DRAFT ENVIRONMENTAL ASSESSMENT FOR THE ROOSEVELT LAKE HABITAT CONSERVATION PLAN ADDENDUM AND PLANNED DEVIATION TO THE MODIFIED ROOSEVELT DAM WATER CONTROL MANUAL

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
AMA	Active Management Area
amsl	above mean sea level
APE	area of potential effects
ARHP	Arizona Register of Historic Places
BGEPA	Bald and Golden Eagle Protection Act of 1940
bgs	below ground surface
CAP	Central Arizona Project
CEQ	Council on Environmental Quality
CESPD	Corps of Engineers South Pacific Division
CFR	Code of Federal Regulations
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
cuckoo	western yellow-billed cuckoo
CS	conservation space
DOI	U.S. Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EJ	environmental justice
EMU	eagle management unit
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERO	ERO Resources Corporation
ESA	Endangered Species Act
FCS	flood control space
FEMA	Federal Emergency Management Agency
flycatcher	southwestern willow flycatcher
FONSI	Finding of No Significant Impact
FR	Forest Road
FWS	U.S. Fish and Wildlife Service
gal/min	gallons per minute
gartersnake	northern Mexican gartersnake
GEI	GEI Consultants, Inc.
GRDD	Granite Reef Diversion Dam
GRIC	Gila River Indian Community
GRUSP	Granite Reef Underground Storage Project

HCP	Habitat Conservation Plan
HUC	Hydrologic Unit Code
ITP	incidental take permit
LAP	local area population
MOA	memorandum of agreement
Modified Roosevelt	Modified Roosevelt Dam and Lake
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NRHP	National Register of Historic Places
PBF	physical and biological feature
PCE	primary constituent element
PDS	planned deviation space
PEIS	Programmatic Environmental Impact Statement
rail	Yuma Ridgway's rail
Reclamation	U.S. Bureau of Reclamation
RHCP	Roosevelt Lake Habitat Conservation Plan
Salt Arm	Salt River arm of Roosevelt Lake
SFRA	Dingell-Johnson Sport Fish Restoration Act of 1950
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SRP	Salt River Project Agricultural Improvement and Power District
SRPMIC	Salt River Pima-Maricopa Indian Community
SWCA	SWCA Environmental Consultants
TMDL	total maximum daily load
Tonto Arm	Tonto Creek arm of Roosevelt Lake
USC	United States Code
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WCA	water control agreement
WCM	Water Control Manual
WSFR	Wildlife and Sport Fish Restoration Program

CHAPTER 1. BACKGROUND, DECISIONS TO BE MADE, AND PURPOSE AND NEED

1.1 INTRODUCTION

The U.S. Fish and Wildlife Service (FWS) has prepared this environmental assessment (EA) to analyze the potential effects of authorizing an amendment to the 2003 incidental take permit (ITP; Permit Number TE-060125-0) held by the Salt River Project Agricultural Improvement and Power District (SRP) for operation of the Modified Roosevelt Dam and Lake (Modified Roosevelt), involving segments of the Salt River and Tonto Creek, in Gila County, Arizona (Figure 1-1). FWS received SRP's application for an amendment to the 2003 ITP pursuant to Section 10 of the Endangered Species Act (ESA), together with a proposed addendum to the 2002 Roosevelt Lake Habitat Conservation Plan (RHCP) (SRP 2002) in support of SRP's application. SRP is responsible for the care, operation, and maintenance of Modified Roosevelt in accordance with a September 6, 1917, contract with the U.S. Secretary of the Interior. The 2003 ITP authorized the incidental take of four bird species caused by SRP's operation of the Modified Roosevelt conservation space (CS). The 2003 ITP has a 50-year term extending through February 26, 2053.

SRP's proposed amendment to the ITP would authorize incidental take of the northern Mexican gartersnake (*Thamnophis eques megalops*) and would expand the application of previously authorized incidental take for the southwestern willow flycatcher (*Empidonax traillii extimus*) and western yellow-billed cuckoo (*Coccyzus americanus*) to a larger permit area associated with additional covered activities. SRP also is seeking to add the following as covered activities under the ITP: 1) flood control space (FCS) operations at Modified Roosevelt in accordance with the 1997 Water Control Manual (WCM) for Modified Roosevelt, issued by the U.S. Army Corps of Engineers (Corps) (Corps 1997); and 2) FCS operations under a proposed planned deviation to the WCM for Modified Roosevelt, if approved by the Corps. The ITP amendment also would enlarge the permit area to include the FCS surrounding Roosevelt Lake, as well as add an approximately 14.1-mile segment of lower Tonto Creek immediately upstream of the FCS. Additionally, SRP's proposed amendment clarifies the amount and extent of incidental take of bald eagles (*Haliaeetus leucocephalus*) authorized under the 2002 RHCP (SRP 2002) and 2003 ITP in the CS at Modified Roosevelt and addresses the effects of FCS operations. The RHCP addendum (SRP 2023a) supporting SRP's ITP amendment application analyzes the effects of the covered activities on covered species and their designated critical habitats, quantifies incidental take not previously authorized by the 2003 ITP, and proposes mitigation measures that SRP would implement to address the impacts of the additional taking.

