United States Department of the Interior

FISH AND WILDLIFE SERVICE

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April 26, 2024

Cons. # 2023-0102400

Scott Cooke
District Manager
Bureau of Land Management
1800 Marquess Street
Las Cruces, New Mexico 88005

Dear Mr. Cooke,

Thank you for the letter dated August 17, 2023, from the Las Cruces District Biological & Watershed Resources Branch, requesting consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), as amended, for the proposed Bureau of Land Management's (BLM) Gila Lower Box Recreation Area Management Plan (RAMP) that will be used to guide overall management of the Gila Lower Box Special Recreation Management Area. The letter, accompanying August 2023 biological evaluation (BE), and subsequent email correspondence dated December 28, 2023, and January 2, 2024, are hereby incorporated by reference. The BE analyzed effects of the proposed action (implementation of the RAMP) on the following fourteen species:

- threatened Chiricahua leopard frog (*Rana chiricahuensis*; "frog")
- threatened narrow-headed gartersnake (*Thamnophis rufipunctatus*) and its designated critical habitat
- threatened northern Mexican gartersnake (*Thamnophis eques megalops*)
- endangered southwestern willow flycatcher (*Empidonax traillii extimus*; "flycatcher") and its designated critical habitat
- threatened yellow-billed cuckoo (*Coccyzus americanus*; "cuckoo") and its designated critical habitat
- endangered loach minnow (*Tiaroga cobitis*) and its designated critical habitat
- endangered spikedace (*Meda fulgida*) and its designated critical habitat
- non-essential experimental population of the Mexican wolf (*Canis lupus baileyi*; "wolf")
- non-essential experimental population of the northern Aplomado falcon (*Falco femoralis septentrionalis*; "falcon")
- threatened Mexican spotted owl (*Strix occidentalis lucida*)
- endangered Gila chub (*Gila intermedia*)
- endangered Gila topminnow (incl. Yaqui; *Poeciliopsis occidentalis*)
- threatened Gila trout (*Oncorhynchus gilae*)

- candidate species Monarch butterfly (*Danaus plexippus*)

In the subsequent e-mail correspondence, the BLM determined that the proposed action "*may affect, is likely to adversely affect*" the frog, both gartersnakes, designated critical habitat for the narrow-headed gartersnake, flycatcher and its designated critical habitat, cuckoo and its designated critical habitat, loach minnow and its designated critical habitat, and spikedace and its designated critical habitat.

The wolf and falcon have both been established in New Mexico as an experimental, non-essential population under section 10(j) of the ESA. For section 7 consultation purposes, any nonessential experimental population located outside a National Park or National Wildlife Refuge System is treated as a proposed species. As such, the BLM determined that the proposed action is "*not likely to jeopardize the continued existence of*" the wolf and the falcon. We concur with this determination for these two species based on the designation as nonessential to the continued existence of both species, an insufficient amount of prey base for the wolf, and insufficient grassland habitat for falcons surrounding the riparian woodlands. No further discussion of these two species is included in this letter or in the attached biological opinion.

The attached biological opinion is based on the review of the proposed action and its effects on species and any designated or proposed critical habitat in accordance with section 7 of the ESA. The biological opinion is based on information provided in the BE, correspondence with your staff, data in our files, a literature review, and other sources of information, including the final rules to list the previously mentioned species as threatened or endangered and designate or propose critical habitat. Literature cited in the attached biological opinion is not a complete bibliography of all literature available on the species of concern, the project and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at the New Mexico Ecological Services Field Office.

The BLM also determined that the proposed action will have "*no effect*" on the Mexican spotted owl, Gila chub, Gila topminnow (incl. Yaqui), Gila trout, and Monarch butterfly. Although the ESA does not require Federal agencies to consult with the Service if the action agency determines their action will have "*no effect*" on threatened or endangered species or designated critical habitat (50 CFR 402.12), we appreciate your consideration for the conservation of these species and notification of your "*no effect*" determinations.

Thank you for your concern for threatened and endangered species and New Mexico's wildlife resources. If you have any questions, please contact Clinton Smith of my staff at the letterhead address, by phone at (505) 761-4743, or by electronic mail at clinton_smith@fws.gov.

Sincerely,

JODIE MAMUSCIA
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Date: 2024.04.26 15:19:47 -06'00'

(For) Shawn Sartorius
Field Supervisor

cc (electronic):
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, New Mexico
Supervisory Natural Resource Specialist, Bureau of Land Management, Las Cruces, New Mexico
Fisheries and Aquatic Habitat Biologist, Bureau of Land Management, Las Cruces, New Mexico
Wildlife Biologist, Bureau of Land Management, Las Cruces, New Mexico
Fish and Wildlife Biologist (Chiricahua leopard frog), Arizona Ecological Services Field Office, Tucson, Arizona
Fish and Wildlife Biologist (narrow-headed and northern Mexican gartersnakes), Arizona Ecological Services Field Office, Tucson, Arizona
Fish and Wildlife Biologist (southwestern willow flycatcher), Arizona Ecological Services Field Office, Phoenix, Arizona
Fish and Wildlife Biologist (yellow-billed cuckoo), Arizona Ecological Services Field Office, Tucson, Arizona
Fish and Wildlife Biologist (loach minnow and spikedace), Arizona Ecological Services Field Office, Tucson, Arizona

Biological Opinion for Bureau of Land Management Gila Lower Box Recreation Area Management Plan

2023-0102400

April 2024

JODIE MAMUSCIA

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Date: 2024.04.26 15:22:04 -06'00'

(For) Shawn Sartorius
Field Supervisor
New Mexico Ecological Services Field Office

Date

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BIOLOGICAL OPINION

Introduction

This document transmits the U.S. Fish and Wildlife Service's (Service or USFWS) framework programmatic biological opinion concerning recreation management to the threatened Chiricahua leopard frog (*Rana chiricahuensis*; "frog"), threatened narrow-headed gartersnake (*Thamnophis rufipunctatus*), threatened northern Mexican gartersnake (*Thamnophis eques megalops*; both "gartersnakes"), endangered southwestern willow flycatcher (*Empidonax traillii extimus*; "flycatcher"), threatened yellow-billed cuckoo (*Coccyzus americanus*; "cuckoo"), endangered loach minnow (*Tiaroga cobitis*; "minnow"), endangered spikedace (*Meda fulgida*), and designated critical habitat for all species (except the frog and northern Mexican gartersnake) for the Bureau of Land Management (BLM) Gila Lower Box Recreation Area Management Plan (RAMP) in accordance with section 7 of the Endangered Species Act of 1973 (16 USC 1531-1544), as amended (ESA).

A biological opinion is a document that states the opinion of the Service as to whether a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. "*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). "*Destruction or adverse modification*" is defined as a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species (50 CFR § 402.02; 84 FR 44976-45018). Please note that primary constituent elements (PCEs) of critical habitat are now referred to as physical and biological features (PBFs) based on the final rule implementing changes to regulations for designating critical habitat (81 FR 7414-7440). However, to maintain consistency with the final rules designating critical habitat for species addressed in this biological opinion, this document will use the term PCEs where applicable.

The Service received your August 17, 2023, request for consultation with your August 2023 biological evaluation (BE) for the proposed BLM Gila Lower Box RAMP that will be used to guide overall management of the Gila Lower Box Special Recreation Management Area (SRMA) on August 17, 2023. In addition to the original BE, the BLM and Service met and corresponded several times in October, November, and December 2023. The original letter, accompanying August 2023 BE, and subsequent email correspondence dated December 28, 2023, and January 2, 2024, are hereby incorporated by reference. The BLM determined that the proposed action "*may affect, is likely to adversely affect*" all the species and critical habitat listed above.

This biological opinion is based on our review of the proposed action and its effects on the frog, both gartersnakes, flycatcher, cuckoo, minnow, spikedace, and designated critical habitat for all species (except the frog and northern Mexican gartersnake) in accordance with section 7 of the ESA. The biological opinion is based on information provided in the submitted BE, correspondence with your office, data in our files, a literature review, and other sources of information including the final rules to list the flycatcher (USFWS 1995) and designate critical habitat (USFWS 2013), minnow (USFWS 2012a) and designate critical habitat (USFWS 2012a),

spikedace (USFWS 2012a) and designate critical habitat (USFWS 2012a), frog (USFWS 2012b), both gartersnakes (USFWS 2014a) and designate critical habitat for the narrow-headed gartersnake (USFWS 2021b), and cuckoo (USFWS 2014b) and designate critical habitat (USFWS 2021a). Literature cited in the biological opinion is not a complete bibliography of all literature available on the species of concern, the project and its effects, or on other subjects considered in this biological opinion. A complete administrative record of this consultation is on file at the New Mexico Ecological Services Field Office.

Consultation History

In 1985, the Gila River Coordinated River Management Plan was completed and currently guides the BLM's management of the Gila Lower Box planning area.

May 10, 2022, BLM biologist first contacted the Service to discuss upcoming RAMP.

June 27, 2022, BLM and Service biologist had virtual meeting to discuss RAMP.

In February 2023, the Environmental Assessment for the Gila Lower Box RAMP was drafted.

July 24, 2023, BLM biologist sent draft RAMP summary and species determinations for Service biologists to review.

August 15, 2023, BLM biologist sent draft biological assessment transmittal letter for Service biologist review.

August 17, 2023, BLM biologists sent in Gila Lower Box RAMP BE. The Service received BLM's request for consultation on August 17, 2023. Included with that request was the BLM's August 2023, BE for the proposed action. The BE made a determination that the effects of the proposed action "*may affect, is not likely to adversely affect*" the flycatcher and its designated critical habitat, cuckoo and its designated critical habitat, frog, both gartersnakes and designated critical habitat for the narrow-headed gartersnake, minnow and its designated critical habitat, and spikedace and its designated critical habitat.

November 21, 2023, BLM and Service biologists had a virtual meeting to discuss BE.

November 29, 2023, BLM and Service biologists had a virtual meeting for further discussions on BE.

December 8, 2023, BLM and Service biologists had a virtual meeting to discuss updating several species' determinations in the BE.

On December 28, 2023, and January 2, 2024, the BLM and Service corresponded about updating several species' determinations. The updated determinations included that the effects of the proposed action "*may affect, is likely to adversely affect*" the flycatcher and its designated critical habitat, cuckoo and its designated critical habitat, frog, both gartersnakes and designated critical habitat for the narrow-headed gartersnake, minnow and its designated critical habitat, and spikedace and its designated critical habitat.

The Service provided a draft biological opinion to the BLM staff on April 1, 2024, and received comments back on April 15, 2024.

Description of Proposed Action

The proposed action described below is a "framework programmatic action" as defined in 50 CFR 402.02, where the framework programmatic action only establishes a framework for the development of specific future action(s) but does not authorize any future action(s). The effects to listed species and designated critical habitat of future actions that are subsequently authorized, funded, or carried out under this program will be addressed in subsequent section 7 consultation, as appropriate.

The BLM Las Cruces District Office has developed a RAMP to guide the agency's overall management of the Gila Lower Box SRMA, a popular recreation area in southwestern New Mexico. The RAMP is meant to provide implementation-level recreation management decisions based on management directives for the area in the 1985 Gila River Coordinated Resource Management Plan (RMP) and Mimbres RMP (BLM 1985; 1993). In addition, the RAMP provides guidance for potential future recreation management actions as conditions and recreation uses change. These future actions may include increasing signage and building recreation infrastructure to protect the area's valuable and unique resources while continuing to allow for recreation uses. The Gila Lower Box RAMP identifies the goals, strategies, and decisions for the BLM's management of recreation in the planning area, and identifies processes for monitoring, enforcement, and adaptive management.

The need for the BLM's action is to implement primitive and sustainable recreation to protect the Gila Lower Box area from increased use and resource damage of sensitive values, while being consistent with the management goal outlined in the 1993 Mimbres RMP (BLM 1993) of protecting riparian values. The purpose of the proposed recreation management actions is to implement the land use planning decision made in the 1993 Mimbres RMP that calls for the continued management of the Gila Lower Box SRMA in accordance with the 1985 Gila River Coordinated RMP (BLM 1985). The 1985 plan called for a "recreation activity plan" to be developed for the Gila Lower Box (BLM 1985). The goals of the RAMP are to balance natural resource preservation with recreation use and to protect the Gila Lower Box's unique and special resources through the proper management of public recreation in the RAMP planning area. This includes managing and improving current recreation opportunities in the planning area and meeting the management requirements of special designations in and around the planning area. Management directives may evolve in the planning area to meet the demands of increased visitation.

The purpose of the Gila Lower Box RAMP is to guide how the BLM manages recreation on BLM-administered lands in the Gila Lower Box planning area. The approximately 11,200-acre (4,532 hectare) Gila Lower Box planning area is primarily used for recreational off-highway vehicle (OHV) use, birding, camping, fishing, some boating (when adequate flows exist in the Gila River) and livestock grazing (to the extent it is compatible with other objectives). The RAMP includes a combination of broad direction and specific strategies to inform the future implementation of BLM recreation facilities, programs, and enforcement consistent with the SRMA, area of critical environmental concern (ACEC), and wilderness study area (WSA)

designations and associated management objectives. The proposed RAMP does not specifically authorize individual projects or activities. Site-specific actions will be subject to future and separate Endangered Species Act section 7(a)(2) consultations.

Guiding principles provide overarching direction for the BLM in implementing the BLM's mission consistent with the values of the SRMA. The BLM will consider the fundamental objectives outlined in the Gila River Coordinated RMP, and summarized in the BE, in managing visitor use by aligning activities, services, and experiences with the purpose to preserve primitive recreation opportunities (BLM 1985). The following principles will guide the BLM's visitor use management in the Gila Lower Box planning area:

- **Primitive Recreation Opportunities**. Provide safe, sustainable, and accessible primitive recreation opportunities in the Gila Lower Box planning area for locals and visitors; and enhance opportunities for solitude.
- **Resource Protection**. Protect the unique and special natural and cultural resources that contribute to the special designations in and around the planning area.

Management Goals, Strategies, and Decisions

The Gila River Coordination RMP and the guiding principles above, provide overarching direction for the BLM in managing the Gila Lower Box planning area and the development of the RAMP. Additionally, the RAMP identifies components including goals, strategies, and decisions for the BLM's management of recreation in the Gila Lower Box planning area.

- Goals provide high-level direction for managing recreation in the Gila Lower Box planning area. These are the management conditions which the BLM would move towards. Goals are aspirational in nature and describe the general conditions toward which the BLM intends to allocate resources during implementation. The list of goals is included below and additional information on goals can be found in Appendix A (of this opinion), Gila Lower Box RAMP draft environmental assessment (BLM 2023a), and Gila Lower Box RAMP BE (BLM 2023b).
    - Goal 1.1 Resource Protection. Emphasis resource protection while improving the quality of outdoor recreation opportunities.
    - Goal 1.2 Recreation Uses and Activities. Facilitate visitor participation through compatible uses while minimizing, mitigating, or prohibiting conflicts on resources.
    - Goal 1.3 Recreation Infrastructure and Facilities. Maintain or construct infrastructure or facilities while improving recreation and protecting resources.
    - Goal 1.4 Travel, Access, and Trails Management. Maintain designated road and trail systems to protect resources and provide recreation opportunities.
    - Goal 1.5 Education, Interpretation, and Partnerships. Provide educational and interpretive opportunities.
    - Goal 1.6 Visitor Health and Safety. Provide enjoyable and safe experiences.
- Strategies are more detailed steps the BLM proposes to implement the goals. In some cases, strategies are specific decisions the BLM intends to make to achieve the goals for the RAMP.
- Decisions are specific actions the BLM would take to achieve the goals and strategies.

Goals, strategies, and decisions align with the guiding principles and achieve the overarching management objectives of the proposed Gila Lower Box RAMP. These components are labeled in the RAMP, cited below by their label identification (ex. A.6.2.1, A.6.2.1.1, etc.), and included in Appendix A (of this opinion). In addition to these components, the RAMP includes project elements such as design features, adaptive management, and management indicators which are included below. Additional information on these can be found in Appendix B (of this opinion), Gila Lower Box RAMP draft environmental assessment (BLM 2023a), and Gila Lower Box RAMP BE (BLM 2023b).

- Design features will be included to limit effect or avoid excessive impacts on various resources during construction, however some of these design features have the potential to effect listed species and habitat.
- Adaptive management will allow the BLM to consider how its management actions are implemented and how to adjust management based on the results of monitoring. The adaptive management proposed in the RAMP framework is divided into four major elements: 1) build the foundation with the broad management in the Gila River Coordination RMP; 2) define specific visitor use management direction for the Gila Lower Box planning area in the RAMP; 3) identify adaptive monitoring and management strategies; and, 4) implement, monitor, evaluate, and adjust. These elements provide increasingly detailed management direction from the Gila River Coordination RMP to the in-field monitoring and mitigation to move resources toward the desired characteristics detailed in the proposed RAMP. Further, the process of adaptive management is intended to be flexible, iterative, and adaptable while including the application of relevant laws and regulations, BLM guidance, and public involvement.
- Management indicators serve as measurements and data sources that may signal a need to adjust management of recreation or resources. Changes in these indicators, such as increases in the evidence of resource damage or number of emergency responses, may indicate a need for change.

The RAMP's purpose includes meeting the management requirements and standards for protection of special designation areas. Most of the Gila Lower Box Wilderness Study Area (WSA) overlaps the planning area, and a small portion of the Blue Creek WSA (less than 5 acres [2 hectares]) overlaps the northeastern portion of the planning area. BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012a), provides management guidance to preserve the wilderness characteristics in WSAs, so as not to impair the suitability of such areas for designation as wilderness. This is known as the non-impairment standard. The BLM manages WSAs according to a non-impairment (BLM 2012a) standard until Congress either designates the areas as wilderness or releases them for other purposes.

The Gila Lower Box ACEC also overlaps the planning area. In accordance with BLM Manual 1613 (BLM 1988), the BLM must manage ACECs to protect the relevant and important values for which they were designated. The Mimbres RMP identified management actions to be applied in the ACEC to protect its relevant and important values, which include habitat for state-listed and federal candidate species and its status as the largest and most significant riparian area in the Mimbres RMP planning area (BLM 1993). The management actions from the Mimbres RMP include developing a primitive recreation management area and parking areas, closing it to

motorized vehicle use (except Nichols Canyon Road), and managing it for primitive and semiprimitive motorized classes.

Additionally, the Mimbres RMP identified the Gila Lower Box stretch of the Gila River as eligible for potential inclusion in the National Wildlife and Scenic Rivers System (BLM 1993). The river is therefore subject to management under BLM Manual 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management (BLM 2012b).

The BLM would complete and implement a RAMP for five recreation sites on the Gila Lower Box: Nichols Canyon, Gauge Dispersed Camping Area, Fisherman's Point, Spring on the Bluff, and Caprock Campground. The RAMP would involve the construction of recreational facilities, such as parking areas, trailheads, and primitive camping areas; the repair and realignment of certain roads and trails; and changes to the types of travel allowed on certain roads. The proposed RAMP does not specifically authorize individual projects or activities. Site-specific actions will be subject to future and separate Endangered Species Act (ESA) section 7(a)(2) consultations.

Conservation Measures

The following conservation measures (called design features in the BE) are included in the proposed action. These are measures to minimize impacts on existing vegetation and will be considered for implementation on a case-by-case basis. These mostly refer to elements implemented in upland areas away from the riparian area, however some are measures that could occur in riparian vegetation.

- Protect roots from damage during excavation.
- Mulch cleared areas.
- Control planting times.
- Furrowing slopes.
- Planting holes on cut/fill slopes.
- Selecting only native plant species.
- Stockpiling and reusing topsoil.
- Fertilizing, mulching, and watering vegetation.
- Partial cutting of woody vegetation as opposed to clear-cutting.
- Feathering/thinning edges.
- Disposing of all slash.
- Controlling construction access.
- Utilizing existing roads.
- Limiting work within the construction area.
- Minimizing clearing size.
- Grass seeding of cleared areas.
- Using retaining walls on fill slopes.

Below are species-specific conservation measures included in the BE.

Flycatcher and cuckoo

- No vegetation clearing will occur during the migratory bird breeding season (March through August). If vegetation clearing must occur between March and August, pre-construction flycatcher and cuckoo protocol surveys for active bird nests will be conducted by a qualified biologist in all suitable nesting habitat that will be removed.
- If active bird nests are identified within the project limits, construction activities will avoid disturbing the nest(s). A qualified biologist will determine the appropriate avoidance strategy until the nestlings have fledged from the nest and the nest is no longer active.
- All temporarily impacted habitats in the Action Area will be recontoured and revegetated or reseeded so that they become available for use by wildlife species.

Frog, both gartersnakes, minnow, and spikedace

- Annual monitoring of loach minnow, spikedace, and other fish species in the Gila River mainstem with species experts, BLM contractors and personnel and in cooperation with U.S. Forest Service (USFS), USFWS, New Mexico Department of Game and Fish (NMDGF) and others.
- Opportunistic inventory and monitoring of Gila River tributaries.
- Participate in various working groups, recovery teams and committees including the Gila River Basin Native Fish Conservation Program (formerly the Central Arizona Project fund transfer program) since 2005.

