sucker will be considered exceeded if the proposed action results in more than 15 acres of backwater/riverine habitat loss in Reach 3.

EFFECT OF THE TAKE

In this biological opinion, we have determined that the level of anticipated take is not likely to result in jeopardy to the razorback sucker, bonytail, Yuma Ridgway's rail, or northern Mexican gartersnake.

REASONABLE AND PRUDENT MEASURES

The 2005 LCR MSCP documents and 2017 amendment documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the HCP and amendment, together with the terms and conditions described in the associated IA, and the section l0(a)(l)(B) permit or permits issued with respect to the HCP Amendment, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this incidental take statement under 50 CFR 402.14(i). It is important to restate from the 2005 LCR MSCP documents and 2017 amendment documents that the conservation measures contained therein fully mitigates for the adverse effects of the covered actions that result in incidental take and therefore meets the permit issuance standard for minimizing and mitigating to the maximum extent practicable. Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section l0(a)(l)(B) and section 7(a)(2) of the Act to apply. If the permittees fail to adhere to these terms and conditions, the protective coverage of the section l0(a)(l)(B) permit and section 7(a)(2) may lapse. Because of the ongoing general conservation measures identified in the 2005 BO and 2017 amendment, the conservation measures identified in the HCP, and the conservation measures proposed by Reclamation in their 2022 BA, we feel

that there are no additional monitoring or measures that would further minimize the effects of the proposed action. Therefore, no further Reasonable and Prudent Measures are required.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900 within three working days of its finding. Provide written notification within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. Send the notification to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that Reclamation coordinates with the FWS to stay informed on the proximity of populations of northern Mexican gartersnakes to habitat restoration sites. This would ensure that the habitat created is of the highest conservation value to the species effected by the activity, such as Beal Lake Conservation Area and Planet Ranch.

2. We recommend that Reclamation coordinates with the FWS to examine opportunities to reduce predation and competition pressure from predatory nonnative species in key gartersnake foraging habitat within the LCR MSCP planning area. We recommend that effective methods be added to the list of available LCR MSCP best management practices so they can be utilized when appropriate.

3. We recommend that Reclamation examine opportunities to evaluate the level of desiccation that takes place to all life stages of razorback sucker between low and high-water during spawning and nesting seasons (April – June). This would ensure that any future activities along a similar vein would have available information on the direct impacts of fluctuating water levels on these fish. Fluctuations of interest include those from daily maximums and minimums during hydropeaking and over the course of the nesting season.

4. We recommend that Reclamation participates with the FWS to review monitoring criteria and methods for the Yuma Ridgway's rail to implement a range-wide survey protocol that informs the status of the species' demographic conditions. We recommend that Reclamation implements the improved methods, once established, within the LCR MSCP conservation areas.

REINITIATION NOTICE

This concludes formal consultation for the Enhanced Habitat Protection and Reduction in Colorado River Flows Project. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the project exceeds the amount or extent of incidental take, any operations causing such take must cease pending reinitiation.

In keeping with our trust responsibilities to American Indian Tribes, we encourage you to coordinate with the Bureau of Indian Affairs in the implementation of this consultation. By copy of this biological opinion, we are notifying the Colorado River Indian Tribes (Chemehuevi and Mohave), Cocopah Tribe, Fort Mojave Indian Tribe, Hopi Tribe, Hualapai Tribe, Quechan Indian Tribe, and Yavapai Tribe of its completion.

We appreciate Reclamation's efforts to identify and minimize effects to listed species from this project. We also appreciate your efforts to include us in the development, and implementation of this project.

Please refer to the consultation number, 2022-0018822-S7-001 in future correspondence concerning this project. Should you require further assistance or if you have any questions, please contact Daniel J. Leavitt (daniel_leavitt@fws.gov) and Mark Lamb (mark_lamb@fws.gov).

Sincerely,

Heather Whitlaw Digitally signed by HEATHER WHITLAW Date: 2022.12.07 14:53:55 -07'00'