SRP proposes to implement a planned deviation from normal flood control operations under the WCM. Implementation of any deviation requires the prior approval of the Corps. The planned deviation would allow SRP to extend the duration over which it must evacuate the FCS from 20 days to 120 days for a single flood control event in a year. This planned deviation would only apply to the first 5 vertical feet of the FCS and only in 3 years within a defined 5-year period. SRP is requesting approval for the planned deviation that would allow for use starting in water year 2023/2024 and ending in December 2028.

The proposed agency actions evaluated in this EA are FWS's approval of SRP's application to amend the 2003 ITP and associated 2002 RHCP, and the Corps' approval of the proposed planned deviation to the WCM for Modified Roosevelt (the Proposed Action). This EA is intended to 1) inform the public of the Proposed Action, a range of reasonable alternatives, and associated effects, 2) solicit information from the public, and 3) provide analyses to inform the decisions to be made by the FWS and the Corps, respectively, concerning the application for an ITP amendment and the request for a planned deviation.

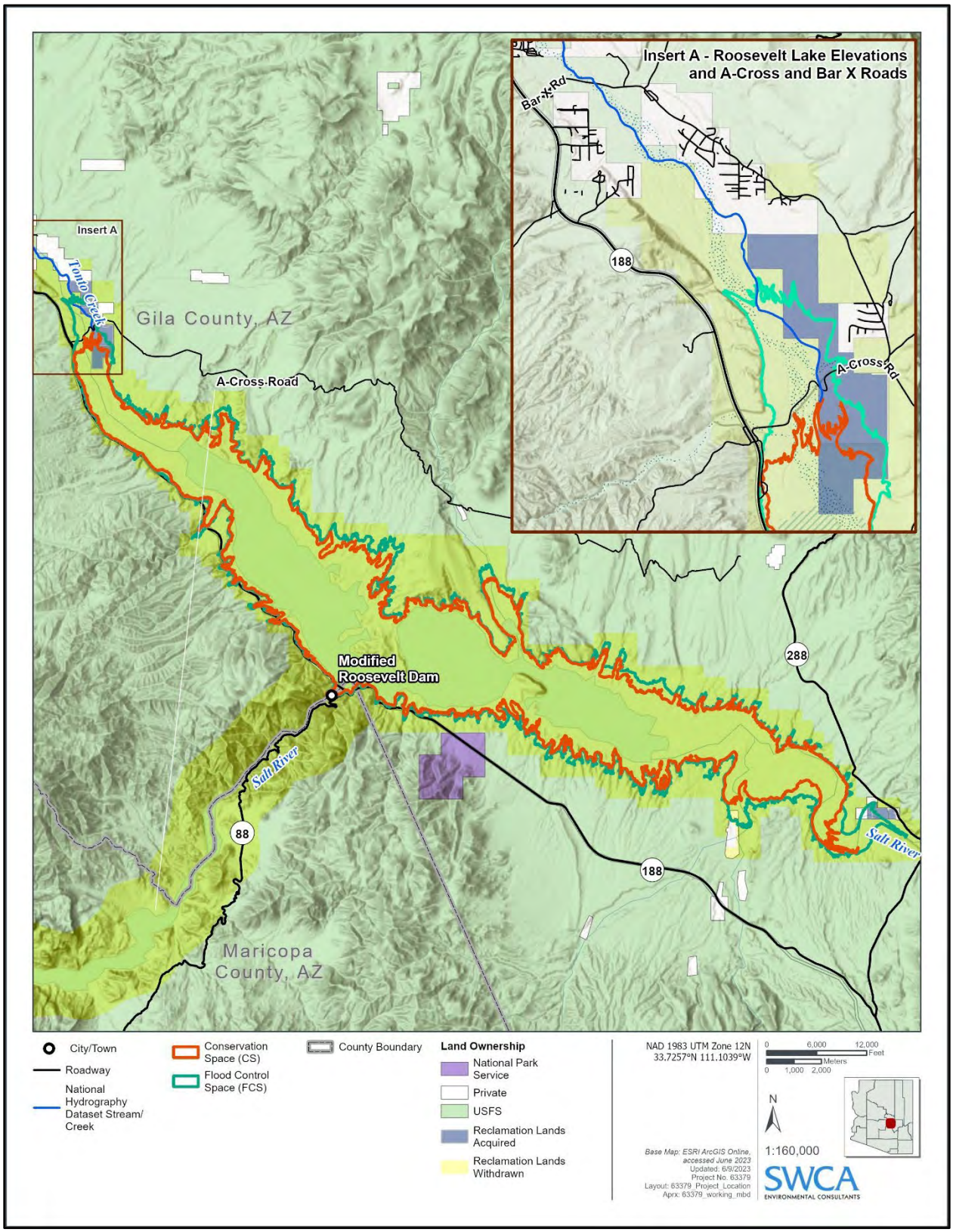

Figure 1-1. Overview map.