All listed species

- Over $300,000 spent on Gila River Lower Box livestock exclusion since 1996.
- Fence maintenance will be continued into the future at increasing rate.
- BLM staff participates with multiple teams, committees, or groups like the Gila River Basin Native Fish Conservation Program (formerly the CAP fund transfer program) and New Mexico Chiricahua leopard frog Conservation and Recovery Working Group.

Since the proposed action is a management plan, site specific on-the-ground activities and additional conservation measures will need to be analyzed later when more information becomes available for those activities and measures.

Description of 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. The action area is typically larger than the area directly affected by the action. In this context, the action area for this consultation will include the entirety of the BLM lower box area.

The Gila Lower Box Canyon RAMP planning area is in Hidalgo and Grant Counties, New Mexico. It is approximately 20 miles northwest of the town of Lordsburg (Figure 1). The

planning area includes the Gila Lower Box Wilderness Study Area (WSA), the Gila Lower Box Area of Critical Environmental Concern (ACEC), and the Gila Lower Box Special Recreation Management Area (SRMA). The planning area boundary largely follows the boundary of the Gila Lower Box SRMA; however, it extends across a wider area to the southeast to include the locations of all proposed recreation features in the RAMP.

The Gila Lower Box SRMA (9,630 acres) was designated in the 1985 Gila River Coordinated RMP. The Gila Lower Box ACEC (6,490 acres) was designated in the Mimbres RMP in 1993. The Gila Lower Box WSA (8,555 acres) was established in 1980. A small portion of the Blue Creek WSA (less than 5 acres) also extends into the northeastern portion of the planning area (Figure 1).

The Gila Lower Box RAMP planning area represents one of the most biologically diverse river corridors in southwestern New Mexico. An oasis in the desert, it is known as one of the best bird-watching areas in New Mexico and contains very high biological diversity; 265 bird species, 67 mammal species, 17 fish species, 12 amphibian species, and 54 reptile species have been recorded. The planning area also contains numerous archaeological resources. In addition, the Mimbres RMP (BLM 1993) identified the Gila Lower Box stretch of the Gila River as eligible for potential inclusion in the National Wild and Scenic River System. A bill proposing it for designation is currently being considered by Congress.

The planning area experiences mostly seasonal and local traffic. Current recreation uses include off-highway vehicle (OHV) use, birdwatching, some float boating (when adequate flows exist in the Gila River), camping, hunting, and fishing. Motorized travel off designated routes, particularly in the streambed, is causing disturbance to biological resources. This has occurred at Sunset Dam in the planning area's western portion, where there is illegal driving into the WSA and on the riverbed, and Nichols Canyon. Since Nichols Canyon Road washed out, Nichols Canyon has experienced an increase in illegal driving over the floodplain and in the river itself down into the upper box. Dispersed camping is also concentrated along the river, which results in trash left in the area. The increase in recreation along the river is also causing degradation of riverbanks and increased concerns for soil sedimentation.

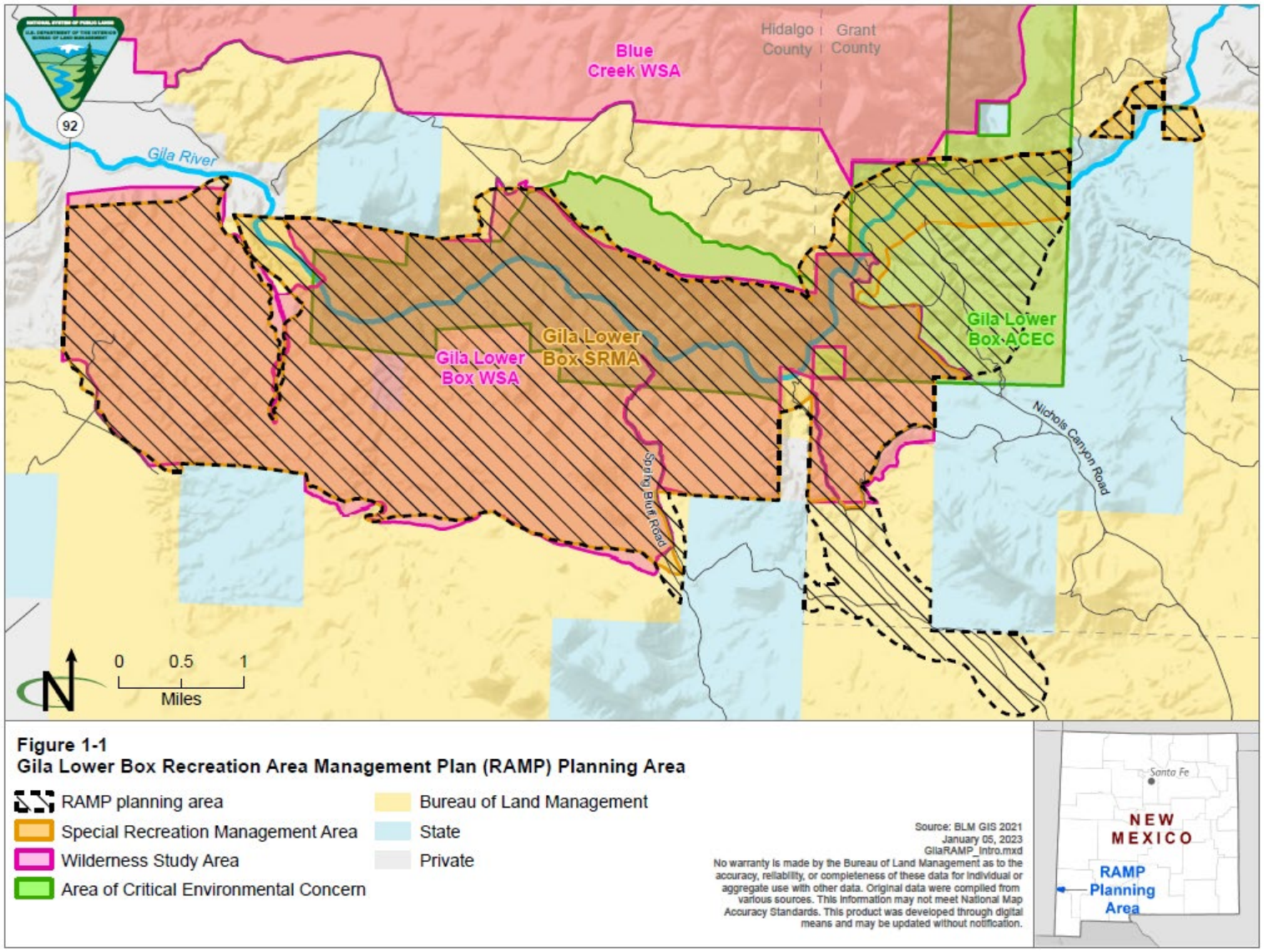

Figure 1. Location of Bureau of Land Management Gila Lower Box Recreation Area in Grant and Hidalgo Counties, New Mexico from Gila Lower Box Recreation Area Management Plan draft Environmental Assessment (from BLM 2023a).

Analytical Framework for the Jeopardy and Adverse Modification Determinations

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this biological opinion relies on four components in our evaluation for each species: (1) the Status of the Species, which evaluates the species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the 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) the Effects of the Action, which determines the consequences of the proposed Federal action on the species that are reasonably certain to occur as a result of the proposed action; and, (4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the species' current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

The jeopardy analysis places an emphasis on consideration of the range-wide survival and recovery needs of the species and the role of the action area in the survival and recovery of the species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

In accordance with policy and regulation, the adverse modification analysis in this biological opinion relies on four components: 1) the Status of Designated Critical Habitat, which evaluates the range-wide condition of designated critical habitat for the species in terms of physical or biological features (PBFs), the factors responsible for that condition, and the intended recovery function of the designated critical habitat overall; 2) the Environmental Baseline, which evaluates the condition of the designated 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 determines the consequences of the proposed Federal action on the PBFs that are reasonably certain to occur as a result of the proposed action and how they will influence the recovery role of affected designated critical habitat units; and, 4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the PBFs, and how they will influence the recovery role of affected designated critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on the designated critical habitat are evaluated in the context of the condition of the designated critical habitat unit, taking into account any cumulative effects, to determine if the designated critical habitat unit would remain functional (or would retain the current ability for

the PBFs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the species.

Status of Species and Critical Habitat

Chiricahua Leopard Frog

The Chiricahua leopard frog (frog) was originally listed as a threatened species under the ESA with the taxonomic scientific name *Rana chiricahuensis* (USFWS 2002a). A summary of the species and status of the frog can be found in the Federal Register final rule listing document (USFWS 2002a) and in the two most recent 5-year reviews for the frog (USFWS 2011; 2023b). A Federal Register final rule published on March 20, 2012 (USFWS 2012b), designated critical habitat and included a reassessment of the status and threats to the species along with a taxonomic scientific name change to *Lithobates chiricahuensis*. Additional information regarding the status of the species can be found in the frog's Final Recovery Plan (USFWS 2007). These documents are hereby incorporated by reference.

Description and Life History

The frog is distinguished from other members of the leopard frog complex by a combination of characters, including a distinctive pattern on the rear of the thigh consisting of small, raised, cream-colored spots or tubercles (wart-like projections) on a dark background; folds on the back and sides that, towards the rear, are interrupted and deflected towards the middle of the body; stocky body proportions; relatively rough skin on the back and sides; eyes that are positioned relatively high on the head; and often green coloration on the head and back (Platz and Mecham 1979, Degenhardt *et al.* 1996). The species also has a distinctive call consisting of a relatively long snore of 1 to 2 seconds in duration (Platz and Mecham 1979, Davidson 1996). Overall body lengths of adults range from approximately 2.1 inches (in; 5.3 centimeters [cm]) to 5.4 in (13.7 cm) (Platz and Mecham 1979).

The life history of the frog can be characterized as a complex life cycle, consisting of eggs and larvae that are entirely aquatic and adults who are primarily aquatic but may be terrestrial at times. Females attach spherical masses of fertilized eggs, ranging in number from 300 to 1,485 eggs, to submerged vegetation (Sredl and Jennings 2005). Egg masses of this species have been reported in all months but reports of egg laying (oviposition) in June and November through January are uncommon (Zweifel 1968, Frost and Bagnara 1977, Frost and Platz 1983, Scott and Jennings 1985, Sredl and Jennings 2005). Frost and Platz (1983) divided egg-laying activity into two distinct periods with respect to elevation. Populations at elevations below 5,900 feet (ft; 1,798 meters [m]) tend to lay eggs from spring through late summer, with most activity taking place before June. Populations above 5,900 ft bred in June, July, and August. Scott and Jennings (1985) found a similar seasonal pattern of reproductive activity in New Mexico (February through September), as did Frost and Platz (1983), although they did not note elevational differences. Additionally, Scott and Jennings (1985) noted reduced egg laying in May and June. Zweifel (1968) noted that breeding in the early part of the year appeared to be limited to sites where water temperatures do not get too low, such as spring-fed sites. Frogs at warm springs may lay eggs year-round due to elevated water temperatures as compared to most breeding habitat (Scott and Jennings 1985).

Eggs hatch in approximately 8 to 14 days depending on temperature (Sredl and Jennings 2005). After hatching, tadpoles remain in the water, where they feed and grow. Tadpoles turn into juvenile frogs in 3 to 9 months (Sredl and Jennings 2005). Juvenile frogs are typically 1.4 to 1.6 in (35 to 40 millimeters [mm]) in overall body length. Males reach sexual maturity at 2.1 to 2.2 in (5.3 to 5.6 cm), a size they can attain in less than a year (Sredl and Jennings 2005).

The diet of this frog includes primarily invertebrates such as beetles, true bugs, and flies, but fish and snails are also taken (Christman and Cummer 2006). Chiricahua leopard frogs can be found active both day and night, but adults tend to be active more at night than juveniles (Sredl and Jennings 2005). Frogs presumably experience very high mortality (greater than 90 percent) in the egg and early tadpole stages, high mortality when the tadpole turns into a juvenile frog, and then relatively low mortality when the frogs are adults (Zug *et al.* 2001, USFWS 2007).

This frog occupies cienegas (mid-elevation wetland communities often surrounded by arid environments), pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations from 3,281 to 8,890 ft (1,000 to 2,694 m) in Arizona, New Mexico, and Mexico. Shallow waters with emergent and perimeter vegetation provide tadpole and adult basking habitats, while deeper water, root masses, and undercut banks provide refuge from predators and potential sites for hibernation (Sredl and Jennings 2005). Most perennial waters supporting frogs possess fractured rock substrate, emergent or submergent vegetation, deep water, root masses, undercut banks, or some combination of these features that frogs may use as refugia from predators and climatic conditions. Frogs may over-winter at or near breeding sites, although these microsites have not been studied. Other leopard frog species typically over-winter at the bottom of well-oxygenated ponds and may bury themselves in the mud (Nussbaum *et al.* 1983, Harding 1997).

Distribution and Status

The range of this frog in the United States includes central and southeastern Arizona and west central and southwestern New Mexico. In Mexico, it includes northeastern Sonora, the Sierra Madre Occidental of northwestern and west-central Chihuahua, and possibly as far south as northern Durango (Platz and Mecham 1984; Degenhardt *et al.* 1996; Sredl and Jennings 2005; Brennan and Holycross 2006; Lemos-Espinal and Smith 2007; Rorabaugh 2008). The distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially Lemos-Espinal's leopard frog (*Lithobates lemosespinali*)) in the southern part of the range of this frog. Based on 2010 data, the species still occurs in most major drainages in Arizona and New Mexico where it occurred historically; the exception to this is the Little Colorado River drainage in Arizona. In Arizona and New Mexico, the species likely occurs within about 14 percent and 16 to 19 percent of its historical localities, respectively (USFWS 2007).

In 2011, the Service completed a 5-year status review (USFWS 2011) which estimated that there were 90, 29, and 45 frog occupied sites in central and southeastern Arizona, west-central and southwestern New Mexico, and northern Sonora and the Sierra Madre Occidental of Chihuahua and Durango, Mexico, respectively. Occupied sites range from one individual frog (i.e., egg mass, tadpole, metamorph, or adult) to a robust breeding population. The most recent 5-year status review (USFWS 2023b) indicated that from 2016 to 2022, the total number of sites occupied by frogs averaged 120 for Arizona (ranging from 65 in 2021 to 155 in 2017 and 2018)

and 27 for New Mexico (ranging from 15 in 2019 to 37 in 2020 and 2021) however it should be noted that not all occupied sites in Arizona and New Mexico are monitored every year. The occupied sites have increased in Arizona primarily as the result of active management, including removing predatory American bullfrogs (*Lithobates catesbeianus*), habitat creation and enhancement, and reintroduction of frogs.

Threats

Range-wide, the most serious threat to the frog includes predation by non-native organisms, especially American bullfrogs, spiny-rayed fishes (*Micropterus spp.; Lepomis spp.*) and non-native crayfish (*Orconectes virilis; Orconectes spp.*). The introduced crayfish (*Orconectes spp*.) is having major negative effects on native populations of leopard frogs in North America (Kats and Ferrer 2003), and likely is having adverse effects to this frog in Arizona and New Mexico. American bullfrogs are also significant predators of native frogs. Recent bullfrog eradication efforts in southern Arizona (Atascosa Mountains and Cienega Valley) appear to have established conditions favorable to the reestablishment of this frog species. Efforts are underway to expand bullfrog eradication in New Mexico. Other major threats to the frog include a fungal skin disease (chytridiomycosis or chytrid) that is globally killing frogs and toads. This disease is caused by the chytrid fungus *Batrachochytrium dendrobatidis* (Bd), a globally occurring pathogen. Habitat loss, degradation, and fragmentation from water diversion, pollution, groundwater pumping, drought, floods, wildfires, and improper grazing practices, and disruption of metapopulation dynamics (relationships among populations of frogs), also adversely affect the species and limit its recovery. Climate change and increased ultraviolet radiation could indirectly impact this species as well in the future through increased temperatures and more prolonged and severe droughts.

Narrow-headed Gartersnake and Critical Habitat

The narrow-headed gartersnake (*Thamnophis rufipunctatus*) was listed as a threatened species under the ESA on July 8, 2014 (USFWS 2014a). A summary of the species and status of the gartersnake can be found in the Federal Register final rule listing document (USFWS 2014a). A final rule published on October 21, 2021 (USFWS 2021c), designated critical habitat for the species. There is no draft or final Recovery Plan for the gartersnake at this time. The documents listed above are hereby incorporated by reference.

Description and Life History

The narrow-headed gartersnake is a small to medium-sized snake with a maximum length of 112 cm (44 in) (Painter and Hibbitts 1996). Its eyes are set high on its unusually elongated head, which narrows to the snout, and it lacks striping on the dorsum (top) and sides, which distinguishes its appearance from other gartersnake species with which it could co-occur (Rosen and Schwalbe 1988). The base color is usually tan or grey, brown with conspicuous brown, black, or reddish spots that become indistinct towards the tail (Rosen and Schwalbe 1988, Boundy 1994). The scales are keeled.

The narrow-headed gartersnake is widely considered to be one of the most aquatic of all gartersnakes (Drummond and Marcias Garcia 1983; Rossman *et al.* 1996), as a function of its

prey specificity. Gartersnakes eat fish (Rosen and Schwalbe 1988; Degenhardt *et al.* 1996; Rossman *et al.* 1996; Nowak and Santana-Bendix 2002; Nowak 2006; Jennings and Christman 2012) and are considered specialists in this regard. This species is an underwater ambush hunter, believed to be heavily dependent on visual cues when foraging (de Queiroz 2003; Hibbitts and Fitzgerald 2005). Therefore, sediment and turbidity levels within the water column may affect foraging success. Native fish species considered as prey for the narrow-headed gartersnake include Sonora sucker (*Catostomus insignis*), desert sucker (*C. clarki*), speckled dace (*Rhinichthys osculus*), roundtail chub (*Gila robusta*), Gila chub (*Gila intermedia*), and headwater chub (*Gila nigra*) (Rosen and Schwalbe 1988; Degenhardt *et al.* 1996) but all native fish species of the appropriate size class are expected as prey. Nonnative predatory fish species in their fingerling size classes are also used as prey by gartersnakes, including brown trout (*Salmo trutta*) (Rosen and Schwalbe 1988; Nowak and Santana-Bendix 2002; Nowak 2006), green sunfish (*Lepomis cyanellus*) (Fleharty 1967), smallmouth bass (*Micropterus dolomieu*) (Lopez, pers. comm, 2010), and rock bass (*Ambloplites rupestris*) (Wilcox 2015). However, nonnative fish with spiny dorsal fins are not generally considered suitable prey items due to the risk of injury to gartersnakes during ingestion and because of where they tend to occur in the water column (Nowak and Santana-Bendix 2002).

Growth rates of wild narrow-headed gartersnakes can be significant; indicating that growth to maturity may be achieved over a relatively short period of time, perhaps as short as 2 years of age (Jennings and Christman 2012). Gartersnakes are viviparous, breeding annually. Females give birth to 4 to 17 offspring from early- to mid-July (Jennings and Christman 2012) into early August, perhaps earlier at lower elevations (Rosen and Schwalbe 1988). Longevity in this species may be as long as 10 years in the wild (Rosen and Schwalbe 1988).

This species is strongly associated with clear, rocky, often perennial streams, using predominantly pool and riffle habitat including cobbles and boulders (Rosen and Schwalbe 1988, Degenhardt *et al.* 1996, Rossman *et al.* 1996, Nowak and Santana-Bendix 2002, Ernst and Ernst 2003). Narrow-headed gartersnakes also use terrestrial, upland habitat for cover and thermoregulatory needs, such as shelter during periods of cold-season dormancy, basking, the gestation of young, facilitating digestion, avoiding flood events.

Distribution and Status

Historically, the species existed in headwater streams of the Gila River subbasin that drain the Mogollon Rim and the White Mountains in Arizona and the Gila Wilderness in New Mexico. Major subbasins in its historical distribution included the Salt and Verde River subbasins in Arizona and the San Francisco and Gila River subbasins in New Mexico (Holycross *et al.* 2006). Holycross *et al.* (2006) suspect the species was likely not historically present in the lowest reaches of the Salt, Verde, and Gila Rivers, even where perennial flow persisted.

In 2011, the only remaining narrow-headed gartersnake populations where the species could reliably be found were located at: Whitewater Creek (NM), Tularosa River (NM), Diamond Creek (NM), Middle Fork Gila River (NM), and Oak Creek Canyon (AZ). However, in 2012 the Whitewater-Baldy fire burned significant areas within the Whitewater Creek watershed. Narrow-headed gartersnake populations in Whitewater Creek and the Middle Fork Gila River were significantly affected by the fire; due to heavy ash flow and lack of prey base. The narrow-

headed gartersnake population in the Middle Fork Gila River appears to be stabilizing with the return of native fish (Christman 2016). From a combination of post-fire effects and a non-native fish removal project (NMDGF 2017), the Whitewater Creek population is now considered extirpated. Based on the most recent capture rates and survey results from Diamond Creek, New Mexico (GCWG 2016), the crayfish population has reached a high density, and the narrow-headed gartersnake population may be in a potentially sharp decline. Survey data from the Tularosa River from 2019 found crayfish densities to be significantly rising, which is a cause for concern for the viability of that population (Jennings *et al.* 2019).