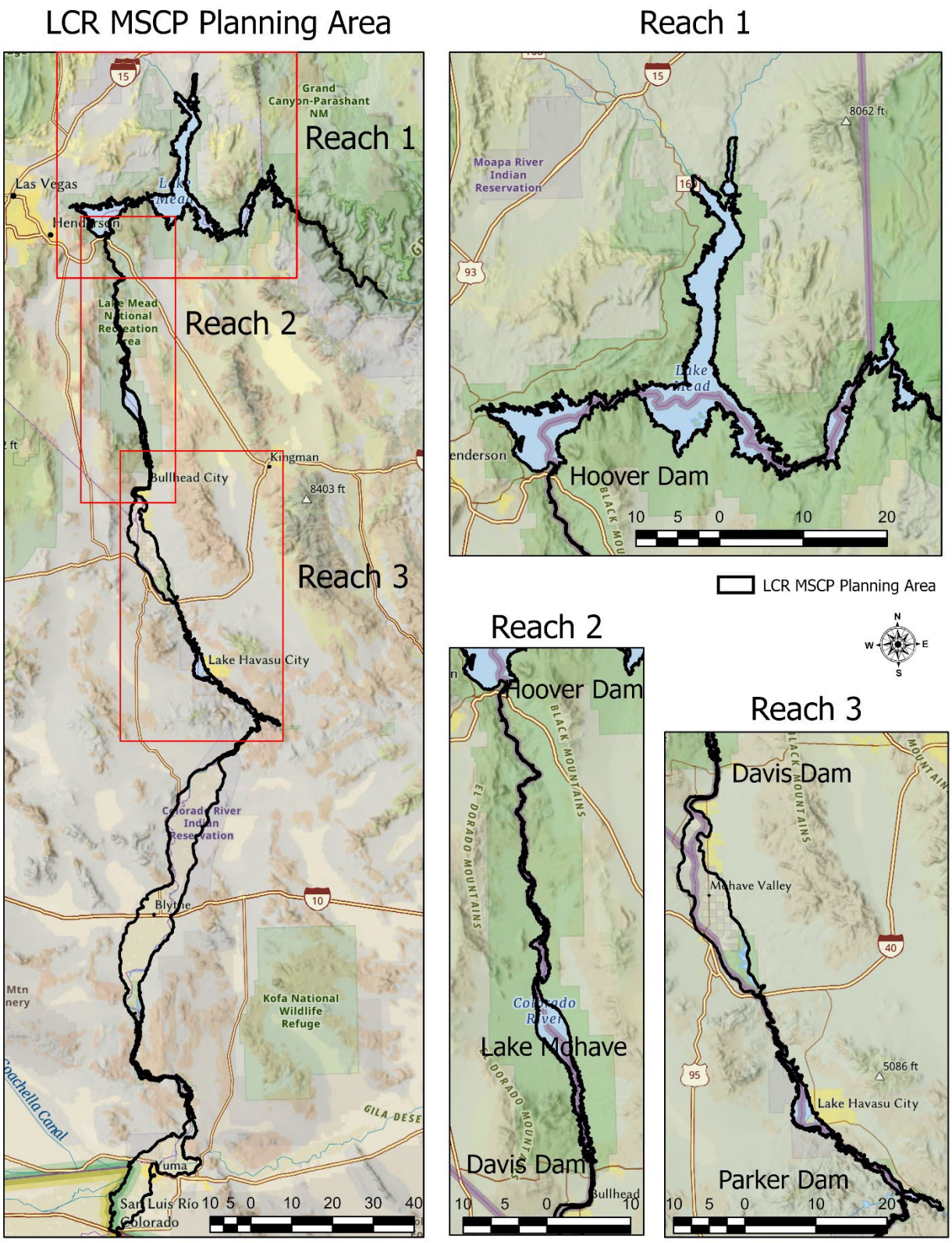
Heather Whitlaw
Field Supervisor

cc (electronic):
Fish and Wildlife Biologists, U.S. Fish and Wildlife Service (Attn: Jeff Servoss, Nichole Englemann)
Director, Environmental Department, Chemehuevi Tribe, Havasu Lake, CA
Director, Cultural Resource Center, Chemehuevi Tribe, Havasu Lake, CA
Director, Tribal Historic Preservation Office, Colorado River Indian Tribes, Parker, AZ
Director, Environmental Protection Office, Colorado River Indian Tribes, Parker, AZ
Chief Game Warden, Fish and Game, Colorado River Indian Tribes, Parker, AZ
Tribal Administrator, Cocopah Indian Tribe, Somerton, AZ
Director, Environmental Protection Office, Cocopah Indian Tribe, Somerton, AZ

Director, Cultural Resources Department, Cocopah Indian Tribe, Somerton, AZ
Attorney, Cocopah Indian Tribe, Somerton, AZ
Director, Aha Makav Cultural Society, Fort Mohave Indian Tribe, Mohave Valley, AZ
Sargent, Police Department, Fort Mohave Indian Tribe, Needles, CA
Director, Cultural Preservation Office, Fort Mohave Indian Tribe, Needles, CA
Director, Department of Natural Resources, Hopi Tribe, Kykotsmovi, AZ
Director, Cultural Preservation Office, Hopi Tribe, Kykotsmovi, AZ
General Council, Office of General Counsel, Hopi Tribe, Kykotsmovi, AZ
Director, Natural Resources Department, Hualapai Tribe, Peach Springs, AZ
Director, Cultural Resources Department, Hualapai Tribe, Peach Springs, AZ
Director, Planning and Economic Development, Hualapai Tribe, Peach Springs, AZ
Tribal Administrator, Quechan Indian Tribe, Yuma, AZ
Chairperson, Cultural Committee, Quechan Indian Tribe, Yuma, AZ
Director, Game & Fish Department, Quechan Indian Tribe, Yuma, AZ
Yavapai Culture Director, Cultural Resource Program, Yavapai Tribe, Camp Verde, AZ
Apache Culture Director, Cultural Resource Program, Yavapai Tribe, Camp Verde, AZ
Tribal Archeologist, Cultural Resource Program, Yavapai Tribe, Camp Verde, AZ
Environmental Protection Officer, Environmental Quality Services, Western Regional Office, Bureau of Indian Affairs, Phoenix, AZ

FIGURES

Figure 1. Map of the Lower Colorado River Multi-Species Conservation Plan planning area, inset maps for Reaches 1, 2, and 3.


LCR MSCP Planning Area
Reach 1
Reach 2
Reach 3
Grand Canyon-Parashant NM
Las Vegas
Lake Mead
Henderson
Lake Mead National Recreation Area
Kingman
Bullhead City
8403 ft
Lake Havasu City
Colorado River Indian Reservation
Blythe
Kofa National Wildlife Refuge
Yuma
San Luis Río Colorado
Coachella Canal
GILA DESE
Mtn nery
10 5 0 10 20 30 40
Moapa River Indian Reservation
8062 ft
Hoover Dam
BLACK MOUNTAINS
10 5 0 10 20
LCR MSCP Planning Area
N
W
E
S
Reach 2
Hoover Dam
BLACK MOUNTAINS
EL DORADO MOUNTAINS
Colorado River
Lake Mohave
Davis Dam
Bullhead
10 5 0 10
Reach 3
Davis Dam
BLACK MOUNTAINS
Mohave Valley
5086 ft
Lake Havasu City
Parker Dam
10 5 0 10 20

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