This EA is consistent with the purpose and goals of the National Environmental Policy Act (NEPA); the requirements of the Council on Environmental Quality (CEQ) for implementing NEPA regulations at 40 Code of Federal Regulations (CFR) 1500–1508; the U.S. Department of the Interior's NEPA regulations (43 CFR 46); and the Corps' procedures for implementing NEPA (33 CFR 230).

1.2 BACKGROUND

1.2.1 Modified Roosevelt Dam Operational History and Current Operations

Modified Roosevelt Dam is owned by the U.S. Bureau of Reclamation (Reclamation) and impounds water in Roosevelt Lake as part of the Salt River Project. Reclamation delegated to SRP the responsibility for the care, operation, and maintenance of Modified Roosevelt, as well as other associated Salt River Project facilities, through their 1917 contract, the Plan 6 Funding Agreement (Reclamation et al. 1986), and the 1993 Modified Roosevelt Operating Agreement (SRP et al. 1993). A detailed description of the operational history at Modified Roosevelt and prior NEPA decisions is provided in Appendix A. Chapter 1C, 1D, and Appendices C and D of the RHCP addendum (SRP 2023a) describe in greater detail the legal authorities and priorities governing operation of Modified Roosevelt and are incorporated here by reference.

Current conservation storage operations follow SRP's 1917 contract and SRP's operational priorities. Flood control operations follow the WCM. Descriptions and operational estimates for current conservation storage and flood control operations are provided in Appendix A as well as in Appendices A, B, I, and J of the RHCP addendum.

1.2.2 2002 Roosevelt Habitat Conservation Plan and 2003 Incidental Take Permit

SRP's 2002 RHCP addresses four species—western yellow-billed cuckoo (cuckoo), southwestern willow flycatcher (flycatcher), Yuma Ridgway's rail (*Rallus obsoletus yumanensis*; rail), and bald eagle—that would be incidentally taken by SRP's conservation storage activities at Modified Roosevelt. In 2002, the flycatcher and rail were listed endangered, the bald eagle was listed threatened, and the cuckoo was a candidate for listing. The 2002 RHCP permit area consists of the Modified Roosevelt CS, which includes the area up to the lake elevation contour at 2,150.78 feet above mean sea level (amsl). For the purposes of discussion in this EA, the top of the CS is simplified to 2,151 feet amsl.

In February 2003, FWS signed its Record of Decision on the environmental impact statement (EIS) evaluating the effects of its decision to issue the ITP, completed a Section 7 ESA Biological Opinion on the issuance of the ITP, and issued a Section 10(a)(1)(B) ITP to SRP (Permit Number TE62371D-0). FWS issued the 2003 ITP to SRP associated with, and conditioned on, the implementation of the 2002 RHCP. The 2003 ITP has an expiration date of February 27, 2053, unless otherwise renewed prior to that date.

The 2002 RHCP and 2003 ITP did not include SRP's operation of the FCS as a covered activity and did not include the FCS or lower Tonto Creek in the permit area. At the time the 2003 ITP was issued, the FCS had not yet been used. Further, Reclamation's 1983, 1989, 1992, and 1995 Biological Assessments (see Appendix C of the RHCP addendum) had already analyzed the effects of the creation and operation of the FCS on the listed species. Because there were no new actions to analyze and no newly listed species or critical habitat in the FCS, SRP elected not to include the FCS or FCS operations in the 2002 RHCP. Consequently, the activities covered in the 2002 RHCP and 2003 ITP, and the associated permit area, were limited to the CS. While the 2002 RHCP EIS identified FCS operations as a federal responsibility subject to ESA Section 7, the Corps' 1997 WCM and the 1996 water control agreement

(WCA; see Appendix A) recognize that the responsibility for ongoing FCS operations has been delegated to SRP (see Appendix D in the RHCP addendum).

Since 2003, FWS has listed as threatened two species that occupy portions of the CS and FCS: cuckoo (previously listed as a candidate species and covered by the 2002 RHCP and 2003 ITP) and northern Mexican gartersnake (gartersnake). Additionally, FWS has designated critical habitat in portions of the FCS for the flycatcher, cuckoo, gartersnake, and the endangered spikedace (*Meda fulgida*). The 2003 ITP and 2002 RHCP did not address incidental take of gartersnakes attributable to SRP's operations of the CS or FCS. The 2003 ITP and 2002 RHCP authorized incidental take of cuckoos attributable to SRP's operation of the CS only. Reclamation's 1995 Biological Assessment (and FWS's subsequent 1996 Biological Opinion) also did not address the effects of FCS operations on cuckoos or gartersnakes and did not address the effects of FCS operations on subsequently designated critical habitat for cuckoos, gartersnakes, and flycatchers.