Threats

Some species of predatory nonnative species such as bass (*Micropterus* spp.), flathead catfish (*Pylodictis* sp.), channel catfish (*Ictalurus* spp.), bullheads (*Ameiurus* spp.), sunfish (*Lepomis* spp.), crappie (*Pomoxis* spp.), brown trout (*Salmo trutta*), American bullfrogs, crayfish (*Orconectes virilis*) and red swamp crayfish (*Procambarus clarkii*) are the most significant threat to narrow-headed gartersnakes and their prey base. Predatory nonnative fish and bullfrogs affect narrow-headed gartersnake populations via direct and indirect community interactions. In contrast, crayfish also affect narrow-headed gartersnakes via effects to their physical habitat in addition to via adverse community interactions (Gonçalves-Loureiro *et al.* 2015).

In the southwestern United States, projected climate change includes increasing temperatures, decreasing precipitation, decreasing snowpack, and decreasing runoff and streamflow (Cayan *et al.* 2013). Increasing temperature increases the evaporation and transpiration of surface water, further reducing the amount of water for gartersnake prey species.

Since 2002, over 607,000 hectares (1,500,000 acres) have burned due to high-intensity wildfires within the range of the gartersnake (Jones *et al.* 2014). High-intensity wildfires lead to excessive sedimentation and ash flows which can, in turn, result in fish kills. The past decade has seen two of the largest fires in the region, which coincided with declines in native fish and narrow-headed gartersnake population numbers (Christman 2016). Declines in population numbers increase the risk of detrimental effects to the species due to genetic drift (Wood *et al.* 2018). Other threats include human recreation, road maintenance, environmental contaminants, and mortality from entanglement (USFWS 2013b).

Narrow-headed Gartersnake Critical Habitat

The 2021 final critical habitat rule for the narrow-headed gartersnake designated eight units comprising approximately 447 stream miles (719 kilometers) within a maximum 326-ft (100-m) lateral extent of the active stream channel. These eight units occur in an area of 23,785 acres (9,625 hectares) in Greenlee, Apache, Yavapai, Gila, and Coconino Counties, Arizona, and Grant, Hidalgo, and Catron Counties, New Mexico (USFWS 2021c). The purpose of designating critical habitat is to conserve the PBFs essential to the conservation of the species and which may require special management consideration or protection. Based on our current knowledge of the physical or biological features and habitat characteristics required to sustain the species' life-history processes, we determined that the PBFs specific to the narrow-headed gartersnake are:

I. Perennial streams or spatially intermittent streams that provide both aquatic and terrestrial habitat that allows for immigration, emigration, and maintenance of population connectivity of narrow-headed gartersnakes and contain:

   A. Pools, riffles, and cobble and boulder substrate, with a low amount of fine sediment and substrate embeddedness;

   B. Organic and natural inorganic structural features (*e.g.,* cobble bars, rock piles, large boulders, logs or stumps, aquatic vegetation, vegetated islands, logs, and debris jams) in the stream channel for basking, thermoregulation, shelter, prey base maintenance, and protection from predators;

   C. Water quality that meets or exceeds applicable State surface water quality standards; and

   D. Terrestrial habitat up to 328 ft (100 m) from the active stream channel (water's edge) that includes flood debris, rock piles, and rock walls containing cracks and crevices, small mammal burrows, downed woody debris, and streamside vegetation (*e.g.,* alder, willow, sedges, and shrubs) for thermoregulation, shelter, brumation, and protection from predators throughout the year.

II. Hydrologic processes that maintain aquatic and riparian habitat through:

   A. A natural flow regime that allows for periodic flooding, or if flows are modified or regulated, a flow regime that allows for the movement of water, sediment, nutrients, and debris through the stream network, as well as maintenance of native fish populations; and

   B. Physical hydrologic and geomorphic connection between the active stream channel and its adjacent terrestrial areas.

III. A combination of native fishes, and soft-rayed, nonnative fish species such that prey availability occurs across seasons and years.

IV. An absence of nonnative aquatic predators, such as fish species of the families Centrarchidae and Ictaluridae, American bullfrogs, and/or crayfish, or occurrence of these nonnative species at low enough levels such that recruitment of narrow-headed gartersnakes is not inhibited and maintenance of viable prey populations is still occurring.

V. Elevations of 2,300 to 8,200 ft (700 to 2,500 m).

Northern Mexican Gartersnake

The northern Mexican gartersnake (*Thamnophis eques megalops*) was listed as a threatened species under the ESA on July 8, 2014 (USFWS 2014a). A summary of the species and status of the northern Mexican gartersnake can be found in the Federal Register final rule listing document (USFWS 2014a). A final rule published on April 28, 2021 (USFWS 2021b), designated critical habitat for the species. There is no draft or final Recovery Plan for the

northern Mexican gartersnake at this time. The documents listed above are hereby incorporated by reference.

Description and Life History

The northern Mexican gartersnake, which reaches up to 44 in (112 cm) total length, 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. It may occur with other native gartersnake species and can be difficult to identify because of its similarity of appearance to other native gartersnake species. The position of the lateral stripe in the anterior portion of the body is a key diagnostic feature. If this stripe invades the fourth scale row, it is conclusive as a northern Mexican gartersnake.

The northern Mexican gartersnake is often found in riparian habitats and may spend time in a terrestrial habitat removed from water (Emmons and Nowak 2016). Aquatic habitat is used for prey acquisition and can be either lentic (such as stock tanks, ponds, or cienegas) or lotic (low-gradient streams). Sexual maturity in northern Mexican gartersnakes occurs at two years of age in males and two to three years in females (Rosen and Schwalbe 1988). Northern Mexican gartersnakes are viviparous. Researchers have observed mating in April and May followed by the live birth of between 7 and 38 newborns from June through September (Rosen and Schwalbe 1988, Degenhardt et al. 1996, Nowak and Boyarski 2012).

Distribution and Status

Historically, the northern Mexican gartersnake occurred 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. When the northern Mexican gartersnake was listed (USFWS 2014a), there were only five northern Mexican gartersnake populations in the United States, where the subspecies remained reliably detected and was considered viable, and all are located in Arizona. The five known populations were: (1) The Page Springs and Bubbling Ponds State Fish Hatcheries along Oak Creek, (2) lower Tonto Creek, (3) the upper Santa Cruz River in the San Rafael Valley, (4) the Bill Williams River, and (5) the upper and middle Verde River. In New Mexico, the northern Mexican gartersnake was captured in 2013 along the Gila River in the vicinity of the Highway 180 crossing (Hotle 2013); two individuals were recorded as road kills (in 2016 and 2018) in Grant County, near Duck Creek and the Gila River, around the cities of Cliff/Gila (Geluso 2018), and this species is considered to occur in extremely low population densities within its historical distribution along the Gila River and Mule Creek. Existing sampling data suggest that perhaps only four populations of northern Mexican gartersnakes in the United States are considered relatively dense where the species remains somewhat reliably detected: (1) the Aquatic Research and Conservation Center (formerly known as the Page Springs and Bubbling Ponds State Fish Hatcheries) adjacent to Oak Creek, (2) lower Tonto Creek, (3) upper Santa Cruz River in the San Rafael Valley, and (4) the upper and middle Verde River.

Threats

Regardless of how they got into the wild, harmful nonnative species are now widespread and present throughout the range of the northern Mexican gartersnake. Some species of predatory nonnative species such as bass, flathead catfish, channel catfish, bullheads, sunfish, crappie, brown trout, American bullfrogs, crayfish and specifically the red swamp crayfish are significant threats to northern Mexican gartersnakes and their prey base. Predatory nonnative fish and bullfrogs affect gartersnake populations via direct and indirect community interactions. In contrast, crayfish also affect gartersnakes via effects to their physical habitat in addition to via adverse community interactions (Gonçalves-Loureiro *et al.* 2015).

Land uses that result in the dewatering of habitat, combined with increasing drought, have destroyed significant amounts of habitat throughout the northern Mexican gartersnake's range and have, therefore, reduced its distribution within several subbasins. In the southwestern United States, projected climate change includes increasing temperatures, decreasing precipitation, decreasing snowpack, and decreasing runoff and streamflow (Cayan *et al.* 2013). Increasing temperature increases the evaporation and transpiration of surface water, further reducing the amount of water for gartersnake prey species.

Southwestern Willow Flycatcher and Critical Habitat

The southwestern willow flycatcher (*Empidonax traillii extimus*; "flycatcher") was listed as an endangered species under the ESA on February 27, 1995 (USFWS 1995). A summary of the species and status of the flycatcher can be found in the Federal Register final rule listing document (USFWS 1995) and in the most recent 5-year review for the flycatcher (USFWS 2014b). A final rule published on January 3, 2013 (USFWS 2013a), redesignated critical habitat for the species. Additional information regarding the status of the species can be found in the flycatcher's Final Recovery Plan (USFWS 2002b). These documents are hereby incorporated by reference.

Description and Life History

The flycatcher is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.8 in (15 cm) in length. It is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993). It is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical breeding range of the flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

Flycatchers arrive on breeding grounds in Arizona and New Mexico in late April and early May. Nesting begins in May and early June. The average clutch size is three to four eggs. The time from egg-laying to fledging is short (28 days), and parental care of fledglings can last 15 days and possibly much longer. The flycatcher is an insectivore and feeds on small to medium-sized

insects. They employ "sit-and-wait" foraging, with long periods of perching interspersed with foraging bouts (Service 2002b).

The flycatcher breeds in dense riparian habitats from sea level in California to approximately 8,500 ft in Arizona and southwestern Colorado (Sogge *et al*. 2010, Service 1995, 2002b). Historical egg/nest collections and species' descriptions throughout its range describe the flycatcher's widespread use of willow (*Salix* spp.) for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, Unitt 1987). Currently, flycatchers primarily use saltcedar (*Tamarix* sp.), Gooddings willow (*Salix gooddingii*), coyote willow (*Salix exigua*), Geyer willow (*Salix geyeriana*), boxelder (*Acer negundo*), Russian olive (*Elaeagnus angustifolio*), and live oak (*Quercus agrifolia*) for nesting. Other plant species less commonly used for nesting include buttonbush (*Cephalanthus* sp.), black twinberry (*Lonicera involucrata*), cottonwood (*Populus* spp.), white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* spp.). Based on the diversity of plant species composition and complexity of habitat structure, we described four basic southwestern willow flycatcher habitat types: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge *et al.* 1997 and 2010, Service 2002b).

The flycatcher's habitat is dynamic and can change rapidly due to its location along waterways which can frequently flood. Flooding is an important process for the long-term maintenance of elevated groundwater aquifers, and recycling and maintenance of breeding habitat (Poff *et al*. 1997). Nesting habitat can grow into and out of suitability quickly. Saltcedar and willow trees can develop from seeds to nesting habitat in about four to five years. Heavy precipitation runoff can remove/reduce habitat suitability in a day. Also, through time, river channels, floodplain width, vegetation location, and vegetation density may change, affecting habitat quality. The flycatcher's use of habitat in different successional stages can also be dynamic. For example, over-mature or young habitat not suitable for nest placement can be occupied and used for foraging and shelter by migrating, breeding, dispersing, or non-territorial flycatchers (McLeod *et al.* 2005, Cardinal and Paxton 2005). Overall, flycatcher habitat can quickly change and vary in suitability, location, use, and occupancy over time (Finch and Stoleson 2000).

Distribution and Status

Throughout the range of the flycatcher and since completion of the Recovery Plan, the overall abundance of flycatcher territories has increased, but not every Recovery Unit (RU) or Management Unit has increased (USFWS 2013a). Since 2002, the overall estimated number of flycatcher territories rangewide has increased from 986 (USFWS 2002b) to 1,299 (Durst *et al.* 2008). In particular, there have been increases in the Gila and Rio Grande RUs, but little change or declines in numbers within the Lower Colorado, Basin and Range, Upper Colorado River, and Coastal California RUs. Tracking the distribution and abundance of the flycatcher has become more challenging due to the reduced amount of survey effort (Durst *et al*. 2008).

As of the most recent flycatcher range-wide estimate there were 308 known flycatcher breeding sites in California, Nevada, Arizona, Utah, New Mexico, and Colorado (all sites from 1993 to 2012 where a territorial flycatcher was detected) holding an estimated 1,629 territories (Durst 2017). Since surveyors do not visit all sites annually, it is difficult to arrive at a grand total of flycatcher territories. There are many territories included in the rangewide estimate where

surveyors have not returned for many years, reducing the estimate's accuracy. Territory numbers have increased since listing and some habitat remains unsurveyed. Since Unitt's (1987) estimate of 500-1000 rangewide territories and about 25 years of targeted surveys, the most recent estimate is not too far beyond his initial conclusion. About 70 percent of the 1,629 estimated territories throughout the subspecies range are located at 5 general locations (Cliff/Gila Valley and Middle Rio Grande – New Mexico and Upper Gila River, Roosevelt Lake, San Pedro River/Gila River confluence – Arizona) (Durst 2017).

While flycatcher territory numbers increased, distribution across the bird's range has not proportionally improved. The increase in known numbers is largely due to territory abundance at the five largest population centers in Arizona and New Mexico. Concurrent large territory increases in other parts of its breeding range, such as southern California, Colorado, Nevada, and Utah have not occurred and have retained similar size and distribution since the previous 2008 rangewide estimate (Durst *et al*. 2008).

While territory numbers have increased in Arizona (145 to 679 territories from 1993 to 2012) (Durst 2017), overall distribution of flycatchers throughout the state has not proportionally grown. We believe population stability in Arizona is largely dependent on the presence of three population centers (Roosevelt Lake, San Pedro/Gila River confluence, upper Gila River). Lower Colorado River nesting sites are still few and limited to Topock Marsh, and adjacent tributaries in southern Nevada and Arizona (*e.g.,* Bill Williams River). We have few consistent surveys and known territories from the Santa Cruz, Powell, Middle Colorado, San Francisco, Little Colorado, and Hassayampa/Agua Fria Management Units. Biologists in the 2010s discovered more territories in the Verde Valley (Perkinsville to Camp Verde), improving the known distribution and abundance of territories/sites within the Verde Management Unit. The result of catastrophic events or substantial population changes either in size or location could greatly change the status and persistence of the bird. Conversely, expansion into new habitats or discovery of populations would improve the known stability and status of the flycatcher.

The abundance and distribution of nesting flycatchers in New Mexico is dynamic (Service 2002b). Because riparian vegetation typically occurs in flood plain areas prone to periodic natural disturbance, suitable habitats are ephemeral, and the species distribution is dynamic. Indeed, many sites will cycle through a stage of being suitable but unoccupied before they become occupied. From there, the habitat will eventually age out if it is not naturally disturbed. This pattern of habitat creation and loss is how the species has been able to persist in these ephemeral systems. The primary population centers in New Mexico include the Middle and Lower Rio Grande and the Gila River. The middle and lower Rio Grande have been consistently surveyed by the Bureau of Reclamation since 1999 with large increases since the surveys began, with the largest portion of the birds occupying the exposed pool of Elephant Butte Reservoir where habitat has been created as the reservoir levels have receded (Moore 2022). During 2021 Middle Rio Grande surveys, 705 resident flycatchers were documented. These residents formed 327 pairs and established 378 territories (Moore 2022). Much less is known about other areas across the state.

Threats

Riparian habitat loss was the main threat which triggered the Service to list the flycatcher under

the ESA. Recovery of the flycatcher requires a watershed approach and consideration of all interrelated factors that influence riparian habitat conditions (Service 2002b). Over the past decade, drought has reduced water levels, increased the potential for fire in suitable habitats, and exacerbated existing stressors created from water management, groundwater pumping, surface water diversion, livestock grazing, and watershed degradation.

Additional threats include non-native plants species and brown-headed cowbirds (Service 2002b). Tamarisk (a non-native tree) provides significant amounts of suitable flycatcher nesting habitat, resulting in some of the densest and most successful nesting populations in the sub-species range (Service 2002b). However, there are concerns about the overall recovery value of tamarisk because, unlike native plants, it can facilitate periodic fire regimes detrimental to adjacent native riparian plants and bird communities (Service 2002b). Brood parasitism by brown-headed cowbirds can reduce flycatcher reproductive performance; this can be especially significant in small populations, geographically distant from other source populations (Service 2002b).

Because of the small population size and the degree of fragmentation between breeding populations, flycatchers are susceptible to demographic stochasticity and reduced genetic variation. While not specifically a threat but rather a consequence of the poor status of the species, these factors may influence the potential to recover the species (Service 2002b).

Southwestern Willow Flycatcher Critical Habitat

The 2013 final critical habitat rule for the flycatcher redesignated stream segments in 24 Management Units found in six Recovery Units as flycatcher critical habitat. The designated stream segments occur in California, Nevada, Utah, Colorado, Arizona, and New Mexico and include a total of approximately 1,227 stream miles (1,975 kilometers). The PCEs of flycatcher critical habitat are those elements of the physical or biological features in an area that provide for life-history processes and are essential to the conservation of the flycatcher. The PCEs listed in the critical habitat for the flycatcher are:

I. Riparian vegetation. Riparian habitat along a dynamic river or lakeside, in a natural or manmade successional environment (for nesting, foraging, migration, dispersal, and shelter) that is comprised of trees and shrubs (that can include Gooddings willow (*Salix gooddingii*), coyote willow (*Salix exigua*), Geyer's willow (*Salix geyeriana*), arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), yewleaf willow (*Salix taxifolia*), pacific willow (*Salix lucida*), boxelder (*Acer negundo*), tamarisk (*Tamarix* spp.), Russian olive (*Eleagnus angustifolia*), buttonbush (*Cephalanthus* spp.), cottonwood (*Populus* spp.), stinging nettle (*Urtica dioica*), alder (*Alnus* spp.), velvet ash (*Fraxinus velutina*), poison hemlock (*Conium maculatum*), blackberry (*Rubus* spp.), seep willow (*Baccharis salicifolia*), oak (*Quercus* spp.), rose (*Rosa* spp.), sycamore (*Platanus* spp.), false indigo (*Baptisia australis*), Pacific poison ivy (*Toxicodendron diversilobum*), grape (*Vitis* spp.), Virginia creeper (*Parthenocissus quinquefolia*), Siberian elm (*Ulmus pumila*), and walnut (*Juglans* spp.) and some combination of:
   A. Dense riparian vegetation with thickets of trees and shrubs that can range in height from about 2 to 30 m (about 6 to 98 ft). Lower-stature thickets [2 to 4 m (6 to 13 ft)

tall] are found at higher elevation riparian forests and tall-stature thickets are found at middle and lower-elevation riparian forests;

B. Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft) above ground or dense foliage only at the shrub or tree level as a low, dense canopy;

C. Sites for nesting that contain a dense (about 50–100 percent) tree or shrub (or both) canopy (the amount of cover provided by tree and shrub branches measured from the ground);

D. Dense patches of riparian forests that are interspersed with small openings of open water or marsh or areas with shorter and sparser vegetation that creates a variety of habitat that is not uniformly dense. Patch size may be as small as 0.1 ha (0.25 acres) or as large as 70 ha (175 acres).

II. Insect prey populations. A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, which can include: flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies, moths, and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

Yellow-billed Cuckoo and Critical Habitat

The yellow-billed cuckoo (*Coccyzus americanus* "cuckoo") was listed as a threatened species under the ESA in the western United States on October 3, 2014 (USFWS 2014c). This area includes a Distinct Population Segment (DPS) of the more extensive, yellow-billed cuckoo range. The DPS is appropriate because the population segment has a geographical distribution that is biologically meaningful. A summary of the species and status of the cuckoo can be found in the Federal Register final rule listing document (USFWS 2014c). A final rule published on April 21, 2021 (USFWS 2021a), designated critical habitat for the species. There is no draft or final Recovery Plan for the cuckoo at this time. The documents listed above are hereby incorporated by reference.

Description and Life History

Yellow-billed cuckoos are slender long-tailed passerines with a fairly stout and slightly down-curved bill. The plumage is grayish-brown above and white below, with reddish primary flight feathers. The tail feathers are boldly patterned with black and white below. They are a medium-sized bird about 12 inches (in) (30 centimeters (cm)) in length, and about 2 ounces (oz) (60 grams (g)) in weight. The bill is blue-black with yellow on the basal half of the lower mandible. The legs are short and bluish-gray. Males and females differ slightly but are indistinguishable in the field (Hughes 2015).

The yellow-billed cuckoo is a neotropical migrant bird that breeds in North America and winters in South America, east of the Andes, primarily south of the Amazon Basin in southern Brazil, Paraguay, Uruguay, eastern Bolivia, and northern Argentina (Sechrist *et a*l. 2012; Hughes 2015; McNeil *et al*. 2015). Western yellow-billed cuckoos breed from late May through September,

although most nesting occurs from late June through August. Timing of spring migration and arrival on the breeding grounds is likely related to climate, habitat, and food availability (Pulido et al. 2001, Cresswell *et al*. 2011). Both adults build loose platform nests composed of dry twigs. Nest height ranges from 1.3 - 17m (Halterman 2001; McNeil *et al*. 2013; Wohner *et al*. 2021). Clutch size is variable, usually two or three (Halterman 2001; McNeil *et al*. 2013; Dillon and Moore 2020). Nestlings grow rapidly, with a period of 17 days from start of incubation to fledgling, which is among the shortest for most bird species (Hughes 2015).

Given that western yellow-billed cuckoos are larger birds with a short hatch-to-fledge time, they require access to abundant food sources to successfully rear their rapidly growing offspring (Laymon 1980). In portions of the southwestern United States, high densities of prey species may be seasonally present, often for brief periods of time, during the vegetation growing season. Food availability and foraging distance can vary greatly within and between years, drainages, and geographic area and is largely rainfall related. In areas that typically receive rains during the summer monsoon, an increase in humidity, soil moisture, and surface water flow are important triggers for insect reproduction and western yellow-billed cuckoo nesting (Wallace *et al*. 2013). In years of high insect abundance, western yellow-billed cuckoos lay larger clutches (three to five eggs rather than two), a larger percentage of eggs produce fledged young, and they breed multiple times (two to three nesting attempts rather than one; Laymon *et al*. 1997). On the upper San Pedro and lower Colorado Rivers, cuckoos renested following both successful and unsuccessful nesting attempts (Halterman 2009; McNeil *et al*. 2013). These subsequent nests are sometimes hundreds of meters away from previous nests.

Western yellow-billed cuckoos eat large insects (e.g., cicadas, caterpillars, katydids, grasshoppers, crickets, large beetles, dragonflies, and moth larvae) and small vertebrates (frogs and lizards) during nesting season (Laymon and Halterman 1985; Laymon *et al*. 1997; Halterman 2001; Halterman 2009; Griffin 2015). Minor prey includes beetles, dragonflies, praying mantis, flies, spiders, butterflies, caddis flies, crickets, and cicadas (Laymon *et al*. 1997; Hughes 2015). In Arizona, cicadas are an important food source (Halterman 2009).

The cuckoo breeding habitat occurs primarily along perennial, intermittent, and ephemeral drainages in the arid Southwestern United States and Northern Mexico. These areas are isolated and sparsely distributed, being surrounded by arid landscapes. Breeding habitat is generally below 6,000 ft (1,829 m) elevation. Habitat for the cuckoo in much of its range is associated mainly with perennial rivers and streams that support the expanse of vegetation characteristics needed by breeding cuckoos. The range and variation of streamflow frequency, magnitude, duration, and timing that establish and maintain riparian habitat can occur in different types of regulated and unregulated flows depending on the interaction of the water and the physical characteristics of the landscape (Poff *et al.* 1997; USFWS 2021a). Hydrologic conditions at cuckoo breeding sites can vary widely between years and during low rainfall years; if vegetation and prey are insufficient, cuckoos may move on to more favorable sites.

Distribution and Status

Based on historical accounts, the cuckoo was formerly widespread and locally common in California and Arizona, more narrowly distributed but locally common in New Mexico, Oregon, and Washington, and uncommon along the western front of the Rocky Mountains north to

British Columbia (Hughes 2015). The species may now be extirpated from British Colombia, Washington, and Oregon (Hughes 2015, Service 2021a), and rare in scattered drainages in western Colorado, Idaho, Nevada, and Utah, with single, nonbreeding birds most likely to occur (Service 2014c, 2021a). The largest remaining core breeding populations occur in Arizona, along the Rio Grande in New Mexico, and in northwestern Mexico (Service 2021a). Population declines continue to occur due to continuing and new threats to the western DPS (Service 2021a).

There are an estimated 450 Western yellow-billed cuckoo breeding territories across Arizona (Service 2021a). The species was a common resident in the (chiefly lower) Sonoran zones of southern, central, and western Arizona (Phillips *et al*. 1964, Groschupf 1987). Western yellow-billed cuckoo populations in Arizona have declined in many perennial riparian areas from historical levels as well as over the past 35 years, with recent declines at some of the largest populations (for example, Bill Williams River). The San Pedro River supports the largest population of cuckoos in Arizona in an unregulated riparian system and one of the largest in the DPS. The Gila River and lower Colorado River also contain large populations of cuckoos in Arizona. Since listing, cuckoos have been documented breeding in some ephemeral and intermittent drainages with a mix of xeroriparian and non-riparian trees, indicating a broader range of habitats and geographic areas than previously known. Fewer than 10 territories are present within most drainages, but combined they make up a large amount of occupied habitat across the landscape. The cuckoo currently nests primarily in the central and southern parts of the state, as well as at revegetation sites along the lower Colorado River (Groschupf 1987; Corman and Magill 2000; Halterman 2009, McNeil *et al*. 2013, Sferra *et al*. 2019).

An estimated 190 to 235 western yellow-billed cuckoo pairs currently breed in western New Mexico (Service 2021a). Cuckoos were historically common in riparian areas along the Rio Grande, as well as uncommon to common locally along portions of the Gila, San Francisco, and San Juan Rivers in western New Mexico (Hubbard 1987). The middle and lower Rio Grande have been consistently surveyed by the Bureau of Reclamation since 2006 (Barron and Moore 2022) in what is considered one of the important strongholds for the cuckoo, where historically they were common along sections of the river. In particular, the San Marcial Reach of the Middle Rio Grande continues to retain a large proportion of annual cuckoo detections in the exposed pool of Elephant Butte Reservoir where habitat has been created as the reservoir levels have receded. This reach provides an important breeding and source population for the species. In 2021, a total of 303 cuckoo detections were recorded with 67 territories delineated from these detections (Barron and Moore 2022). Many other areas in New Mexico have not yet been surveyed.

Threats

Current yellow-billed cuckoo breeding populations are fragmented and geographically isolated. The primary threat to the species is the loss and degradation of its habitat from altered watercourse hydrology and natural stream processes, livestock overgrazing, encroachment from agriculture, and resulting conversion of native habitat to predominantly nonnative vegetation. Additional threats to the species include the effects of climate change, drought, pesticides, wildfire, and fragmentation of suitable habitat patches (Service 2014c). In addition, minerals mining projects adversely affect occupied habitat by reducing streamflow and habitat and

increasing disturbance (Service 2021). The tamarisk leaf beetle *(Diorhabda* spp.) may potentially adversely affect occupied habitat by defoliating tamarisk to the extent that it no longer provides protective cover, temperature amelioration, or food (Service 2021). Mortality from collisions with towers and other tall structures and mortality from solar power facilities is an ongoing and serious threat that needs further evaluation (Longcore *et al*. 2005; Kagan *et al*. 2014).

Yellow-billed Cuckoo Critical Habitat

The 2021 final critical habitat rule for the cuckoo designated approximately 298,000 acres (120,000 hectares) of land in Arizona, California, Colorado, Idaho, New Mexico, Texas, and Utah (USFWS 2021a). The purpose of designating critical habitat is to conserve the PBFs essential to the conservation of the species and which may require special management consideration or protection. Based on our current knowledge of the physical or biological features and habitat characteristics required to sustain the species' life-history processes, we determined that the PBFs specific to the yellow-billed cuckoo are:

I. Riparian woodlands (including mesquite bosques), desert scrub and desert grassland drainages with a tree component, and Madrean evergreen woodland (oak and other tree species) drainages. This physical or biological feature includes breeding habitat found throughout the DPS range and additional breeding habitat characteristics unique to the Southwest;

   A. *Range-wide breeding habitat (including areas in the Southwest).* Range-wide breeding habitat is composed of woodlands within floodplains or in upland areas or terraces often greater than 325 ft (100 m) in width and 200 acres (81 hectare) or more in extent with an overstory and understory vegetation component in contiguous or nearly contiguous patches adjacent to intermittent or perennial watercourses. The slope of the watercourses is generally less than three percent but may be greater in some instances. Nesting sites within the habitat have an above-average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats; and,

   B. *Southwestern breeding habitat.* Southwestern breeding habitat comprises more arid riparian woodlands (including mesquite bosques), desert scrub and desert grassland drainages with a tree component, and Madrean evergreen woodlands (oak and other tree species), in perennial, intermittent, and ephemeral drainages. These more arid riparian woodland drainages also bisect other habitat types, including Madrean evergreen woodland, native and nonnative desert grassland, and desert scrub. More than one habitat type within and adjacent to the drainage may contribute toward nesting habitat. Southwestern breeding habitat is more water-limited, contains a greater proportion of xeroriparian and non-riparian plant species, and is often narrower, more open, patchier, or sparser than elsewhere in the DPS and may persist only as narrow bands or scattered patches along the bankline or as small in-channel islands. The habitat contains a tree or large-shrub component with a variable overstory canopy and understory component that is sometimes less than 200 acres (81 hectare). Riparian trees (including xeroriparian) in these ecosystems may even be

more sparsely distributed and less prevalent than non-riparian trees. Adjacent habitat may include managed (mowed) nonnative vegetation or terraces of mesquite or other drought-tolerant species within the floodplain. In narrow or arid ephemeral drainages, breeding habitat commonly contains a mix of non-riparian vegetation found in the base habitat as well as riparian (including xeroriparian) trees.

II. Adequate prey base. Presence of prey base consisting of large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies, moth larvae, spiders), lizards, and frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas;

III. Hydrologic processes, in natural or altered systems, that provide for maintaining and regenerating breeding habitat. This physical or biological feature includes hydrologic processes found in range wide breeding habitat as well as additional hydrologic processes unique to the Southwest in southwestern breeding habitat;

A. Range wide breeding habitat hydrologic processes (including the Southwest): Hydrologic processes (either natural or managed) in river and reservoir systems that encourage sediment movement and deposits and promote riparian tree seedling germination and plant growth, maintenance, health, and vigor (e.g., lower-gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). In some areas where habitat is being restored, such as on terraced slopes above the floodplain, this may include managed irrigated systems that may not naturally flood due to their elevation above the floodplain; and,

B. Southwestern breeding habitat hydrologic processes: In southwestern breeding habitat, elevated summer humidity and runoff resulting from seasonal water management practices or weather patterns and precipitation (typically from North American Monsoon or other tropical weather events) provide suitable conditions for prey species production and vegetation regeneration and growth. Elevated humidity is especially important in southeastern Arizona, where cuckoos breed in intermittent and ephemeral drainages.

Loach Minnow and Critical Habitat

The loach minnow (*Tiaroga cobitis*; "minnow") was listed as a threatened species under the ESA on October 28, 1986 (USFWS 1986b). On February 23, 2012, the Service reclassified the loach minnow as endangered and designated critical habitat for the species (USFWS 2012a). A summary of the species and status of the minnow can be found in the Federal Register final rule listing document (USFWS 2012a) and in the two 5-year reviews for the minnow (USFWS 2012c; 2023a). Additional information regarding the status of the species can be found in the minnow's Final Recovery Plan (USFWS 1991a) and Recovery Plan amendment (USFWS 2019). These documents are hereby incorporated by reference.

Description and Life History

The minnow is a small, slender, elongate fish of the family Cyprinidae that can reach up to 2.4 in (60 mm) in length (Minckley 1973). The loach minnow has upward-directed eyes and a terminal

mouth with no barbels. Loach minnows have an olive color that is blotched with darker pigment. Whitish spots are present at the origin and insertion of the dorsal fin and the dorsal and ventral portions of the caudal fin base. Breeding males develop bright red-orange coloration at the bases of the paired fins, on adjacent fins, on the base of the caudal opening, and often on the abdomen. Breeding females become yellowish on their fins and lower body (Minckley 1973).

Loach minnows are found in turbulent, rocky riffles of streams up to about 7,200 ft (2,200 m) in altitude. The loach minnow is a bottom-dwelling inhabitant of shallow, swift waters flowing over gravel, cobble, and rubble substrates in mainstream rivers and tributaries (Rinne 1989; Propst and Bestgen 1991).

The loach minnow deposits eggs on the downstream side of rocks using sicky adhesive eggs. These areas form a cavity in the substrate, providing some protection for the eggs. Rocks used for spawning are flattened and slightly elevated from the stream bottom on the downstream side and are nearly always fine-grained, basalt-type material with smooth surfaces (Propst and Bestgen 1991). Loach minnow females can attach up to 260 eggs to a single rock (Britt 1982; Propst and Bestgen 1991). The fecundity of females ranges from about 150 to 250 mature ova and generally increases with increasing size (Service 1991a). Eggs incubated at 64.4 to 68 °F (18 to 20 °C) hatched in 5 to 6 days (Propst *et al.* 1988).

Individual loach minnows grow quickly during their first summer and are nearly as large as adults within a few months. Longevity is typically 15 months to 2 years, although loach minnow can live up to 3 years (Britt 1982; Propst *et al.* 1988; Propst and Bestgen 1991). The first spawn generally occurs in the spring of their second year (March – May) (Britt 1982; Propst *et al.* 1988). The species is also known to spawn in the autumn if the conditions meet the needs of the species including base flows similar to spring runoff and water temperatures greater than 68 °F (20 °C); however, this is uncommon (Vives and Minckley 1990). Miller (1998) reports that loach minnow males in New Mexico were in breeding coloration in late June. The loach minnow has low population density, short life expectancy, and low fecundity. Even in optimal habitat, loach minnow populations are not abundant (Propst and Bestgen 1991).

Loach minnows feed exclusively on aquatic insects (Britt 1982; Abarca 1987). Loach minnows are opportunistic benthic insectivores, feeding primarily on larval mayflies, black flies, and chironomids. They actively seek their food among bottom substrates.

Distribution and Status

The loach minnow is endemic to the Gila River basin of Arizona and New Mexico, and Sonora, Mexico. During the last century, loss of habitat, competition, and predation by nonnative aquatic species have reduced the historical range of the loach minnow by about 85 percent (Miller 1961; Hendrickson and Minckley 1984; Williams *et al.* 1985; Service 1986b; Marsh *et al.* 1989; Service 1994). Present populations are geographically isolated and inhabit upstream areas of their historical range, including the Verde, Salt, San Pedro, San Francisco, and Gila Rivers (Minckley 1973; Sublette *et al.* 1990).

In Arizona, the loach minnow once occupied as many as 1,400 miles (2,250 kilometers) of streams, but it is now found in less than ten percent of that range and is considered uncommon

(Propst *et al.*, 1988). The species is believed extirpated in Mexico due to dewatering, nonnative predators, and habitat destruction (Service 1986b).

Before European settlement in New Mexico, the loach minnow lived in warm water reaches of the San Francisco and Gila Rivers and their significant tributaries. The species has become rare in New Mexico and now occupies only fragmented reaches of the San Francisco and Gila drainages (Propst *et al.* 1988). The loach minnow was the most abundant fish in 6.2 miles (10 kilometers) stretch of the Tularosa and San Francisco Rivers (NMDGF 2010). In the lower reaches of the West Fork Gila River, a small population persists (NMDGF 2009), and the population in the Gila-Cliff Valley has declined considerably during the past 15 years (Paroz *et al.* 2006; NMDGF 2010).

Biochemical investigations on this species indicate that there are substantial differences in genetic makeup between the remnant loach minnow populations that occupy isolated fragments of the Gila River basin, indicating a geographic component to the population structure of the species (Tibbets and Dowling 1996). Therefore, protection of isolated loach minnow populations is essential to preserving genetic variation.

Past changes in the range and population density of the loach minnow undoubtedly occurred in response to natural spatial and temporal variations in the environment. However, its declining status is the result of human activities (Service 2012a). Much of the habitat in the Gila River basin is degraded with poor riparian habitats, incised channels, poor bank stability, and high streambed embeddedness due to water diversion and pumping, livestock grazing, and road construction (Service 2012a).

Threats

When the loach minnow was listed, the main threats identified were range reduction and population decline due to habitat destruction and competition with nonnative fish species (Service 1986b). During the last century, the loach minnow distribution and abundance have been greatly reduced throughout the species' range (Propst *et al.* 1988). Competition and predation by non-native fish and habitat destruction have reduced the historical range of the loach minnow by about 85 percent (Service 1986b). Suitable habitat for the loach minnow is vulnerable to the harmful effects of sedimentation. These factors make the loach minnow very sensitive to environmental changes and disturbances. Loach minnows use the spaces between and the lee of larger substrates for resting, sheltering, feeding, and spawning (Propst *et al.* 1988; Rinne 1989). The species is rare or absent from habitats where fine sediments fill interstitial spaces (Propst and Bestgen 1991).

Current threats to the loach minnow that can exacerbate sedimentation include livestock grazing, mining, agriculture, timber harvest, wildfire, recreation, development, or impoundments (Hendrickson and Minckley 1984; Belsky *et al.* 1999). Land and water use practices have impaired perennial flows and natural hydrographs (Minckley and Meffe 1987). These activities can degrade loach minnow habitats by altering flow regimes, increasing watershed and channel erosion, contributing to increased sedimentation, and adding contaminants to streams and rivers (Belsky *et al.* 1999; Donahue 2000). Alteration of the natural flooding characteristic of desert streams has degraded habitat and increased competition from introduced nonnative species

(Minckley and Meffe 1987). As a result, these activities may affect the loach minnow through direct mortality, interference with reproduction and predator avoidance, and reduction of invertebrate food supplies.

Nonnative aquatic species (fishes, bullfrogs, and crayfish) are a threat to the loach minnow. Red shiners compete with the loach minnow for food and habitat and tolerate the extreme conditions found in desert streams (Matthews and Hill 1977). Nonnative fish such as channel catfish and flathead catfish frequent riffles occupied by loach minnow, especially at night when catfish move onto riffles to feed and may prey on loach minnow (Propst 1999). In addition, largemouth bass *(Micropterus salmoides)*, smallmouth bass *(Micropterus dolomieu)*, green sunfish, introduced trout, and bullfrogs may prey on the loach minnow.

Loach Minnow Critical Habitat

The 2012 final critical habitat rule for the minnow designated approximately 610 miles (983 kilometers) as minnow critical habitat. The designated critical habitat occurs in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai Counties, Arizona, and Catron, Grant, and Hidalgo Counties in New Mexico. The PCEs of minnow critical habitat are those elements of the physical or biological features in an area that provide for life-history processes and are essential to the conservation of the minnow. The PCEs listed in the critical habitat for the minnow are:

I. Habitat to support all egg, larval, juvenile, and adult loach minnow, which:

   A. Perennial flows with a stream depth generally less than 3.3 ft (1 m) and with slow to swift flow velocities between 0.0 and 31.5 in per second (0 and 80 cm per second).

   B. Appropriate microhabitat types including pools, runs, riffles, and rapids over sand, gravel, and cobble, and rubble substrates with low or moderate amounts of fine sediment and substrate embeddedness.

   C. Appropriate habitat must have a low gradient of less than approximately 2.5 percent, at elevations below 8,202 ft (2,500 m).

   D. Water temperatures should be in the general range of 46.4 to 77.0 °F (8.0 to 25.0 °C).

II. An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies;

III. Streams with no or no more than low levels of pollutants;

IV. Perennial flow, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted;

V. No nonnative aquatic species or levels of nonnative aquatic species that are sufficiently low as to allow persistence of loach minnow.

VI. Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable transporting sediments.

Spikedace and Critical Habitat

The spikedace (*Meda fulgida*) was listed as a threatened species under the ESA on July 1, 1986 (USFWS 1986a). On February 23, 2012, the Service reclassified the spikedace as endangered and designated critical habitat for the species (USFWS 2012a). A summary of the species and status of the spikedace can be found in the Federal Register final rule listing document (USFWS 2012a) and in the two 5-year reviews for the spikedace (USFWS 2012c; 2023a). Additional information regarding the status of the species can be found in the spikedace's Final Recovery Plan (USFWS 1991b) and Recovery Plan amendment (USFWS 2019). These documents are hereby incorporated by reference.

Description and Life History

The spikedace is a member of the minnow family Cyprinidae. Adult spikedace are 2.5 – 2.9 in (63-75 mm) in length (Sublette *et al.* 1990). The spikedace has large eyes, a pointed snout, and a slightly subterminal mouth with no barbels present. The species is slender and slightly compressed laterally. Scales are present only as small, deeply embedded plates. The first spinous ray of the dorsal fin is the strongest and most sharply pointed. The spikedace is olive-gray to light brown above, with bright silver sides, black specks, and blotches on the back and upper sides. Breeding males have brassy-yellow heads and fin bases (Minckley 1973).

Spikedace occupy midwater habitats, usually less than 12 in (305 mm) deep, with slow to moderate water velocities over sand, gravel, and cobble substrates (Sublette *et al.* 1990). Adults often aggregate in shear zones along gravel-sand bars where rapid water borders slower flow, quiet eddies on the downstream edges of riffles, and broad, shallow areas above gravel sand bars (Propst *et al.* 1986). The preferred habitat of spikedace varies, shifting both seasonally and with maturation (Propst *et al.* 1986). The species shows geographic variation in microhabitat use, with populations in the forks area of the Gila drainage occupying deeper, slower velocities than more downstream populations. Likewise, researchers have noted seasonal shifts in microhabitat in the upper Gila drainage, with populations seeking shallower habitats in the winter and deeper water during warmer months (Sublette *et al.* 1990). In winter, the species congregates along stream margins with cobble substrates.

The erratic flow patterns of southwestern streams that include periodic flash floods and recurrent floods are essential to the feeding and reproduction of spikedace by scouring the sands and keeping gravels clean (Propst *et al.* 1986). The spikedace larvae and juveniles tend to occupy shallow, peripheral portions of streams that have slow currents and sand or delicate gravel substrates, as well as backwater habitats. The spikedace lives approximately 2 years, with reproduction occurring primarily in 1-year-old fish (Barber *et al.* 1970; Anderson 1978; Propst *et al.* 1986). Spawning extends from mid-March into June and occurs in shallow gravel-sand substrates with the moderate flow (Barber *et al.* 1970; Anderson 1978; Propst *et al.* 1986). By mid-May, most spawning has occurred, although spawning may continue into early June (Propst *et al.* 1986). Younger females spawn once per year and older females twice.