The bald eagle is also no longer protected by the ESA following delisting due to recovery and a determination by FWS that the bald eagle population in the Sonoran Desert area of central Arizona is not a listable taxonomic entity. However, the species remains protected by the Bald and Golden Eagle Protection Act of 1940 (BGEPA; *Federal Register* 71:8265), and the implementing regulations for BGEPA permits have changed since approval of the 2002 RHCP. The BGEPA implementing regulations provide that incidental take authorization under Section 10 of the ESA satisfies the permitting requirements of BGEPA (50 CFR 22.10[a]). FWS also defined the word "disturb" under BGEPA, delisted the bald eagle (*Federal Register* 72:37345, *Federal Register* 73:23966, *Federal Register* 77:5792), and established regulations to permit take under the BGEPA where the take is associated with otherwise lawful activities (*Federal Register* 73:29075). A local area population (LAP) analysis for eagles within the analysis area was completed in compliance with the BGEPA and can be found in Appendix B.

Since the issuance of the 2003 ITP, Roosevelt Lake entered the FCS in 2 years: 2009 and 2010. Flood control operations occurred four times during these 2 years, with each flood event being drawn down within 20 days of the lake entering the FCS, as required by the WCM. The lake did not rise more than 2 vertical feet into the FCS during these events. The maximum elevation reached was 2,151.5 feet amsl in 2009, and 2,152.1 feet amsl in 2010.

1.3 COOPERATING AGENCIES

The FWS is the lead federal agency responsible for preparing this EA. The Corps, Reclamation, and U.S. Forest Service (USFS) are cooperating agencies because of their associated jurisdiction by law or special expertise. Section 1.4, below, describes the decisions to be made by the FWS and the Corps. Reclamation is the federal bureau that administers the United States' ownership interests in Modified Roosevelt. As the facility owner, Reclamation has jurisdiction over dam safety and has ultimate responsibility for ensuring that SRP properly implements the water control plan in the WCM, including any planned deviation that the Corps may approve. The USFS has jurisdiction over the lands within the Tonto National Forest, including shared jurisdiction over Roosevelt Lake and its surrounding lands that are withdrawn for Reclamation's purposes as defined by the April 27, 1979, Management Memorandum among SRP, USFS, and Reclamation (SRP et al. 1979) and the September 1982 addendum to the 1979 Management Memorandum (Reclamation et al. 1982). Where there is shared jurisdiction, Reclamation has jurisdiction for Reclamation-related activities and USFS has jurisdiction over all other uses of the land that are not used in connection with Reclamation works.

1.4 DECISIONS TO BE MADE AND PURPOSE AND NEED

1.4.1 U.S. Fish and Wildlife Service

The FWS is delegated the authority by the Secretary of the Interior to approve Section 10 permits (including amendments) for non-marine species in accordance with the ESA. As such, FWS is the lead agency for the ITP amendment and must determine whether SRP's application for an ITP amendment meets ESA issuance criteria specified under Section 10 of the ESA. The FWS shall issue the ITP amendment if it determines that the proposed amendment meets ESA Section 10(a)(2)(B) issuance criteria and if the covered activities, with implementation of appropriate minimization and mitigation measures, would not jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. If FWS issues the ITP amendment, it will authorize incidental take of listed species for SRP's covered activities and revise the surrogate metrics to estimate and track incidental take of bald eagles from the covered activities for the remaining duration of the ITP in compliance with the BGEPA.

The FWS's purpose in considering the Proposed Action is to fulfill its authority under ESA Section 10(a)(1)(B). Non-federal applicants, whose otherwise lawful activities may result in take of species, can apply to the FWS for incidental take authorization so that their activities may proceed without violations of ESA Section 9. In the case of non-listed species in an ITP, such as the bald eagle, the take authorization becomes effective should the species become listed during the life of the ITP.

The purpose of the FWS federal action is to address SRP's application for an amendment to the 2003 ITP that would authorize incidental take of the covered species for the covered activities (described in Chapters 1 and 2 of the RHCP addendum) within the permit area (as expanded by the RHCP addendum). If the RHCP addendum meets the issuance criteria described in Section 10(a)(2)(B) of the ESA and 50 CFR 13.21 and 13.23, then the FWS shall issue an amended ITP.

Section 10 of the ESA specifically directs the FWS to issue ITPs to non-federal entities when the applicant satisfies the criteria in Section 10(a)(2)(B). Once the FWS receives an application for an ITP, it reviews the application to determine if it meets issuance criteria. The FWS also ensures that ITP issuance and Habitat Conservation Plan (HCP) implementation comply with other applicable federal laws and regulations (Appendix C). Thus, in addition to ensuring satisfaction with the ESA's Section 10 requirement, through this NEPA analysis and issuance of the amended ITP, the FWS will ensure that SRP would continue to comply with BGEPA. As corollary to its permit decision, in addition to NEPA compliance, the FWS meets the requirements of Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (54 United States Code [USC] 306108 and its implementing regulations under 36 CFR 800); treaties; and Executive Order (EO) 11998 (1977), EO 11990 (1977), EO 13186 (2001), EO 12630 (1988), and EO 12962 (1995). Because amending an ITP under ESA Section 10(a)(1)(B) constitutes a federal action, the FWS will conduct an intra-agency consultation under Section 7(a)(2) of the ESA and complete a Biological Opinion.

1.4.2 U.S. Army Corps of Engineers

The Corps is responsible for establishing flood control operating criteria for use of reservoir capacity allocated for flood control at all reservoirs constructed wholly or in part with federal funds. The Corps has final approval authority over issuance of WCM deviations, in accordance with Section 7 of the Flood Control Act of 1944.

Section 7 of the Flood Control Act, Corps' Engineer Regulation 1110-2-240, Corps of Engineers South Pacific Division (CESPD) Regulation 10-1-04, and the existing Modified Roosevelt WCM and WCA establish the process and requirements for approval of a planned WCM deviation. The Modified Roosevelt WCM contains a provision authorizing SRP (the dam operator) to deviate temporarily from

operations prescribed in the approved water control plan contained within the WCM when necessary to alleviate critical situations or to realize increased benefits during certain operation seasons without significantly affecting the fulfillment of Modified Roosevelt's authorized purposes. The WCM and WCA also provide that the Corps must determine whether to approve proposed non-emergency deviations from the WCM's water control plan and instruct that SRP shall make any requests for deviation to the Corps, after consultation with Reclamation. A risk and uncertainty analysis (Section 8.b.3 of CESPD Regulation 10-1-04) is a required element that must be performed to determine potential consequences of any proposed non-emergency deviation.

The purpose of the Corps' federal action is to address SRP's request for a planned deviation to the Modified Roosevelt WCM that would temporarily increase the operational flexibility within the FCS. SRP's objective is to increase the ability to beneficially use spill waters controlled by the Modified Roosevelt Dam without compromising dam and flood management safety for downstream resources and communities. The need for the Proposed Action stems from an increase in central Arizona's total surface water use primarily from Colorado River supplies provided by the Central Arizona Project (CAP) and sustained growth in use of renewable surface water supplies, combined with the likelihood of reduced surface water availability due to shortage conditions on the Colorado River. These conditions require careful management of central Arizona water supplies, including spill waters provided by Salt River flood events. Increased operational flexibility within Modified Roosevelt's FCS would allow for increased use of available floodwaters through direct use or underground recharge for recovery during times of drought and shortage.

1.5 INTEGRATED COMPLIANCE PROCESS

The Corps' review and decision associated with any deviation from the WCM is a federal action subject to NEPA. As the effects and impacts of SRP's proposed planned deviation on covered species and critical habitats are included in the RHCP addendum, FWS and the Corps aim to consolidate their NEPA and ESA compliance obligations for their respective federal actions, pursuant to NEPA and an integrated process described in Sections 3.4.6 and 14.12.7 of the FWS's Habitat Conservation Planning and Incidental Take Permit Processing Handbook (FWS 2016a). The FWS will complete a single Biological Opinion under Section 7(a)(2) of the ESA regarding effects on ESA-listed species from the ITP amendment, including the Corps' planned deviation. The FWS and the Corps are working to ensure they address their requirements through all aspects of the NEPA process and development of the EA. For these reasons, the agencies are analyzing these actions within one EA.

1.6 PUBLIC INVOLVEMENT

The FWS solicited public input on the Proposed Action to assist in identifying key issues and defining the scope of the environmental analysis. The FWS conducted scoping via mail and email (to 585 potentially interested agencies, organizations, tribes, and neighbors to the Proposed Action), newspaper notice, and Internet publication. Scoping for this EA began on June 1, 2022. Within the 30-day scoping period, the FWS received two comments: one from an individual and one from Arizona Game and Fish Department (AGFD) (Appendix D). The FWS addresses scoping comments within this EA and SRP responded to the comments in the RHCP addendum.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION ALTERNATIVE – ISSUANCE OF AMENDED SECTION 10(A)(1)(B) PERMIT AND APPROVAL FOR A PLANNED DEVIATION FROM THE WCM

Under the Proposed Action, the FWS would issue an amended ITP authorizing incidental take of covered species addressed in the RHCP addendum resulting from the operation of Modified Roosevelt (see Section 2.1.1). The Proposed Action also includes Corps review and decision for a planned deviation from the Modified Roosevelt Dam WCM (see Section 2.1.2).

Under the Proposed Action, the FWS would approve the RHCP addendum and issue an amendment to the ITP that authorizes take of covered species associated with the covered activities, per 50 CFR 17.3. Specifically, the ITP would: 1) authorize incidental take of gartersnakes resulting from SRP's operation of the CS and SRP's normal operation of the FCS under the 1997 WCM; and 2) authorize the incidental take of all covered species resulting from SRP's operation of the FCS under the planned deviation, if approved by the Corps. The FWS would also expand the 2002 RHCP permit area to include the FCS and approximately 14.1 miles of lower Tonto Creek.