The spikedace begin to reproduce when stream discharge starts to decline and water temperatures increase. Males move about the spawning riffles without exhibiting aggression, awaiting females ready to spawn (Barber *et al.* 1970). Females enter spawning sites from adjacent pools, slow velocity areas, or from downstream and are met by two or more patrolling males and herded toward the bottom where spawning occurs. After spawning, the males return to patrol the area while the females move downstream. Gametes are presumably expelled into the water column. The eggs are heavy, sink, and adhere to the substrate. The fecundity of individual females ranges from 90 to 250 ova, with larger, older females producing more eggs (Service 1991b). The young grow rapidly, attaining a length of 1.4 to 1.6 in (35 to 40 mm) by late fall.

Spikedace feeds primarily on aquatic and terrestrial insects (Barber and Minckley 1983; Propst *et al.* 1986; Marsh *et al.* 1989). In addition, Barber *et al.* (1970) report that they feed on items in the drift, including some fish fry. Habitat type and time of year determine diet composition (Minckley 1973). Propst *et al.* (1986) report that spikedace from the Gila-Cliff Valley feed on mayflies, true flies, and caddisflies. The general lack of terrestrial invertebrates in spikedace stomachs indicated that the species depends on aquatic insects for sustenance.

Recent taxonomic and genetic work on spikedace indicates substantial differences in morphology and genetic makeup among drainage basins. Anderson and Hendrickson (1994) found that spikedace from the Verde River are morphologically distinguishable from all other spikedace populations, being the most distinct from spikedace in Aravaipa Creek. In contrast, spikedace from the upper Gila River and Eagle Creek populations have intermediate levels of variation. Mitochondrial DNA and allozyme analyses have revealed similar patterns of geographic variation within the species (Tibbets and Dowling 1996). Protection of isolated spikedace populations is vital to preserving genetic variation.

Distribution and Status

Since the 1800s, spikedace have declined markedly in distribution and abundance throughout their range (Propst *et al.* 1986; Service 1986a). Historically, spikedace occurred in the Agua Fria, Verde, Salt, San Pedro, San Francisco, and Gila drainages in Arizona and throughout the Gila River and its tributaries (e.g., San Francisco River, West, East, and Middle Forks Gila River) in New Mexico. By 2000, spikedace had been eliminated from over 90 percent of its historical range (Paroz *et al.* 2006). By 2004, there were only two remaining stronghold reaches for the species, 13 miles (21 kilometers) of Aravaipa Creek in Arizona and a 7-mile (11 kilometer) segment of the Gila River at the Gila Bird Area (Paroz and Propst 2007). Spikedace exists in low numbers in other locations of the Gila River, but its numbers have been declining since 2000 (Paroz *et al.* 2006; Paroz and Propst 2007).

Threats

During the last century, habitat destruction, competition, and predation by nonnative aquatic species have reduced the historical range of the spikedace (Miller 1961; Hendrickson and Minckley 1984; Williams *et al.* 1985; Service 1986a; Marsh *et al.* 1989; Service 1994). Both historical and present landscapes surrounding spikedace habitats have been impacted to varying

degrees by domestic livestock grazing, mining, agriculture, timber harvest, wildfire, recreation, development, or impoundments (Hendrickson and Minckley 1984; Belsky *et al.*, 1999).

Detrimental land and water use practices have impaired perennial flows and natural hydrographs (Minckley and Meffe 1987). These activities degrade spikedace habitats by altering flow regimes, increasing watershed and channel erosion, contributing to increased sedimentation, and adding contaminants to streams and rivers (Belsky *et al.* 1999; Donahue 2000). As a result, these activities may affect spikedace through direct mortality, interference with reproduction and predator avoidance, fragmentation of populations, and reduction of invertebrate food supplies.

Nonnative aquatic species (fishes, bullfrogs, and crayfish) are a threat to spikedace as they are for most native aquatic fishes. Researchers have identified the red shiner *(Cyprinella lutrensis)* as a cause of spikedace decline (Minckley and Deacon 1968; Minckley 1973). Red shiner outcompetes spikedace for food and habitat and is very tolerant of the extreme conditions found in desert streams (Matthews and Hill 1977). Nonnative fish such as channel catfish *(Ictalurus punctatus)* and flathead catfish *(Pylodictis olivaris)* frequent riffles occupied by spikedace, especially at night when they move onto riffles to feed and might prey on spikedace (Propst 1999). In addition, largemouth bass, smallmouth bass, green sunfish *(Lepomis cyanellus),* introduced trout, and bullfrogs may prey on spikedace.

Spikedace Critical Habitat

The 2012 final critical habitat rule for the spikedace designated approximately 650 miles (1,050 kilometers) within five complexes as spikedace critical habitat. The designated critical habitat occurs in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai Counties, Arizona, and Catron, Grant, and Hidalgo Counties in New Mexico. The PCEs of spikedace critical habitat are those elements of the physical or biological features in an area that provide for life-history processes and are essential to the conservation of the spikedace. The PCEs listed in the critical habitat for the spikedace are:

I. Habitat to support all egg, larval, juvenile, and adult spikedace, which includes:

   A. Perennial flows with a stream depth generally less than 3.3 ft (1 m) and with slow to swift flow velocities between 1.9 and 31.5 in per second (5 and 80 cm per second).

   B. Appropriate stream microhabitat types include glides, runs, riffles, the margins of pools and eddies, and backwater components over sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness.

   C. Appropriate habitat with a low gradient of less than approximately 1.0 percent, at elevations below 6,890 ft (2,100 m).

   D. Water temperatures should be in the general range of 46.4 to 82.4 °F (8.0 to 28.0 °C).

II. An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies.

III. Streams with no or no more than low levels of pollutants.

IV. Perennial flow, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted.

V. No nonnative aquatic species or levels of nonnative aquatic species that are sufficiently low as to allow persistence of Spikedace.

VI. Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flow capable transporting sediments.

Environmental Baseline

Under section 7(a)(2) of the ESA, when considering the effects of the action on federally listed species, the Service is required to take into consideration the environmental baseline. Regulations implementing the ESA (50 FR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in progress. The environmental baseline defines the status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. The environmental baseline refers to 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 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 (84 FR 44976-45018).

Status of the Species and Critical Habitat within the Action Area

Chiricahua Leopard Frog

Inventory, monitoring, and protocol surveys by BLM and contract biologists has been conducted annually (with few exceptions) throughout the action area since 1993 for flycatchers, since 2017 for cuckoo, and from 2014 – 2019 (except 2016) for gartersnakes. Gartersnake survey efforts included visual encounter survey and nocturnal minnow trap deployment. No frogs have been observed in the action area during any of these survey efforts and according to the BE, habitat in the action area may not be suitable for the frog. The closest frog records are approximately 7.0 miles upstream on BLM's Middle Box area and 11.5 miles straight line north of the action area in the Lemmons Peak Chiricahua leopard frog Management Area in Blue Creek. The Middle Box is upstream on the Gila River and Blue Creek does drain into the Gila River near the upstream end of the Gila Lower Box ACEC. These records are separated from the action area by 7.0 and 11.5 miles of ephemeral flow drainage through the Gila River and are likely too far from the action area to be considered reliable dispersal sources (USFWS 2012). However, it may be possible that frogs and/or tadpoles reach the Gila River (from Blue Creek) or travel downstream (from Middle Box) and occupy the action area during ephemeral flow events or that habitat may become suitable for frog for activities covered under the RAMP.

Northern Mexican Gartersnake, Narrow-headed Gartersnake and Critical Habitat

There are historic narrow-headed and northern Mexican gartersnake observations from the action area from the 1970s. There is also a recent observation from 1996 for the narrow-headed gartersnake (from approximately 9.5 miles upstream) and from 2018 for the northern Mexican gartersnake (from approximately 21.5 miles upstream). Gartersnake protocol surveys have been conducted in the action area from 2014 – 2019 (except during 2016) by permitted BLM and contract biologists. Gartersnake survey efforts included visual encounter survey and nocturnal minnow trap deployment (Christman and Jennings 2018). No gartersnakes were observed in the action area during these survey efforts. According to the BE, riparian areas in the Gila Lower Box ACEC in the proposed action area do have suitable gartersnake habitat. However, it may be possible for both gartersnakes to travel downstream and occupy the action area (from the 1996 and 2018 recent observations) during ephemeral flow events for activities covered under the RAMP. Additionally, gartersnake maybe in the action since there are historic records from the action area and since there are difficulties in detecting gartersnakes through survey and trapping methods.

The entire Gila Lower Box is designated as Critical Habitat for the narrow-headed gartersnake. Presently, there is upland terrestrial habitat with structural vegetation complexity and diversity (see flycatcher and cuckoo below) that is available for the gartersnake. Historically, drought and low flows have caused decreased vigor and mortality in the upland terrestrial habitat and has reduced the amount of stream habitat available for the gartersnake. Within the past year (2022) however, extended high flows, overbank flooding, and a large flow (~18,600 cubic feet per second) have knocked down mature cottonwoods and provided the hydrologic conditions to stage a comeback for woody riparian vegetation which may provide some structural complexity for gartersnakes. These high flows and flooding also allow for extended water and fish permanence which can provide more prey items during longer time periods for gartersnakes.

Southwestern Willow Flycatcher and Critical Habitat

Flycatcher surveys have been conducted in part on the Gila Lower Box Recreation Area since 1993 and addition survey areas have been added over the years (Table 1). Flycatcher populations have followed the vegetative trends in the Recreation Area since a large portion was removed from grazing in 1993. Certain stages of community succession, in different locations, during certain time periods favored flycatchers more than others. Flycatcher populations did extremely well during early successional stages after the main exclosures were built (starting in 1994) and experienced another rapid boost in numbers when the Sunset Dam area was removed from grazing (in 1997). The flycatcher population peaked in 2008 with 92 pairs and 203 residents. In 2022, 17 pairs and only 34 residents were detected (Table 1).

Table 1. Surveys of Southwestern willow flycatcher populations since 1993 (* partial survey, portions of site not surveyed) from Bureau of Land Management Gila Lower Box Recreation Area, located in Grant and Hidalgo Counties, New Mexico.

	Cotton wood	Cotton wood	Main Canyon	Main Canyon	Blue/ Nichols	Blue/ Nichols	Sunset Dam	Sunset Dam	Total	Total
Year	Resident	Pair	Resident	Pair	Resident	Pair	Resident	Pair	Resident	Pair
1993	--	--	--	--	5	--	--	--	5	--
1996	--	--	--	--	7	--	--	--	7	--
1997	3	--	--*	--	2*	--	--	--	5	--
1998	0	--	--*	--	9*	--	--	--	9	--
1999	5	--	2*	--	15*	--	--	--	22	--
2000	8	--	4*	--	10*	--	--	--	22	--
2001	22	--	6*	--	15*	--	--	--	43	--
2002	46	--	12*	--	14*	--	--	--	72	--
2003	66	--	12*	--	15*	--	--	--	93	--
2005	47	19	16*	8	24*	10	--	--	87	37
2007	8	2	101	40	58	23	--	--	167	65
2008	13	5	110	50	80	37	--	--	203	92
2013	21	7	64	25	42	20	4	2	131	54
2017	6	2	9	3	27	13	18	9	60	27
2018	7	3	1	0	21	9	18	8	47	20
2019	0	0	13	6	30	15	12	5	55	26
2020	0	0	29	12	36	17	11	5	76	34
2021	0	0	22	9	22	11	4	2	48	22
2022	0	0	14	7	18	9	2	1	34	17

The entire Gila Lower Box is designated as Critical Habitat for the southwestern willow flycatcher. Presently, the habitat along the majority of the Gila Lower Box is a cottonwood gallery with minimal structure and understory. Smaller patches along the riverbank or near off-channel pools still maintain a higher level of structural vegetative complexity and higher species diversity. Drought and low flows have caused decreased vigor and mortality in willows and cottonwoods throughout the Lower Box area. Mortality due to decreased flows and drought conditions was occurring most frequently around Sunset Dam. Throughout the rest of the project area, decreased vigor with infestations of mistletoe was common primarily in cottonwoods. In 2022, extended high flows, overbank flooding, and a large flow (~18,600 cubic feet per second) have knocked down mature cottonwoods and provided the hydrologic conditions to stage a comeback for woody riparian vegetation such as Gooding's willow and coyote willow which provides structural complexity and favorable microclimates for nesting.

Yellow-billed Cuckoo and Critical Habitat

In 2013, cuckoos began to appear and stay through at least late July, suggesting breeding. From 2013 onwards until 2020, yellow-billed cuckoo populations and their habitat seemed to be improving with the maturing stands of riparian vegetation. In the three-year span from 2018-2020 an average of 6 yellow-billed cuckoo territories were detected yearly from the Nichols canyon confluence upstream to the state land boundary (6 in 2018, 7 in 2019, and 5 in 2020, but in 2020 the upstream state land parcel was also surveyed, and 4 additional territories were detected). Elsewhere in the Gila Lower box only two territories were detected from 2018-2020, both were from 2018 in-between Sunset Dam and Spring on the Bluff. In 2021 and 2022 survey efforts were more limited due to high flows and inclement weather. In 2021, three territories

were detected. Additionally, cuckoos were observed in areas where they previously had territories, but not enough observations were made to confirm territories. In 2022 only one survey was completed due to inclement weather and although cuckoos were detected, no territories were delineated. Initial 2023 survey results suggest breeding throughout Nichols Canyon.

The entire Gila Lower Box is designated as Critical Habitat for the yellow-billed cuckoo. Presently, the habitat along the majority of the Gila Lower Box is a cottonwood gallery with minimal structure and understory. Smaller patches along the riverbank or near off-channel pools still maintain a higher level of structural vegetative complexity and higher species diversity. Drought and low flows have caused decreased vigor and mortality in willows and cottonwoods throughout the Lower Box area. Mortality due to decreased flows and drought conditions was occurring most frequently around Sunset Dam. Throughout the rest of the area, decreased vigor with infestations of mistletoe was common primarily in cottonwoods.

Loach Minnow, Spikedace, and their Critical Habitat

Three sites across seven locations have been surveyed for fish on an annual basis during autumn by the BLM, NMDGF, private contractors and various cooperating entities beginning in the mid-1990s. Survey locations have included reaches on the mainstem above and below of the action area. These range from the Cherokee Canyon confluence near NM Hwy 180 downstream to the Sunset Diversion weir near Virden, New Mexico, approximately 35 miles (Figure 1). Spikedace and loach minnow have been captured intermittently - temporally and spatially – throughout the sites and across years. Density and abundance of native species has generally been lower at reaches sampled in the action area (i.e., Nichols Canyon, Gila Lower Box sites, Sunset Diversion) (Paroz *et al*. 2006). With the exception of 2019 and 2020, spikedace have not been captured within the action area since 2000 (Paroz *et al*. 2006; Propst 2016, BLM *unpublished data*). However, spikedace have been captured upstream of the action area in the USFS Bird Area and the Riverside/Iron Bridge site (Bryan Ferguson NMDGF per. comm.). Though loach minnow were captured at the Cherokee Canyon site upstream of the action area, neither species were captured during the 2023 surveys in the Gila Lower Box, which occurred after several years of atypical high flows.

The entire Gila Lower Box is designated as critical habitat for both spikedace and loach minnow. During Gila River surveys in 2019, the instream habitat within the fenced portion of the ACEC consisted of various amounts of run, riffle, and pool habitats. Stream flow during the sampling period was below historical average. Due to higher-than-average flows in most of 2021 and all of 2022 surveys of the mainstem were not performed. However, though limited to available access points (Sunset Dam, Spring on the Bluff, Fisherman's Point and Nichols Canyon), surveys were performed June of 2023. The flows were consistently high enough over the three-year period that water also flowed past Sunset Diversion, even during the typically dry spring and summer.

Factors affecting all species within the Action Area

Factors affecting the frog, gartersnakes, flycatcher, cuckoo, loach minnow, and spikedace occur in riparian areas or corridors, wetland communities and waterbodies including creeks, rivers, and

streams. They include grazing; off highway vehicle (OHV) use, dispersed camping, and recreation; low river flows from a combination of agricultural water use, drought conditions, and climate change; and nonnative species.

There is grazing that occurs on a portion of the project area. Although most of the project area is excluded from grazing, there is approximately 0.8 miles of riparian habitat on BLM lands that is grazed. Effects from grazing generally include the removal and trampling of vegetation and compaction of underlying soils which leads to inhibited germination and altered hydrology (USFWS 2014, Belsky *et al*. 1999). Long-term effects from livestock grazing can change the structure and composition of riparian vegetation (USFWS 2014). Grazing pressure on the Gila Lower Box upstream of the fence varies from year to year. When grazing pressure increases cattle tend to congregate around several spring-fed backwater ponds and other areas off channel with stands of coyote willow. Observations by contractors and BLM staff show that even with as little as 5 cattle grazing in this portion of the Gila Lower Box, habitat degradation can occur. Utilization of younger coyote willow stands and hoof action around the pools and on the riverbanks has damaged existing riparian vegetation and inhibited the regenerative capabilities of the area. Continued grazing use in this area limits the development of high foliage density in the understory and reduces structural complexity (Scott *et al*. 2003).

With the exception of 2022 and 2023, average flows from spring run-off have been significantly lower over the last decade or more. The lack of surface flows can extend greater than 1 mile upstream of the lower end of the planning area at Sunset Diversion creating a dry channel. These low flow conditions allow for OHVs to enter and travel up significant portions of the dry streambed. Further, low flow conditions in Nichols Canyon allow for OHV intrusion into the wetted channel with direct and indirect damage to aquatic species and habitats. The OHV use in the streambed can result in increased bank erosion, increased mud coatings in rocky streambeds, increased fine-sediment accumulations, and changes in the size distributions of coarse bed material (Marion *et al*., 2014). The OHV use also results in sections of the riverbank that become chronically defoliated and unstable. Currently recreation has led to the creation of several user-created roads in the Nichols Canyon floodplain that wind through the riparian area leading to haphazard campsites under the cottonwood canopy. Several of these roads pass through or by territories for cuckoo and flycatcher, and encourage recreation and camping in important areas for both birds. Low river flows in recent years have limited vegetative vigor and recovery, resulting in the mortality of riparian vegetation in several areas. Most notably, this has resulted in mortality or summer defoliation of coyote willow and Gooding's willow in the areas immediately upstream and downstream of Sunset Dam, an area that has previously been very productive for the flycatcher. In the past 5 years or so, the cottonwoods in the Gila Lower Box have matured, shading out the smaller Gooding's willow and large swathes of coyote willow, resulting in the formation of larger stretches of gallery forest lacking structural complexity. However, large flows and extended higher flows extending from the summer of 2022 to early summer in 2023 has opened the canopy and provided the hydrological conditions for those understory/midstory species to reestablish. Additionally, the lack of significant flooding events over the last decade have decreased quality habitat for spikedace and loach minnow. Scouring floods transport excess fine sediment downstream and redistribute cobble and boulder riffles in the main channel. In lower gradient reaches such as Nichols Canyon, they can wash sands of fine sediments and create run habitat with shifting sands. The OHV use in the floodplain and stream channel further disturbs these natural processes by increasing sedimentation and turbidity.

River flows and recreation (OHV and camping) use will be compounded by climate change since the Southwest has the hottest and driest climate in the United States.

The U.S. Fourth National Climate Assessment suggests that warming temperatures will lead to decreasing snowpack, increasing frequency and severity of droughts, and increasing frequency and severity of wildfires, and these in turn will result in warmer water temperatures, reduced streamflows, and increased risk of fire-related impacts to aquatic ecosystems (Gonzales *et al.* 2018; Overpeck and Bonar 2021). The effects of climate change are anticipated to increase the scale and intensity of effects on aquatic habitats, especially in high-value riparian and aquatic habitats in the arid landscape, in combination with habitat-altering activities. Aquatic species generally exhibit high vulnerability to climate change due to factors such as expected habitat loss and alterations of specific habitat (Friggens *et al.* 2013). Many are at high risk of population declines in the near future (Friggens *et al.* 2014). According to the Intergovernmental Panel on Climate Change (IPCC 2021) in "Western North America, future aridification will far exceed the magnitude of change seen in the last millennium." The IPCC (2021) predicts with high confidence that drought conditions in the Southwest will increase in duration and severity with the predicted magnitude changing depending on the emissions scenario considered.

The future of the frog, both gartersnakes, flycatcher, cuckoo, loach minnow, and spikedace is also intrinsically linked to climate change. Climate change in the southwestern United States is projected to increase temperatures, decrease precipitation, decrease snowpack, and decrease runoff and stream flow (Cayan *et al.* 2013). Specifically, projections suggest that by year 2100 1) average annual temperatures in the Southwest may increase by 2-9° F; 2) annual runoff could decrease by 10-40 percent; and 3) the severity and length of droughts and soil-moisture depletion could increase substantially (Fleishman *et al.* 2013). Increasing temperature increases the rate of evaporation and transpiration of surface water, further reducing the amount of water for these species.

Predatory nonnative fish such as largemouth bass are expected to benefit from prolonged periods of low flow (Propst *et al.* 2008, Rahel and Olden 2008). Other predatory nonnative species such as green sunfish (*Lepomis cyanellus*), channel catfish, and bluegill (*Lepomis macrochirus*), are expected to increase their distribution by 7.4 percent, 25.2 percent, and 33.3 percent, respectively (Eaton and Scheller 1996). Climate change is predicted to foster the expansion of predatory nonnative aquatic species into new areas, magnify the effects of existing aquatic nonnative species where they currently occur, increase predation rates from nonnative predators, and heighten the virulence of disease outbreaks in North America (Rahel *et al.* 2008). As annual precipitation amounts lower, base flows weaken, and pools decline in volume and persistence, aquatic vertebrate populations will be forced to occupy smaller aquatic spaces which will increase the frequency of interactions between predatory nonnative species and native species, thus increasing predation and hastening the decline of native aquatic species throughout the southwestern United States.

Effects of the Action

Effects of the action refer to the consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action 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 (84 FR 44976-45018). The BLM 2023 BA includes effects or impacts on species or critical habitat; effects or impacts will be referred to as consequences in this opinion.

Because this is a programmatic consultation and many site-specific actions have not yet been planned, we will only discuss consequences in terms of the general effects we anticipate will occur to each species and its critical habitat. The RAMP guiding principles and goals provides overarching and high-level direction for management of the Gila Lower Box. Specific components including strategies, decisions, and design features are the detailed steps proposed by BLM to implement the goals. These components provide direction to protect, limit, or mitigate effects on species or critical habitat. Discussion on the goals and components are included below. A table including goals and components (strategy, decision, and design features) that are specifically referred to in this consultation are included in Appendix A of this opinion. More detailed information on the RAMP can be found in the Gila Lower Box RAMP draft environmental assessment (BLM 2023a). Because the BLM's BA (BLM 2023b) does not authorize site-specific actions, nor do they typically prescribe the timing or exact location of specific activities, a more detailed effects discussion will occur as each site-specific project is developed, and these projects will be consulted on separately, as required. Specifically, each site-specific project or activity implemented under the RAMP that may affect a listed species or critical habitat will undergo a separate ESA section 7(a)(2) consultation.

Consequences of the proposed action on species and critical habitat in the action area

The RAMP activities are expected to occur throughout the Gila Lower Box Recreation Area in areas or habitats where federally listed species (and critical habitat if applicable) occur. Consequences (i.e., harassment, harm or alternations to habitat) to the frog, both gartersnakes, narrow headed gartersnake critical habitat, flycatcher, flycatcher critical habitat, cuckoo, cuckoo critical habitat, minnow, minnow critical habitat, spikedace, and spikedace critical habitat could occur due to RAMP activities under all goals covered in the RAMP including resource protection; recreation uses and activities; recreation infrastructure and facilities; travel, access, and trails management; education, interpretation, and partnerships; and visitor health and safety. In each section below, we reference the individual components (strategy, decision, and design feature) that were included in these sections in the BE (BLM 2023b) if they could affect species in that section. The full text from these components is included in Appendix A for this opinion. Additional information can be found in the BE (BLM 2020b) and the Gila Lower Box RAMP draft environmental assessment (EA; BLM 2023a).

Goal 1.1 Resource Protection (RP)

Based on the information included in the RP section of the draft EA (BLM 2023a) and the BE (BLM 2023b), there is a potential for consequences to the frog, both gartersnakes, flycatcher, cuckoo, loach minnow, spikedace, and designated critical habitat for all species (except the frog and northern Mexican gartersnake) based on RP strategies (1 – 4) and RP decisions (1 – 2) referenced in this section. Monitoring and design features (in the draft EA [BLM 2023a]), and conservation measures (in the BE [BLM 2023b]) may help reduce consequences to these species and designated critical habitat. Specific RP actions including construction of primitive walk-in

campsites and installation of posts and cables surrounding parking areas; and restore, revegetation, and barricade access to unauthorized routes included in the draft EA (BLM 2023a) and BE (BLM 2023b) may be beneficial to these species and designated critical habitat since it should reduce pressure and direct visitors to use unoccupied or less suitable habitat.

Goal 1.2. Recreation Uses and Activities (RUA)

Based on the information included in the RUA section of the draft EA (BLM 2023a) and the BE (BLM 2023b), there is a potential for consequences to the frog, both gartersnakes, flycatcher, cuckoo, loach minnow, spikedace, and designated critical habitat for all species (except the frog and northern Mexican gartersnake) based on RUA strategies (1 – 2) and RUA decisions (1 – 3) referenced in this section. Monitoring and design features (in the draft EA [BLM 2023a]), and conservation measures (in the BE [BLM 2023b]) may help reduce consequences to these species and designated critical habitat. Specific RUA actions include providing pedestrian access from a proposed campground to the river via a proposed trail and from the bluff to the river via an existing trail included in the draft EA (BLM 2023a) and BE (BLM 2023b) may be beneficial to these species and designated critical habitat since it should reduce pressure and direct visitors to use unoccupied or less suitable habitat.

Goal 1.3 Recreation Infrastructure and Facilities (RIF)

Based on the information included in the RIF section of the draft EA (BLM 2023a) and the BE (BLM 2023b), there is a potential for consequences to the frog, both gartersnakes, flycatcher, cuckoo, loach minnow, spikedace, and designated critical habitat for all species (except the frog and northern Mexican gartersnake) based on RIF strategies (1 – 2) and RIF decisions (1 – 4) referenced in this section. Monitoring and design features (in the draft EA [BLM 2023a]), and conservation measures (in the BE [BLM 2023b]) may help reduce consequences to these species and designated critical habitat. Specific RIF actions include establishing a walk-in boat pullout and launch; installing posts and cables surrounding the parking area for Nichols Canyon and Spring of the Bluff parking area; and establishing campsites in Nichols Canyon, Gauge Station Road, Fisherman's Point, and south of Caprock Mountain included in the draft EA (BLM 2023a) and BE (BLM 2023b) may be beneficial to these species and designated critical habitat since it should reduce pressure and direct visitors to use unoccupied or less suitable habitat.

Goal 1.4 Travel, Access, and Trails Management (TATM)

Based on the information included in the TATM section of the draft EA (BLM 2023a) and the BE (BLM 2023b), there is a potential for consequences to the frog, both gartersnakes, flycatcher, cuckoo, loach minnow, spikedace, and designated critical habitat for all species (except the frog and northern Mexican gartersnake) based on TATM strategies (1 – 4) and TATM decisions (1 – 3) referenced in this section. Monitoring and design features (in the draft EA [BLM 2023a]), and conservation measures (in the BE [BLM 2023b]) may help reduce consequences to these species and designated critical habitat. Specific TATM actions include installing a locked gate to limit unauthorized motorized access past the Gauge Station Road campground, and reestablishing and repairing existing pedestrian-only trails at Fisherman's Point and Spring on the Bluff that are included in the draft EA (BLM 2023a) and BE (BLM 2023b) may be beneficial to these species and designated critical habitat since it should reduce pressure and direct visitors to use other

unoccupied or less suitable habitat. In addition, actions including restore, revegetate, and barricade access to unauthorized routes in Nichols Canyon may be beneficial to flycatchers, cuckoos, and designated critical habitat for both species.

Goal 1.5 Education, Interpretation, and Partnerships (EIP)

Based on the information included in the EIP section of the draft EA (BLM 2023a) and the BE (BLM 2023b), there is a potential for consequences to the frog, both gartersnakes, flycatcher, cuckoo, loach minnow, spikedace, and designated critical habitat for all species (except the frog and northern Mexican gartersnake) based on EIP strategy (1) and EIP decisions (1 – 3) referenced in this section. Monitoring and design features (in the draft EA [BLM 2023a]), and conservation measures (in the BE [BLM 2023b]) may help reduce consequences to these species and designated critical habitat. Specific EIP actions include providing on-site education identifying open routes for motorized use and routes available for nonmotorized use only that are included in the draft EA (BLM 2023a) and BE (BLM 2023b) may be beneficial to these species and designated critical habitat since it should reduce pressure and direct visitors to use unoccupied or less suitable habitat.

Goal 1.6 Visitor Health and Safety (VHS)

Based on the information included in the VHS section of the draft EA (BLM 2023a) and the BE (BLM 2023b), there is a potential for consequences to the frog, both gartersnakes, flycatcher, cuckoo, loach minnow, spikedace, and designated critical habitat for all species (except the frog and northern Mexican gartersnake) based on VHS strategies (1 – 6) and VHS decisions (1 – 3) referenced in this section. Monitoring and design features (in the draft EA [BLM 2023a]), and conservation measures (in the BE [BLM 2023b]) may help reduce consequences to these species and designated critical habitat. Specific VHS actions include posting warnings for flash flood danger in the floodplain that are included in the draft EA (BLM 2023a) and BE (BLM 2023b) may be beneficial to these species and designated critical habitat since it should reduce pressure and direct visitors to use unoccupied or less suitable habitat.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Since the entire action area for this opinion is on BLM lands, then all lands within the action area are managed by a Federal agency and any activities that could potentially have consequences for listed species are Federal activities that are subject to additional section 7 consultation. However, the effects of these Federal activities are not considered cumulative effects. Forestry management practices, infrastructure maintenance, livestock grazing, off-highway vehicle use, and other activities occur on these lands and are expected to continue into the foreseeable future.

Conclusion

Chiricahua leopard frog, narrow-headed gartersnake, northern Mexican gartersnake, and narrow-headed gartersnake designated critical habitat

After reviewing the current status of the frog and both gartersnakes, the environmental baseline for the action area, the consequences of the proposed action and the cumulative effects, it is our biological opinion that implementation of BLM's Gila Lower Box RAMP will not jeopardize the continued existence of these species and will not destroy or adversely modify narrow-headed gartersnake designated critical habitat. We base our conclusion on the following:

1. Frogs and both gartersnakes are not currently known to occupy any sites in the action area; therefore, projects carried out under this plan will not result in disturbance to frogs.
2. Actions associated with several goals, strategies, and decisions focus on establishing and designating trails, roads, and camping areas. Once trails, roads and camping areas are established and designated, this will reduce the overall area used by recreationists which will reduce disturbance to frogs, both gartersnakes (if all three species become established), and narrow-headed gartersnake designated critical habitat.
3. Boating and OHV users currently use all riparian areas within the Gila Lower Box, however the RAMP includes construction of a boat launch and establishment of OHV trails. Boat launch and OHV trail construction should reduce disturbance to frogs, both gartersnakes (if all three species become established), and narrow-headed gartersnake designated critical habitat since recreationists will be more restricted in areas they use.
4. Livestock grazing does occur within the action area (0.8 miles of riparian area) although most of the action area is excluded from grazing. If frogs or either gartersnake become established and occupy any areas where livestock grazing also occurs during the life of the Gila Lower Box RAMP, then the BLM will work with the USFWS to ensure that consequences to frogs and gartersnakes are minimized.
5. While some short-term adverse effects or consequences may occur as part of implementing the management direction within the Gila Lower Box RAMP, the components (strategies, decisions, and design features) will help to minimize them and over the long-term, may lead to increased sustainability and resiliency of frogs, both gartersnakes (if all three species become established), and narrow-headed gartersnake PCEs within critical habitat will be improved.

Southwestern willow flycatcher, yellow-billed cuckoo, loach minnow, spikedace, and designated critical habitat for all four species

After reviewing the current status of the all four species (flycatcher, cuckoo, loach minnow, and spikedace), the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of BLM's Gila Lower Box RAMP will not jeopardize the continued existence of the four species and will not destroy or adversely modify designated critical habitat for all four species. We base our conclusion on the following:

1. Actions associated with several goals, strategies, and decisions focus on establishing and designating trails, roads, and camping areas. Hiking and camping will only be permitted

on identified trails and camping areas while other areas will be fenced off instead of allowing hiking and camping everywhere, what is currently allowed. Once trails, roads and camping areas are established and designated, this will reduce the overall area used by recreationists which will reduce disturbance to flycatchers, cuckoos, and designated critical habitat for both species.

2. Boating and OHV users currently use all riparian areas within the Gila Lower Box, however the RAMP includes construction of a boat launch and establishment of OHV trails. Boat launch and OHV trail construction should reduce disturbance to flycatchers, cuckoos, loach minnow, spikedace, and designated critical habitat for these species since recreationists will be more restricted in areas they use. Additionally, the boat launch construction will occur outside flycatcher and cuckoo occupied habitat.
3. The RAMP includes goals, strategies, decisions, and best management practices with regards to vegetation work. These include: avoid removing whole trees, work to occur outside breeding season (during non-breeding season from September through February), using survey information to determine where occupied flycatcher and cuckoo habitat occurs, and active vegetation restoration involving planting of native plants. These measures should reduce disturbance to flycatchers, cuckoos, and designated critical habitat for both species and the active vegetation restoration should increase the amount of future suitable flycatcher and cuckoo breeding and foraging habitat.
4. Livestock grazing does occur within the action area (0.8 miles of riparian area) although most of the action area is excluded from grazing. If flycatchers or cuckoos occupy any areas where livestock grazing also occurs during the life of the Gila Lower Box RAMP, then the BLM will work with the USFWS to ensure that consequences to flycatchers and cuckoos are minimized.
5. While some short-term adverse effects or consequences may occur as part of implementing the management direction within the Gila Lower Box RAMP, the components (strategies, decisions, and design features) will help to minimize them and over the long-term, may lead to increased sustainability and resiliency of flycatchers, cuckoos, loach minnow, Spikedace, and the PCEs within critical habitat for all four species will be improved.

Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA 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) as an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. "Harass" is defined (50 CFR § 17.3) as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take 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 incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to an applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the BLM must report the progress of the action and its impact on the species to the USFWS as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Programmatic Consultations

The proposed action described above is a "framework programmatic action" as defined in 50 CFR 402.02. In accordance with 50 CFR 402.14(i)(6), an incidental take statement is not required at the programmatic level for a framework that does not authorize future actions; incidental take resulting from any action subsequently authorized, funded, or carried out under the program will be addressed in subsequent section 7 consultation, as appropriate. This biological opinion provides a broad-scale examination of the proposed action's potential impacts on Chiricahua leopard frog, narrow-headed gartersnake, northern Mexican gartersnake, southwestern willow flycatcher, yellow-billed cuckoo, loach minnow, spikedace, and designated critical habitat for all species (except frog and northern Mexican gartersnake), but we lack reasonable certainty of where, when, and how much incidental take may occur. Therefore, we have not quantified the amount and extent of incidental take that may result from the proposed action and have not exempted such take in this biological opinion.

Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" has been defined as USFWS suggestions regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibility. In order for the USFWS to be kept informed of activities that either minimize or avoid adverse effects or that benefit listed species or their habitats, the USFWS requests notification of the implementation of the conservation recommendations. These recommendations include:

1. We recommend the BLM continue to conduct surveys to confirm the occupied areas or sites on the Gila Lower Box for flycatchers, cuckoos, loach minnow, and spikedace.
2. We recommend the BLM continue to conduct surveys to confirm the status of frogs and both gartersnakes on the Gila Lower Box.
3. We recommend the BLM continue to work with the USFWS, NMDGF, and other partners to remove non-native plants and species, and reestablish native fish on the Gila Lower Box.
4. We recommend the BLM work with USFWS, NMDGF, and other partners to develop and improve riparian habitat for frogs, both gartersnakes, flycatchers, and cuckoos.

5. We recommend the BLM continue to work with the USFWS, NMDGF, and other partners to identify factors that might limit the recovery of frogs, both gartersnakes, flycatchers, cuckoos, loach minnow, and spikedace on the Gila Lower Box and work to correct them.

Disposition of Dead of Injured Listed Species

Upon locating a dead, injured, or sick listed species, initial notification must be made to the Service's Law Enforcement Office, 4901 Paseo del Norte NE, Suite D, Albuquerque, NM 87113; 505-248-7889) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to the New Mexico Ecological Services Field Office (see contact information on Biological Opinion cover letter). 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.

Reinitiation Notice

This concludes formal consultation concerning recreation management to the threatened Chiricahua leopard frog, threatened narrow-headed gartersnake, threatened northern Mexican gartersnake, endangered southwestern willow flycatcher, threatened yellow-billed cuckoo, endangered loach minnow, endangered spikedace, and designated critical habitat for all species (except the frog and northern Mexican gartersnake) for the Bureau of Land Management Gila Lower Box Recreation Area Management Plan. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) 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 that was 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 amount or extent of incidental take is exceeded, any operations causing such take must cease pending consultation with the Service.

Literature Cited

Abarca, F.J. 1987. Seasonal and diet patterns of feeding in loach minnow. Proceedings of the Desert Fishes Council 19:20.

Barron, T. and D. Moore 2022. Middle Rio Grande Yellow-billed Cuckoo Study Results- 2021: Isleta Pueblo to Elephant Butte Reservoir, NM. Report # ENV-2022-039. Bureau of Reclamation, Technical Service Center, Denver, CO.

Boundy, J. 1994. *Thamnophis rufipunctatus*. Color and size. Herpetological Review 25(3):126-127.

Brennan, T.C. and A.T., Holycross. 2006. Field guide to amphibians and reptiles in Arizona. Arizona Game and Fish Department.

Britt, K.D. 1982. The reproductive biology and aspects of life history of *Tiaroga cobitis* in southwestern New Mexico. MS Thesis, New Mexico State University, Las Cruces, New Mexico.

Browning, M.R. 1993. Comments on the taxonomy of Empidonax traillii (willow flycatcher). Western Birds 24:241-257.

Cardinal, S.N. and E.H. Paxton. 2005. Home range, movement, and habitat use of the southwestern willow flycatcher at Roosevelt Lake, AZ – 2004. U.S. Geological Survey Report to the U.S. Bureau of Reclamation, Phoenix, AZ.

Cayan, D., M. Tyree, K E. Kunkel, C. Castro, A. Gershunov, J. Barsugli, A.J. Ray, J. Overpeck, M. Anderson, J. Russell, B. Rajagopalan, I. Rangwala, and P. Duffy. 2013. "Future Climate: Projected Average." In Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment, edited by G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, 101–125. A report by the Southwest Climate Alliance. Washington, DC: Island Press. 25 pp.

Christman, B. 2016. Summary of 2015 monitoring for the narrow-headed gartersnake (*Thamnophis rufipunctatus*), at the Tularosa River, Upper Middle Fork Gila River, Whitewater Creek, and Saliz Creek. Endangered Species Act recovery permit report for 2015 activities, submitted to the U.S. Fish and Wildlife Service's Arizona Ecological Services Office. 6 pp.

Christman, B.L., and M.R. Cummer. 2006. Stomach contents analysis of the Chiricahua Leopard Frog (*Rana chiricahuensis*) and Plains Leopard Frog (Rana blairi) in New Mexico. Final report to the New Mexico Department of Game and Fish. Share with Wildlife Contract 05-516.0000.051

Corman, T.E. and R.T. Magill. 2000. Western yellow-billed cuckoo in Arizona: 1998-1999 Survey Report. Arizona Game and Fish, Technical Report 150. March 10, 2000.

Cresswell, K.A., W.H. Satterthwaite, and G.A. Sword. 2011. Understanding the evolution of migration through empirical examples. In: Milner-Gulland EJ, Fryxell JM, Sinclair ARE, editors. Animal Migration. Oxford University Press. p. 6–16.

Davidson, C. 1996. Frog and toad calls of the Rocky Mountains. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York.

Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. Amphibians and Reptiles of New Mexico. University of New Mexico Press, Albuquerque, New Mexico.

Detting, M.D., and C.A. Howell. 2011. Status of the yellow-billed cuckoo along the Sacramento River in 2010. Report to California Department of Fish and Game. Point Reyes Bird Observatory Contribution #1794. 49 pp.

de Queiroz, A. 2003. Testing an adaptive hypothesis through context-dependence: effects of water depth on foraging behavior in three species of garter snakes. Ethology 109:369-384.

Dillon, K.G. and D. Moore. 2020. Yellow-billed Cuckoo Breeding Habitat Use: Radio Telemetry on the Middle Rio Grande, New Mexico 2019. Denver, CO: Bureau of Reclamation Technical Service Center Report No.: Report # ENV-2020-016.

Drummond, H., and C. Macías Garcia. 1983. Limitations of a generalist: a field comparison of foraging snakes. Behaviour 108(1/2):23-43.

Durst, S.L, M.K. Sogge, H.C. English, H.A. Walker, B.E. Kus, and S.J. Sferra. 2008. Southwestern willow flycatcher breeding site and territory summary – 2007. U.S. Geological Survey, Colorado Plateau Research Station, Flagstaff, AZ.

Durst, S.L. 2017. Southwestern willow flycatcher breeding site and territory summary – 2012. San Juan River Basin Recovery Implementation Program, U.S Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, NM.

Emmons, I., and E. Nowak. 2016. Northern Mexican gartersnake (*Thamnophis eques megalops*) habitat use and ecology: monitoring surveys and radiotelemetry in the Verde Valley, Arizona. Final Report to Arizona Game and Fish Department Heritage Fund IIAPM Program, Grant # I12028. 73 pp.

Ernst, C.H., and E.M. Ernst. 2003. Snakes of the United States and Canada. Smithsonian Institution. 668 pp.

Finch, D.M. and S.H. Stoleson, eds. 2000. Status, ecology, and conservation of the southwestern willow flycatcher. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 131 p.