The proposed RHCP addendum evaluates the following, which the FWS would authorize upon issuance of the amended ITP:

1. Incidental take of gartersnakes associated with SRP's operation of the Roosevelt Lake CS below elevation 2,151 feet amsl.
2. Incidental take of gartersnakes associated with SRP's normal operation of the FCS (2,151 to 2,175 feet amsl) under the current WCM.
3. Incidental take of gartersnakes, flycatchers, and cuckoos associated with SRP's operation of the FCS under the proposed planned deviation from the current WCM (reservoir's water surface elevation of 2,151 to 2,156 feet amsl), conditioned on Corps approval, and the effects of normal FCS operations (2,151 to 2,175 feet amsl) on these species.
4. Incidental take of gartersnakes within a 14.1-mile segment of lower Tonto Creek upstream of Roosevelt Lake, associated with SRP's operation of the lake's CS below the elevation of 2,151 feet amsl.
5. Implementation of conservation measures to minimize and mitigate the impacts of the taking to the maximum extent practicable (see Section 2.1.2.2 below).
6. Surrogate metrics that SRP and FWS would use to estimate and track incidental take of bald eagles in the CS and the FCS arising from the covered activities, as expanded, for the remaining duration of the ITP. SRP has designed the revised surrogate metrics for incidental take of bald eagles, eggs, nests, and nest trees to address the BGEPA and ESA.

The RHCP addendum evaluates effects on gartersnake critical habitat in the FCS and along lower Tonto Creek. In addition, the RHCP addendum evaluates the effects of SRP's operation of the FCS under the 1997 WCM and the planned deviation on designated critical habitat for the gartersnake, flycatcher, cuckoo, and spikedace. SRP is not seeking to amend its 2003 ITP authorizations for the flycatcher, cuckoo, or rail that arise from its Modified Roosevelt CS operations, because no additional incidental take is expected to occur.

With the issuance of an amended ITP, SRP would implement the RHCP addendum to minimize and mitigate the impacts of incidental take to the maximum extent practicable (see Section 2.1.2.2 below).

The RHCP addendum also includes provisions for monitoring, adaptive management, and changed circumstances.

SRP is responsible for the Modified Roosevelt surcharge space (2,175 to 2,218 feet amsl) operations under the 1997 WCM and the 1996 WCA. SRP is not electing to include existing surcharge space operations as a covered activity because there is a low likelihood (1 in 10,000 for any given year) that such operations would occur over the remaining 30 years of the permit (FWS 1996; Reclamation 1996). Further, SRP is not proposing any deviation or modification to existing surcharge space operations.

2.1.1 Expanded Permit Area

The permit area described in the RHCP addendum is where incidental take of covered species associated with implementation of the RHCP addendum is expected to occur (Figure 2-1). The permit area includes 1) the Roosevelt Lake CS, 2) the Roosevelt Lake FCS, and 3) lower Tonto Creek from the top of the FCS upstream to the crossing of East del Chi Drive. SRP is seeking to amend and expand the ITP permit area to include the Roosevelt Lake FCS and lower Tonto Creek (an approximately 14.1-mile distance from the FCS to East del Chi Drive).

Roosevelt Lake's FCS surrounds the CS and includes the area between the 2,151-foot amsl and 2,175-foot amsl contour (see Figure A-1 in Appendix A). The FCS covers an elevation change of approximately 24 vertical feet and a horizontal (planar) area of approximately 3,596 acres.

2.1.2 Planned Deviation from the Water Control Manual for Modified Roosevelt

The planned deviation would be included as a covered activity under the RHCP addendum and ITP amendment described above. Under this alternative, the Corps—in coordination with Reclamation (as owner of Modified Roosevelt Dam)—would decide whether to approve the planned deviation from the WCM for Modified Roosevelt. If approved by the Corps, the planned deviation would allow SRP to extend the duration over which it must evacuate the FCS from 20 days to 120 days for a single flood control event in a year. The planned deviation would be included as a covered activity under the RHCP addendum and ITP amendment.

This planned deviation would only apply to the bottom 5 vertical feet of the FCS (referred to as the planned deviation space [PDS], which occurs between 2,151 feet amsl and 2,156 feet amsl) and only in up to 3 years within a given 5-year period (beginning in the 2023/2024 water year). Flood control operations would return to the WCM's current operating criteria when the lake is above the 2,156-foot amsl elevation contour, when the deviation period has expired, or when SRP has implemented these alternate flood control measures in 3 of the 5 years. Reclamation's Dam Safety Advisory Team identified a risk-neutral finding for the proposed planned deviation at Modified Roosevelt and to downstream communities—a critical finding in support of safely managing flood events (Olsker 2023).

Increased operational flexibility within the FCS would allow for increased beneficial use of spill waters, when available, through direct use or underground recharge for recovery during times of drought and surface water shortage. Spill water deliveries made possible by the extended-release period in the PDS would be made available to lands identified in Figure A-2 by the entities responsible for making deliveries to those lands, pursuant to existing water delivery agreements with SRP. SRP and the non-federal entities would enter into a separate agreement that would identify how the parties share and take delivery of the water made possible by the planned deviation.