Fleharty, E.D. 1967. Comparative ecology of *Thamnophis elegans*, *T. cyrtopsis*, and *T. rufipunctatus* in New Mexico. The Southwestern Naturalist 12(3):207-229.

Gartersnake Conservation Working Group (GCWG). 2016. Northern Mexican and narrow-headed gartersnake 2016 survey results presented at the Gartersnake Conservation Working Group annual meeting December 1-2, 2016. Unpublished report. 8 pp.

Geluso, K. 2018. Email from Keith G. to Jeff Servoss and Michelle Christman (gartersnake leads for AZ and NM) regarding dead on road Thamnophis eques found on 15 July 2018.

Gonçalves Loureiro, T., P.M. Gentil Anastácio, P. Beatriz Araujo, C. Souty-Grosset, and M. Pereira Almerão. 2015. Nauplius 23(1):1-19.

Griffin, D.J. 2015. Surveys for Yellow-billed Cuckoos at Buenos Aires National Wildlife Refuge, Pima County, Arizona. Sasabe, AZ: Griffin Biological Services.

Groschupf, K. 1987. Status of the yellow-billed cuckoo (Coccyzus americanus occidentallis) in Arizona and West Texas.

Halterman, M.D. 2001. Population status of the yellow-billed cuckoo at the Bill Williams River NWR and Alamo Dam, Arizona, and southern Nevada: Summer 2000. Weldon, CA: Southern Sierra Research Station.

Halterman, M.M. 2009. Sexual dimorphism, detection probability, home range, and parental care in the yellow-billed cuckoo. Ph.D. Dissertation, Univ. of Nevada, Reno, NV.

Harding, J. 1997. Amphibians and Reptiles of the Great Lakes Region. The University of Michigan Press, Ann Arbor, Michigan

Hendrickson, D.A., and W.L. Minckley. 1984. Cienagas - vanishing climax communities of the American Southwest. Desert Plants 6(3):131-175.

Hibbitts, T.J. and L.A. Fitzgerald. 2005. Morphological and ecological convergence in two natracine snakes. Biological Journal of the Linnean Society 85:363-371.

Hockett, K., A. Clark, Y. Leung, J.L. Marion, and L. Park. 2010. Deterring off-trail hiking in protected natural areas: Evaluating options with surveys and unobtrusive observation. Virginia Polytechnic Institute and State University, College of Natural Resources, Forestry/Recreation Resources. Blacksburg, Virginia.

Holycross, A.T., W.P. Burger, E.J. Nigro, and T.C. Brennan. 2006. Surveys for *Thamnophis eques* and *Thamnophis rufipunctatus* along the Mogollon Rim and New Mexico. A Report to Submitted to the Arizona Game and Fish Department. 94 pp.

Hotle, D.L. 2013. Preliminary Report on the Verification of Thamnophis eques in New Mexico. 6 pp.

Howell, S.N.G., and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press, New York, New York. 851 pp.

Hubbard, J.P. 1978. Revised checklist of the birds of New Mexico. New Mexico Ornithological Society Publication no. 6.

Hubbard, J.P. 1987. The Status of the Willow Flycatcher in New Mexico. Endangered Species Program, New Mexico Department of Game and Fish, Sante Fe, New Mexico. 29 pp.

Hughes, J.M. 2015. Yellow-billed Cuckoo (Coccyzus americanus). In: Rodewald PG, editor. The Birds of North America Online. Ithaca, NY: Cornell Lab of Ornithology. [accessed 2021 Aug 24]. https://birdsoftheworld.org/bow/historic/bna/yebcuc/2.0/introduction.

Jennings, R., and B. Christman. 2012. Dry and wet season habitat use of the narrow-headed gartersnake, *Thamnophis rufipunctatus*, in southwestern New Mexico. Final Report submitted to Share with Wildlife, New Mexico Department of Game and Fish. 34 pp.

Jennings, R.D., B.L. Christman, and J.T. Giermakowski. 2019. 2019 Status Report Narrow-headed Gartersnake (*Thamnophis rufipunctatus*) Surveys in Southwestern New Mexico.

Jones, A.K., A.S. Makinster, and J.M. Carter. 2014. Status and distribution of roundtail chub (Gila robusta) and headwater chub (*Gila nigra*) in the Lower Colorado River Basin, Arizona. Arizona Game and Fish Department. Unpublished report. 146 pp.

Frost, J.S., and J.T. Bagnara. 1977. Sympatry between *Rana blairi* and the southern form of leopard frog in southeastern Arizona (Anura: Ranidae). Southwestern Naturalist 22:443-453.

Frost, J.S., and J.E. Platz. 1983. Comparative assessment of modes of reproductive isolation among four species of leopard frogs (*Rana pipiens* Complex). Evolution 37(1):66-78.

Kagan, R.A., T.C. Viner, P.W. Trail, and E.O. Espinoza. 2014. Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Report. National Fish and Wildlife Forensics Laboratory.

Kats, L.B., and R.P. Ferrer. 2003. Alien predators and amphibian declines: review of two decades of science and the transition to conservation. Diversity and distributions 9(2):99-110.

Laymon, S.A. 1980. Feeding and nesting behavior of the yellow-billed cuckoo in the Sacramento Valley. California Dept. of Fish and Game, Wildlife Management Branch, Sacramento, CA, Admin Rep. 80-2.

Laymon, S.A., and M.D. Halterman. 1985. Yellow-billed Cuckoos in the Kern River Valley: 1985 Population, Habitat Use, and Management Recommendations. Kern River Preserve, The Nature Conservancy.

Laymon, S.A, P.L. Williams, and M.D. Halterman. 1997. Breeding Status of the Yellow-billed Cuckoo on the South Fork Kern River Valley, Kern County, California: Summary Report 1985-1997. USDA Forest Service Sequoia National Forest Report No.: Cost Share Grant 92-5-13.

Lemos-Espinal, J.A. and H.M. Smith. 2007. Anfibios y reptiles del estado de Chihuahua, México/Amphibians and reptiles of the state of Chihuahua, Mexico. Universidad Nacional Autonoma de México y CONABIO, México DF.

Longcore T, C. Rich, and S.A. Gauthreaux Jr. 2005. Scientific Basis to Establish Policy Regulating Communications Towers To Protect Migratory Birds: response to Avatar Environmental, LLC., report regarding migratory bird collisions with communications towers, WT Docket No. 03–187. Federal Communications Commission Notice of Inquiry. Los Angeles, CA: Land Protection Partners.

Lopez, M. 2010. E-mail correspondence from Mike Lopez, Fish Program Manager, Arizona Game and Fish Department (January 29, 2010; 1051 hrs.).

Marion, D.A., J.D. Phillips, C. Yocum, and S.H. Mehlhope. 2014. Stream channel responses and soil loss at off-highway vehicle stream crossings in the Ouachita National Forest. Geomorphology, 216, 40-52. https://doi.org/10.1016/j.geomorph.2014.03.034

Marion, J.L., J. Wimpey, J. Arredondo, and F. Meadema. 2020. Sustainable Camping Best Management Practices. United States Geological Survey, Virginia Tech Field Unit. Harpers Ferry, West Virginia.

Marsh, P.C., F.J. Abarca, M.E. Douglas and W.L. Minckley. 1989. Spikedace (Meda fulgida) and loach minnow (*Tiaroga cobitis*) relative to introduced red shiner (*Cyprinella lutrensis*). Arizona Game and Fish Department, Phoenix, Arizona.

McLeod, M.A., T.J. Koronkiewicz, B.T. Brown, and S.W. Carothers. 2005. Southwestern willow flycatcher surveys, demography, and ecology along the lower Colorado River and tributaries. Annual report submitted U.S. Bureau of Reclamation, Boulder City, NV, by SWCA Environmental Consultants, Flagstaff, AZ.

McNeil, S.E., D. Tracy, J.R. Stanek, J.E. Stanek, and S.S.R. Station. 2013. Yellow-billed Cuckoo Distribution, Abundance, and Habitat Use on the Lower Colorado River and Tributaries 2008-2012 Summary Report. Boulder City, NV: Lower Colorado River Multi-Species Conservation Program, U.S. Bureau of Reclamation.

McNeil, S.E., D. Tracy, and C.D. Capello. 2015. Loop migration by a western yellow-billed cuckoo wintering in the Gran Chaco. Western Birds. 46:24–215.

Miller, R.R. 1961. Man and the changing fish fauna of the American southwest. Papers of the Michigan Academy of Science, Arts, and Letters XLVI:365-404.

Miller, D. 1998. Fishery survey report of Negrito Creek within the Gila National Forest, New Mexico. Western New Mexico University and U.S. Forest Service. Gila National Forest, Silver City, New Mexico.

Minckley, W.L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Phoenix, Arizona.

New Mexico Department of Game and Fish (NMDGF). 2009. Inventory of the East, Middle and West Forks of the Gila River 2005-2008. Santa Fe, New Mexico.

New Mexico Department of Game and Fish (NMDGF). 2010. Gila Monitoring Database. Unpublished data (Microsoft Access). Santa Fe, New Mexico.

New Mexico Department of Game and Fish (NMDGF). 2017. Restoration of Gila trout (*Onchorynchus gilae*) and other native fishes to Whitewater Creek, New Mexico. Biological assessment and biological evaluation addendum. Prepared for the U.S. Forest Service and U.S. Fish and Wildlife Service.

Nowak, E. 2006. Monitoring surveys and radio-telemetry of narrow-headed gartersnakes (*Thamnophis rufipunctatus*) in Oak Creek, Arizona. Final Report to the Arizona Game and Fish Department. 40 pp.

Nowak, E.M., and V.L. Boyarski. 2012. *Thamnophis eques megalops* (Northern Mexican Gartersnake). Reproduction: Litter size. Herpetological Review 43(2):351-352.

Nowak, E.M., and M.A. Santana-Bendix. 2002. Status, distribution, and management recommendations for the narrow-headed garter snake (*Thamnophis rufipunctatus*) in Oak Creek, Arizona. Final Report to the Arizona Game and Fish Department. Heritage Grant I99007. 57 pp.

Nussbaum, R.A., E.D. Brodie, and R.M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. Idaho University Press, Moscow, Idaho.

Painter, C.W. and T.J. Hibbitts. 1996. *Thamnophis rufipunctatus*. Maximum size. Herpetological Review 27(3):147.

Peterson, R.T. 1990. A field guide to western birds. Third edition. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.

Phillips, A.R. 1948. Geographic variation in Empidonax traillii. The Auk 65:507-514.

Phillips, A.R., J. Marshall, and G. Monson. 1964. The Birds of Arizona. University of Arizona Press, Tucson, Arizona. 212 pp.

Platz, J.E., and J.S. Mecham. 1979. *Rana chiricahuensis*, a new species of leopard frog (*Rana pipiens* Complex) from Arizona. Copeia 3:383-390.

Platz, J.E., and J.S. Mecham. 1984. *Rana chiricahuensis*. Catalogue of American Amphibians and Reptiles 347.1.

Poff, L.N., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegaard, B.D. Richter, R.E. Sparks and J.C. Stromberg. The Natural Flow Regime. BioScience, Vol. 47, No. 11 (Dec. 1997), pp. 769-784.

Propst, D.L., and K.R. Bestgen. 1991. Habitat and biology of the loach minnow, Tiaroga cobitis, in New Mexico. Copeia 1991:29-38.

Propst, D.L., K.R. Bestgen and C.W. Painter. 1988. Distribution, status, biology, and conservation of the loach minnow (Tiaroga cobitis) in New Mexico. Endangered Species Report 17. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Pulido, F., T. Coppack, and P. Berthold. 2001. Genetic variation and phenotypic plasticity may explain adaptive changes in the timing of Autumn migration. The Ring. 23:149–158.

Ridgely, R.S., and G. Tudor. 1994. The Birds of South America: Suboscine Passerines. University of Texas Press, Austin, Texas.

Rinne, J.N. 1989. Physical habitat uses by loach minnow, *Tiaroga cobitis*, in southwestern desert streams. Southwestern Naturalist 34:109-117.

Rorabaugh, J.C. 2008. An introduction to the herpetofauna of mainland Sonora, México, with comments on conservation and management. Journal of the Arizona-Nevada Academy of Science 40(1):20-66.

Rosen, P. C., and C.R. Schwalbe. 1988. Status of the Mexican and narrow-headed garter snakes (*Thamnophis eques megalops* and *Thamnophis rufipunctatus rufipunctatus*) in Arizona. Unpubl. report from Arizona Game and Fish Dept. (Phoenix, Arizona) to U.S. Fish and Wildlife Service, Albuquerque, New Mexico. iv + 50 pp + appendices.

Rossman, D.A., N.B. Ford, and R.A. Seigel. 1996. The Garter Snakes. University of Oklahoma Press: Norman, Oklahoma. 332 pp.

Scott, N.J., and R.D. Jennings. 1985. The tadpoles of five species of New Mexican leopard frogs. The Museum of Southwestern Biology: Occasional Papers No. 3, December 3, 1985.

Sechrist, J.D., E.H. Paxton, D.D. Ahlers, R.H. Doster, and V.M. Ryan. 2012. One Year of Migration Data for a Western Yellow-billed Cuckoo. Western Birds. 43(1):2–11.

Sferra, S., C. Drost, T.C. Theimer, and N. Beauregard. 2019. Investigating Western Yellow-billed Cuckoo Breeding Status in the Mountains of Southeastern Arizona; Implications for Recovery Annual report, 2018. Flagstaff, AZ.

Sogge, M.K., R.M. Marshall, S.J. Sferra, and T.J. Tibbitts. 1997. A southwestern willow flycatcher survey protocol and breeding ecology summary. National Park Service/Colorado Plateau Res. Station/N. Arizona University, Tech. Rept. NRTR-97/12. 37 pp.

Sogge, M.K., D. Ahlers, and S.J. Sferra. 2010. A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher. U.S. Geological Survey Techniques and Methods 2A-10. Available at: https://pubs.usgs.gov/tm/tm2a10/pdf/tm2a10.pdf.

Sredl, M.J., and R.D. Jennings. 2005. *Rana chiricahuensis*: Platz and Mecham, 1979, Chiricahua leopard frogs. Pages 546-549 in J.M. Lanoo (ed), Amphibian Declines: The Conservation Status of United States Species. University of California Press, Berkeley, California.

Stiles, F.G., and A.F. Skutch. 1989. A guide to the birds of Costa Rica. Comstock, Ithaca, New York. 364 pp.

Sublette, J.E., M.D. Hatch, and M.S. Sublette. 1990. The fishes of New Mexico. University of New Mexico Press, Albuquerque, NM.

U.S. Bureau of Land Management (BLM). 1985. Gila River Coordinated Resource Management Plan. Las Cruces District Office Lordsburg Resource Area, New Mexico. 1985.

U.S. Bureau of Land Management (BLM). 1988. BLM Manual 1613—Areas of Critical Environmental Concern. Washington, DC. Internet website: https://www.ntc.blm.gov/krc/uploads/360/5_1613_ACEC_Manual%201988.pdf.

U.S. Bureau of Land Management (BLM). 1993 Mimbres Resource Management Plan. Las Cruces District Office Mimbres Resource Area. https://eplanning.blm.gov/eplanning-ui/project/72801/570.

U.S. Bureau of Land Management (BLM). 2007. The Gold Book Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. Fourth Edition, Revised 2007. https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/the-gold-book.

U.S. Bureau of Land Management (BLM). 2012a. BLM Manual 6330—Management of Wilderness Study Areas (Public). Washington, DC. Internet website: https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter_blmpolicymanual6330.pdf.

U.S. Bureau of Land Management (BLM). 2012b. BLM Manual 6400—Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management. Washington, DC. Internet website: https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter_blmpolicymanual6400.pdf.

U.S. Bureau of Land Management (BLM). 2023a Gila Lower Box Recreation Area Management Plan 2023a. February 2023.

U.S. Bureau of Land Management (BLM). 2023b Gila Lower Box Recreation Area Management Plan 2023b. Biological Evaluation

U. S. Fish and Wildlife Service (USFWS). 1986a. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Spikedace; final rule. Federal Register: 51(126): 23769-23781.

U. S. Fish and Wildlife Service (USFWS). 1986b. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Loach Minnow; final rule. Federal Register: 51(208): 39468-39478.

U. S. Fish and Wildlife Service (USFWS). 1991a. Spikedace Recovery Plan. Albuquerque, New Mexico. 38 pp.

U. S. Fish and Wildlife Service (USFWS). 1991b. Loach Minnow Recovery Plan. Albuquerque, New Mexico. 38 pp.

U. S. Fish and Wildlife Service (USFWS). 1994. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Threatened Loach Minnow (*Tiaroga cobitis*); final rule. Federal Register: 59(45):10898-10906.

U. S. Fish and Wildlife Service (USFWS). 1995. Final rule determining endangered status for the southwestern willow flycatcher. Federal Register 60(38):10694–10715.

U. S. Fish and Wildlife Service (USFWS). 2002a. Endangered and Threatened Wildlife and Plants; Listing of the Chiricahua Leopard Frog (*Rana chiricahuensis*). Federal Register: 67(114):40790-40811.

U. S. Fish and Wildlife Service (USFWS). 2002b. Southwestern Willow Flycatcher Recovery Plan, Region 2, Albuquerque, NM.

U.S. Fish and Wildlife Service (USFWS). 2007. Chiricahua leopard frog. Final Recovery Plan. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service (USFWS). 2011. Chiricahua leopard frog (*Lithobates* [=*Rana*] *chiricahuensis*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Arizona Ecological Services Office, Phoenix, Arizona.

U.S. Fish and Wildlife Service (USFWS). 2012a. Endangered and Threatened Wildlife and Plants; Endangered Status and Designations of Critical Habitat for Spikedace and Loach Minnow; final rule. Federal Register 77(36):10810-10932

U.S. Fish and Wildlife Service (USFWS). 2012b. Endangered and Threatened Wildlife and Plants; Listing and Designation of Critical Habitat for the Chiricahua Leopard Frog; final rule. Federal Register 77(54):16324-16424.

U.S. Fish and Wildlife Service (USFWS). 2012c. 5-Year Review: Summary and Evaluation. Loach Minnow (Tiaroga cobitis) Current Classification: Endangered. U.S. Fish and Wildlife service, Arizona Ecological Services Office, Phoenix, Arizona. 5 pp.

U.S. Fish and Wildlife Service (USFWS). 2013a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Southwestern Willow Flycatcher. Federal Register 78(2):344–534.

U.S. Fish and Wildlife Service (USFWS). 2013b. Endangered and Threatened Wildlife and Plants; Threatened Status for the Northern Mexican Gartersnake and the Narrow-headed Gartersnake; proposed rule. Federal Register 78(132):41500-41547.

U.S. Fish and Wildlife Service (USFWS). 2013c. Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*); proposed rule. Federal Register 78(192):61622-61666.

U.S. Fish and Wildlife Service (USFWS). 2014a. Endangered and Threatened Wildlife and Plants; Threatened Status for the Northern Mexican Gartersnake and Narrow-Headed Gartersnake; final rule. Federal Register 79(130):38678-38746.

U.S. Fish and Wildlife Service (USFWS). 2014b. Southwestern Willow Flycatcher (Empidonax traillii extimus) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Arizona Ecological Service, Phoenix, Arizona. 104 pp.

U.S. Fish and Wildlife Service (USFWS). 2014c. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*); final rule. Federal Register 79(192):59992-60038.

U.S. Fish and Wildlife Service (USFWS). 2019. Loach Minnow Recovery Plan Amendment. 22 pp.

U.S. Fish and Wildlife Service (USFWS). 2021a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo; final rule. Federal Register 86(75):20798-21005.

U.S. Fish and Wildlife Service (USFWS). 2021b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Northern Mexican Gartersnake.; final rule. Federal Register 86(80):22518-22580.

U.S. Fish and Wildlife Service (USFWS). 2021c. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Narrow-headed gartersnake; final rule. Federal Register 86(201):58474-58523.

U.S. Fish and Wildlife Service (USFWS). 2023a. Loach Minnow (Tiaroga cobitis) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Arizona Ecological Services Office, Phoenix, Arizona. 58 pp.

U.S. Fish and Wildlife Service (USFWS). 2023b. Chiricahua Leopard Frog (Lithobates [=Rana] chiricahuensis) 5-Year Status Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Arizona Ecological Services Office, Phoenix, Arizona. 23 pp.

Unitt, P. 1987. Empidonax traillii extimus: An endangered subspecies. Western Birds 18:137-162.

Wallace, C.S.A, M.L. Villarreal, and C. Riper III. 2013. Influence of monsoon-related riparian phenology on yellow-billed cuckoo habitat selection in Arizona. Pearson R, editor. Journal of Biogeography. 40(11):2094–2107. doi:10.1111/jbi.12167.

Wilcox, J. 2015. E-mail correspondence John Wilcox (Zone Wildlife Biologist, Tonto National Forest, U.S. Forest Service). (December 4, 2015; 1532 hrs.).

Williams, J.E., D.B. Bowman, J.E. Brooks, A.A. Echelle, R.J. Edwards, D. A. Hendrickson, and J.J. Landye. 1985. Endangered aquatic ecosystems in North American deserts with a list of vanishing fishes of the region. Journal of the Arizona-Nevada Academy of Science 20:1-62.