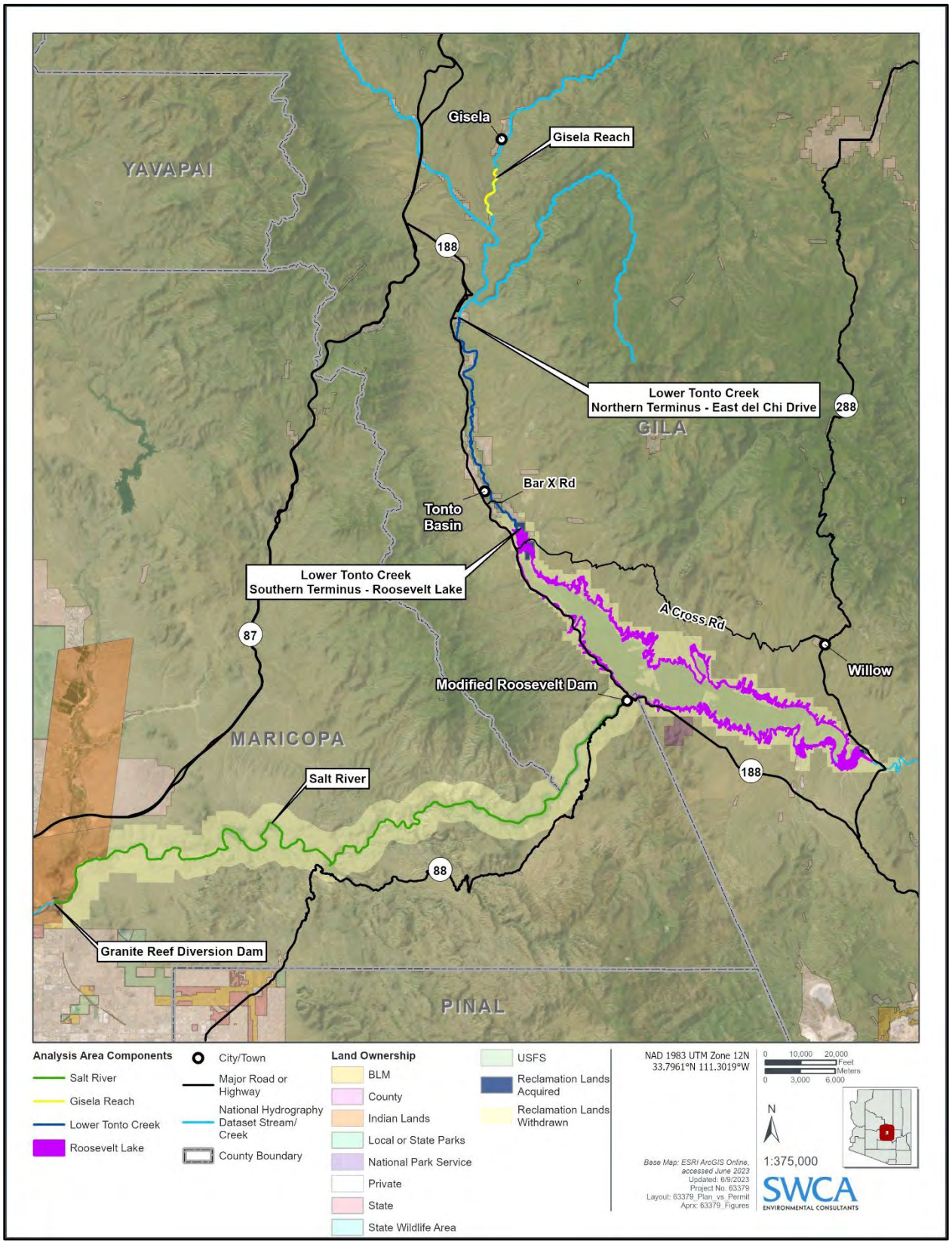

Figure 2-1. Permit area.

SRP used the Reservoir Planning Model to estimate water levels over time and modeled two scenarios: the normal FCS operations following the WCM and standard conservation operations as a base case, and the increased 120-day FCS evacuation period proposed by the planned deviation (described in this section). In both scenarios, the model outputs for the CS are the same; only the projected lake elevations in the FCS vary based on the extended evacuation period. Once water enters the FCS, the reservoir elevation estimates depend on whether the FCS operations follow the current WCM's operations or if SRP uses the extended evacuation period allowed for under the planned deviation (Figure 2-2). The WCM-prescribed minimum releases modeled in the example water year result in water levels that are 1 or 2 feet higher than needed to demonstrate a complete evacuation of the FCS within the required 20 days. SRP uses its operator discretion to ensure that the water level fully evacuates from the FCS within the required time.