Wohner, P.J., S.A. Laymon, J.E. Stanek, S.L. King, and R.J. Cooper. 2021. Early successional riparian vegetation is important for western Yellow-billed Cuckoo nesting habitat. Restoration Ecology 29(5). doi:10.1111/rec.13376.

Wood, D.A., I.D. Emmons, E.M. Nowak, B.L. Christman, A.T. Holycross, R.D. Jennings, and A.G. Vandergast. 2018. Conservation genomics of the Mogollon Narrow-headed gartersnake (Thamnophis rufipunctatus) and Northern Mexican gartersnake (Thamnophis eques megalops): U.S. Geological Survey Open-File Report 2018 – 1141, 47 pp. Available at: https://doi.org/10.3133/ofr20181141.

Zug, G.R., L.J. Vitt, and J.P. Caldwell. 2001. Herpetology: An Introductory Biology of Amphibians and Reptiles, 2nd edition. Academic Press, San Diego, California.

Zweifel, R.G. 1968. Reproductive biology of anurans of the arid Southwest, with emphasis on adaptation of embryos to temperature. Bulletin of the American Museum of Natural History Volume 140:Article 1.

Appendix A – Goals, Strategies, and Decisions

Bureau of Land Management's Gila Lower Box Recreation Area Management Plan components including goals, strategies, and decisions used for the management of recreation in the Gila Lower Box planning area.

A.6.2.1 Goal 1.1 Resource Protection

Emphasize resource protection while improving the quality of outdoor recreation opportunities in the Gila Lower Box SRMA.

There is the potential for visitor use to impact natural resources, such as disturbing vegetation and wildlife through the continued use of user-created routes and unauthorized OHV use. The BLM would balance recreation use in the Gila Lower Box planning area through the following strategies and decisions to protect resources.

A.6.2.1.1 Resource Protection Strategy 1

Restore areas with native plant materials appropriate for use within the Gila Lower Box SRMA.

A.6.2.1.2 Resource Protection Strategy 2

Restore burned areas or degraded habitats to improve wildlife habitat and visitor enjoyment of the Gila Lower Box SRMA.

A.6.2.1.3 Resource Protection Strategy 3

Implement a combination of active and passive restoration methods and revegetate unauthorized user-created routes in the ACEC and WSA. Some restoration options include:

Passive Restoration Options

- Physical barriers at road heads, such as posts and cables, boulders, and berms
- Signage indicating the route is closed for restoration
- Vertical mulching at road access points (endcaps) to the line of sight
- Using salvaged dead plant material and substrate to disguise road access and encourage plant recolonization
- Allowing routes to restore naturally

Active Restoration Options

- Decompaction and imprinting to include a 1-inch harrow and heavy machinery, imprinting de-compacted surfaces to create seed catches and encourage colonization, and/or manual seeding
- If severe erosion is occurring, recontouring to shed water more effectively

A.6.2.1.4 Resource Protection Strategy 4

Acquire properties and conservation easements from willing parties to improve the protection of sensitive habitats and scenic viewsheds.

A.6.2.1.5 Resource Protection Decision 1

Ensure rules, regulations, and ethics are clearly posted and enforced, including use restrictions, limitations, and closures.

A.6.2.1.6 Resource Protection Decision 2

Prioritize avoidance of sensitive resources when designating or creating trails.

A.6.2.2 Goal 1.2. Recreation Uses and Activities

Facilitate visitor participation in uses that are compatible with the Gila Lower Box SRMA, ACEC, and WSA designations. Minimize conflicts between recreational user groups and potential impacts from recreation on natural and cultural resources by minimizing, mitigating, or prohibiting noncompatible recreational activities in certain areas or at certain times.

Currently, recreation use of the Gila Lower Box SRMA is largely focused on primitive activities, including fishing, boating, camping, hiking, and nature viewing. OHV use also occurs on roads open to motorized access and in washes. Activities occur mainly in a primitive setting with minimal site controls and few interactions with other users. The proposed RAMP would emphasize dispersed water-based and water-dependent recreation, primarily fishing, boating, camping, hiking, and nature viewing, as the primary activities within the area, while allowing for OHV use on authorized roads and washes.

A.6.2.2.1 Recreation Uses and Activities Strategy 1

Encourage responsible recreation and trail use.

A.6.2.2.2 Recreation Uses and Activities Strategy 2

Address visitor health and safety, resource protection and use, and user conflicts by implementing management controls along the primary access corridors and in camping areas.

A.6.2.2.3 Recreation Uses and Activities Decision 1

Manage the Gila Lower Box SRMA primarily for dispersed water-based and water-dependent recreation, including fishing, boating, camping, hiking, and nature viewing, while allowing OHV use on authorized roads and washes.

A.6.2.2.4 Recreation Uses and Activities Decision 2

Evaluate special recreation permit applications pursuant to BLM Handbook 2930.

A.6.2.2.5 Recreation Uses and Activities Decision 3

Manage specific sites for the following area settings and opportunities:

Nichols Canyon

- Allow dispersed water-based and water-dependent recreation, primarily fishing, boating, camping, and nature viewing, accessed via Nichols Canyon Road.
- Preserve wild and scenic river outstandingly remarkable value characteristics with activities that occur in a primitive or semiprimitive setting with moderate site controls and few interactions with other uses.

Gauge Dispersed Camping Area

- Provide for dispersed camping and nature-viewing opportunities accessible by OHVs via an existing road.
- Maintain camping in a primitive or semiprimitive setting with minimal site controls and few interactions with other users.
- Provide pedestrian access from the proposed campground to the river via a proposed trail.

Fisherman's Point

- Allow for bird-watching and other nature-viewing and dispersed camping opportunities accessible via an existing county road and spur route.
- Provide pedestrian access from the bluff to the river via an existing trail.
- Preserve activities that occur in a primitive or semiprimitive setting with minimal site controls and few interactions with other users.

Spring on the Bluff

- Allow for trail-based recreation opportunities with river access.
- Provide access via an existing county road.
- Provide pedestrian access from the bluff to the river via the Spring on the Bluff Trail.
- Continue activities in a primitive setting with minimal site controls and few interactions with other users.

Caprock Campground

- Provide developed camping opportunities that are accessible by motor vehicle via an existing county road.
- Maintain camping in a semiprimitive setting with extensive site controls and a high potential for interactions with other users.

A.6.2.3 Goal 1.3 Recreation Infrastructure and Facilities

Prioritize the maintenance of existing facilities and infrastructure. Construct new facilities and infrastructure to improve recreation experiences and protect natural resources.

A.6.2.3.1 Recreation Infrastructure and Facilities Strategy 1

Maintain and improve existing facilities as funding and partnerships permit. Consider new facilities on a case-by-case basis.

A.6.2.3.2 Recreation Infrastructure and Facilities Strategy 2

Upgrade and maintain water gates across the river to restrict livestock while enabling boater access.

A.6.2.3.3 Recreation Infrastructure and Facilities Decision 1

Allow recreational mining and rock hounding pursuant to the Mimbres RMP, ACEC, and WSA.

A.6.2.3.4 Recreation Infrastructure and Facilities Decision 2

Acquire properties and easements from willing parties to improve public river access for fishing, boating, safe portage access, trails, and other types of recreation.

A.6.2.3.5 Recreation Infrastructure and Facilities Decision 3

Establish the following site-specific recreation infrastructure and facilities:

Nichols Canyon

- Construct three to five primitive walk-in campsites with fire rings above the Nichols Canyon floodplain. Limit campfires to fire rings.
- Establish a walk-in boat pullout and launch with informational river access signage at the riverside terminus of the new pedestrian trail.
- Construct a parking lot, kiosk, and trailhead approximately 0.15 miles past the existing cattleguard across Nichols Canyon Road. Install posts and cable surrounding the parking area.
- Install signage alerting visitors of the electric range fencing crossing the river.

Gauge Dispersed Camping Area

- Establish a post and cable boundary of the Gila Lower Box WSA along the Gauge Station Road from the intersection with the old mining road to the locked gate.
- Establish a primitive (dispersed) campground and signage off the Gauge Station Road after it turns west.
- Install a kiosk with a map indicating access to the Gila River from the camping area.

Fisherman’s Point

- Install informational signage as needed, dependent on use. Provide pedestrian access from the bluff to the river via an existing trail.
- Establish a trailhead and parking area at the end of the county road leading to the WSA.

- Establish a small parking area on the spur route before the nonmotorized trailheads downhill to the primitive (dispersed) camping area.
- Establish a primitive (dispersed) camping area near the beginning of the pedestrian trail.

Spring on the Bluff

- Establish a new trailhead and formalize the existing parking area at the intersection of the county road and the existing pedestrian trail.
- Install posts and cables to designate the pull-out parking area.
- Install signage as needed, dependent on use.

Caprock Campground

- At a location south of Caprock Mountain accessed via White Rock Canyon Road, establish a 1.6-acre campground, including developed sites, a kiosk, pit toilets, fire rings, water, and a site host location.
- Establish the campground once visitor monitoring data demonstrate a demand.
- Establish an informational kiosk to serve as an entry portal to the Gila Lower Box SRMA.

A.6.2.3.6 Recreation Infrastructure and Facilities Decision 4

With increased use, evaluate the potential of establishing a fee area for all or portions of the SRMA.

A.6.2.4 Goal 1.4 Travel, Access, and Trails Management

Maintain a designated road and trail system that protects natural resources and provides access to recreation opportunities in the Gila Lower Box planning area.

Dirt roads and trails are the primary means of access in the Gila Lower Box planning area. The following strategies and decisions are intended to enhance trail-based recreation opportunities, while protecting and enhancing the area's natural resources through strategies that keep visitors on designated trails.

A.6.2.4.1 Travel, Access, and Trails Management Strategy 1

Prevent new user-created trails using signs, barriers, other infrastructure, and enforcement.

A.6.2.4.2 Travel, Access, and Trails Management Strategy 2

Consider seasonal or temporary closures following weather events to reduce trail impacts from visitor use.

A.6.2.4.3 Travel, Access, and Trails Management Strategy 3

Install barriers to prevent motorized access to the ACEC and WSA.

A.6.2.4.4 Travel, Access, and Trails Management Strategy 4

Install information signs identifying the boundaries of the ACEC and WSA.

A.6.2.4.5 Travel, Access, and Trails Management Decision 1

Manage the Gila Lower Box ACEC and WSA as closed to cross-country OHV use, and limit OHV travel to existing county roads.

A.6.2.4.6 Travel, Access, and Trails Management Decision 2

Prohibit motorized use in the river channel.

A.6.2.4.7 Travel, Access, and Trails Management Decision 3

Implement the following site-specific travel, access, and trails management decisions:

Nichols Canyon

- Repair and realign Nichols Canyon Road to a condition that accommodates OHV access to the new proposed parking area approximately 0.15 miles past the existing cattle guard across the road within the wash; manage the road as open to motorized access up until the proposed parking area.
- Restore, revegetate, and barricade access to unauthorized routes in Nichols Canyon.
- Construct new primitive campsites above the Nichols Canyon floodplain.
- Install signage alerting visitors of the electric range fencing crossing the river and replace the existing livestock fence on the river's south bank with a U- or V-shaped pass-through gate.

Gauge Dispersed Camping Area

- Maintain motorized access via a roadway that is a valid existing right.
- Designate the existing route from the new primitive campground to the Nichols Canyon floodplain for nonmotorized and administrative access. Install a locked gate to limit unauthorized motorized access past the campground.
- Establish a new nonmotorized trail from the Gauge Station Road to the Nichols Canyon floodplain.
- Manage the old mining road heading east from the Gauge Station Road for nonmotorized and administrative access. Install a locked fence at the intersection of the Gauge Station Road and the old mining road to prevent unauthorized motorized access.

Fisherman's Point

- Manage the spur route from the junction with the county road to where the route heads downhill as open to motorized travel. Decommission and restore a portion of the spur route where it heads downhill. Manage the remainder of the spur route heading downhill to its terminus at Fisherman's Point for nonmotorized travel only.

- Reestablish and repair the existing pedestrian trail to provide safe pedestrian-only access from the new trailhead to the river.

Spring on the Bluff

- Reestablish the Spring on the Bluff Trail for pedestrian access only.

A.6.2.5 Goal 1.5 Education, Interpretation, and Partnerships

Expand visitor understanding of the Gila Lower Box planning area by providing diverse educational and interpretive opportunities.

A.6.2.5.1 Education, Interpretation, and Partnerships Strategy 1

Provide on-site and offsite education and interpretation opportunities that inform the public of the area's natural and cultural resources, describe the allowed recreation uses, and identify open routes for motorized use and those available for nonmotorized use only.

A.6.2.5.2 Education, Interpretation, and Partnerships Decision 1

Install interpretive materials at existing and new kiosks and/or trailhead locations.

A.6.2.5.3 Education, Interpretation, and Partnerships Decision 2

Develop educational materials to advise visitors of resource considerations in the Gila Lower Box planning area.

A.6.2.5.4 Education, Interpretation, and Partnerships Decision 3

Develop educational materials to advise boaters to avoid floating through water that anglers are fishing.

A.6.2.6 Goal 1.6 Visitor Health and Safety

Provide enjoyable and safe experiences for visitors while recognizing there are limitations on the capability of the BLM and its staff, volunteers, partners, and contractors to eliminate all hazards.

A.6.2.6.1 Visitor Health and Safety Strategy 1

Strive to protect human life and provide for injury-free visits. The recreational activities of some visitors may pose a personal risk to participants, which the BLM cannot totally control. Gila Lower Box visitors must assume a substantial degree of responsibility for their own safety when visiting areas that are managed and maintained as natural, cultural, or recreational environments.

A.6.2.6.2 Visitor Health and Safety Strategy 2

Prioritize saving human life over all other management actions.

A.6.2.6.3 Visitor Health and Safety Strategy 3

Ensure public safety, protect federal land resources, and continue to create an environment to promote the health and safety of visitors, staff, and nearby residents by working with local, state, and federal agencies. These are the BLM's primary responsibilities.

A.6.2.6.4 Visitor Health and Safety Strategy 4

Encourage courteous and safe behavior by all users.

A.6.2.6.5 Visitor Health and Safety Strategy 5

Enforce rules and regulations using BLM law enforcement.

A.6.2.6.6 Visitor Health and Safety Strategy 6

Coordinate with local volunteer organizations to encourage self-enforcement practices.

A.6.2.6.7 Visitor Health and Safety Decision 1

Develop educational materials to advise recreationists of resource considerations in the Gila Lower Box SRMA.

A.6.2.6.8 Visitor Health and Safety Decision 2

Where feasible, post warnings of imminent flash flood danger in the floodplain.

A.6.2.6.9 Visitor Health and Safety Decision 3

Cooperatively develop safe passage and portage and scouting opportunities.

Appendix B – Design Features

The BLM is proposing to implement the following design features, as needed, to avoid excessive impacts on vegetation, cultural resources, paleontological resources, wildlife, and trails and recreation.

A. 7.4.1. Vegetation

1. Retain existing vegetation. Consider:
    a. Using retaining walls on fill slopes
    b. Reducing surface disturbance
    c. Protecting roots from damage during excavations
2. Enhance revegetation. Consider:
    a. Mulching cleared areas
    b. Controlling planting times
    c. Furrowing slopes
    d. Planting holes on cut and fill slopes
    e. Choosing native plant species
    f. Stockpiling and reusing topsoil
    g. Fertilizing, mulching, and watering vegetation
3. Minimize impacts on existing vegetation. Consider:
    a. Using partial cut instead of clear cut
    b. Using irregular clearing shapes
    c. Feathering and thinning edges
    d. Disposing of all slash
    e. Controlling construction access
    f. Using existing roads
    g. Limiting work within construction area
    h. Selecting the type of equipment to be used
    i. Minimizing the clearing size (that is, strip only where necessary)
    j. Using grass seeding of cleared areas
4. Maintain the integrity of vegetation units. Consider:
    a. Using the edge effect for structure placement along natural vegetation breaks

A. 7.4.2 Cultural Resources

1. Comply with all state and federal laws relating to prehistoric or historic archaeological sites or artifacts (historic properties). Collecting artifacts or disturbing historic properties on federal lands is prohibited and is prosecutable under the ARPA. Disturbance of human graves is also prohibited. Actions other than those explicitly approved by the BLM that result in impacts on archaeological resources are subject to the ARPA, as amended, and the Federal Land Policy and Management Act of 1976. Damaging historic properties more than 100 years of age is a punishable act under ARPA. Criminal or civil penalties, or both, may result if damage to historic properties is documented, as provided under ARPA and its implementing regulations at 43 Code of Federal Regulations (CFR) 7.

2. In accordance with 43 CFR 10.4 (g), ensure the BLM Authorized Officer is notified immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony, pursuant to 43 CFR 10.4 (b). Suspend all work within 100 feet of the discovery until the BLM Authorized Officer issues written authorization to proceed. In addition, cover, stabilize, or otherwise protect the area of discovery from damage. Ensure the Authorized Officer evaluates the discovery to determine appropriate actions to prevent the loss of significant cultural or scientific values.

A. 7.4.3 Paleontological Resources

1. Report any unanticipated paleontological resource discoveries.
2. Suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer, and protect the discovery from damage or looting. Do not require suspension of activities if activities can be adjusted to avoid further impacts on a discovered locality or be continued elsewhere. Ensure the Authorized Officer evaluates or will have evaluated such discoveries as soon as possible, but not later than 10 working days after being notified.
3. Determine appropriate measures to mitigate adverse effects on significant paleontological resources.
4. Where necessary, either stabilize the fossil resource in place and avoid further disturbance to the fossil resource or mitigate impacts on the fossil resource prior to continuing construction.

A. 7.4.4 Wildlife

1. Protect migratory bird nests by working outside the nesting season or by surveying for nests prior to activities. Protect any active nests.
2. Move visitor areas away from high-quality wildlife habitat. Consider:
    a. Moving camping areas away from riparian areas or water sources
    b. Limiting or prohibiting off-trail travel in sensitive areas
    c. Concentrating trails to lower-quality habitat areas

A. 7.4.5 Travel Management

1. Follow The Gold Book standards for road design (BLM 2007).

A. 7.4.6 Visual Resources

1. Reduce the size of cut and fill slopes. Consider:
    a. Relocating to an area with less slope
    b. Changing the road width, grade, etc.
    c. Changing the alignment to follow existing grades
    d. Prohibiting dumping of excess material on downhill slopes
2. Reduce earthwork contrasts. Consider:
    a. Rounding or warping slopes, or both
    b. Retaining rocks, trees, drainage, etc.
    c. Toning down freshly broken rock faces with asphalt emulsion spray or with gray paint

   d. Adding mulch, hydromulch, or topsoil
   e. Shaping cuts and fills to appear as natural forms
   f. Cutting rock areas so forms are irregular
   g. Designing to take advantage of natural screens (that is, vegetation and landforms)
   h. Using grass seeding of cuts and fills
3. Maintain the integrity of topographic units. Consider:
   a. Locating projects away from prominent topographic features
   b. Designing projects to blend with topographic forms in shape and placement
4. Minimize the number of visible structures.
5. Minimize the structure contrast. Consider:
   a. Using earth-tone paints and stains
   b. Using corten steel (self-weathering)
   c. Treating wood for self-weathering
   d. Using natural stone surfaces
   e. Burying all or part of the structure
   f. Selecting paint finishes with low levels of reflectivity (that is, flat or semigloss)
6. Redesign structures that do not blend or fit. Consider:
   a. Using rustic designs and native building materials
   b. Using natural-appearing forms to complement the landscape character (use special designs only as a last resort)
   c. Relocating the structure
7. Recognize the value and limitations of color. Consider:
   a. that the color (hue) is most effective within 1,000 feet. Beyond that, paint color becomes more difficult to distinguish, and tone or value determines visibility and the resulting visual contrast;
   b. that using color has limited effectiveness (in the background distance zone) in reducing visual impacts on structures that are silhouetted against the sky;
   c. painting structures somewhat darker than the adjacent landscape to compensate for the effects of shade and shadow;
   d. selecting the color to blend with the land and not the sky.

A. 7.4.7 <u>Trails and Recreation</u>

1. Improve communication with visitors. Consider:
   a. Adding signs at trailheads
   b. Employing a trail steward to aid in educating the public
2. Improve trail markings. Consider:
   a. Adding obvious trail markers or paint blazes, or both
   b. Adding markers for areas of concern, such as muddy sections
3. Consider formalizing some informal trails (Hockett *et al*. 2010).
4. Modify the amount, density, and type of use. Consider:
   a. Redistributing, discouraging, or limiting use
   b. Redistributing or reducing peak use
   c. Long-term monitoring
5. Modify location of use. Consider:
   a. Dispersing levels or use to prevent lasting impacts
   b. Concentrating use on established trails and recreation areas

6. Modify visitor behavior. Consider:
    a. Using persuasive language and education
    b. Using enforcement or regulation
    c. Promoting high-quality social conditions
7. Modify site management. Consider:
    a. Maintaining or relocating trails and campsites to more sustainable locations
    b. Closing or rehabilitating less sustainable locations
    c. Limiting campsite numbers
    d. Marking campsites either with markers or established infrastructure, such as fire circles or visitor-created log and rock seating circles
    e. Charging a fee
    f. Warning visitors of known hazards (Marion *et al*. 2020)