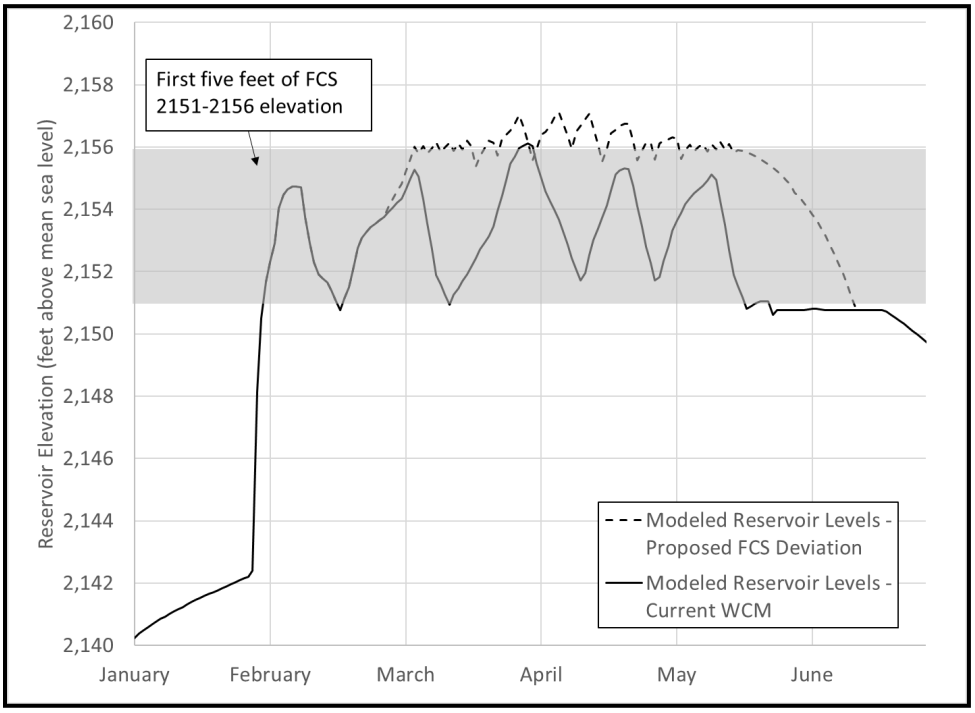

Figure 2-2. Illustration of an example water year showing the estimated Roosevelt Lake water levels under current WCM and planned deviation for the planned deviation space.

The Reservoir Planning Model results for the above example water year shows that normal FCS operations would return the lake's elevation levels to the top of the CS within 20 days (modeled as March 1), while the planned deviation would allow the lake's elevation levels to remain in the first 5 feet of the FCS for up to an additional 100 days for a single event in a calendar year when reservoir inflows allow. Additional inflow events during the 100-day period (March, April, and early May) result in current operations entering the FCS three more times (nearly reaching 5 feet into the FCS before returning to the top of the CS, based on the current WCM), while the planned deviation operations maintain levels 5 feet into the FCS and show only a slight increase as releases are still operated per the current WCM above 2,156 feet amsl. Following the winter/spring inflow events, current operations would maintain the lake's elevation levels at the top of the CS (2,151 feet amsl), while the planned deviation would gradually decrease within the top 5 feet of the FCS before returning to the top of the CS within 120 days from entry into the FCS (by end of June). Following the 120-day period, the lake's elevation levels would be consistent with levels from current operations and would remain the same following the planned deviation under normal operations within the CS.

The WCM specifies a schedule of minimum releases from Modified Roosevelt based on lake elevation and whether the lake elevation is rising or falling. Minimum release rates under the proposed planned deviation (Table 2-1) would be lower than under current WCM operations. The proposed change to the release plan for the planned deviation considers one of the WCM's original goals—to make maximum use of water in the FCS for power generation. The planned deviation does this by 1) decreasing minimum release rates for elevations within the PDS, and 2) maintaining existing release rates for lake elevations in the FCS greater than the PDS. As identified in the WCM, additional minimum releases may be required while the lake is receding to meet the 20-day drawdown requirement above the PDS.

Table 2-1. Release Plan under the Proposed Planned Deviation

Water Surface Elevation—Rising (feet amsl)	Minimum Release Rate—Rising	Water Surface Elevation—Falling (feet amsl)	Minimum Release Rate—Falling
2,151–2,153	460 cfs	2,151–2,156	460 cfs
2,153–2,156	460 cfs	–	–
2,156–2,157	6,500 cfs	2,156–2,157	12,200 cfs
2,157–2,162	12,200 cfs	–	–
2,162–2,172	39,500 cfs	2,157–2,170	39,500 cfs
2,172–2,175	53,100 cfs	2,170–2,175	53,100 cfs

Note: cfs = cubic feet per second; values are rounded to the nearest whole number.

SRP used the Reservoir Planning Model to evaluate the planned deviation's effects on lake elevations (Table 2-2). As proposed in SRP's planned deviation, the evacuation period extends from 20 to 120 days for a single runoff event in a year. Additional months of FCS operations beyond a single 120-day event can occur from a new runoff/flood control (storms or snowmelt) event. If an additional runoff event occurs within the 120-day planned deviation, SRP would evacuate the FCS above the 2,156 feet amsl elevation within 20 days. SRP would then continue FCS operations under the release rates as allowed by the planned deviation.

The RHCP addendum and the proposed ITP amendment do not address unplanned deviations from the WCM, which might arise during consecutive large inflow events or due to other short-term circumstances. Unplanned minor deviations from the WCM are subject to Corps approval. Any such deviation would be requested by SRP, at the time the circumstance arose, and would require a separate approval process.

Table 2-2. Comparison of the Duration, Timing, and Magnitude of Estimated FCS Operations under the Planned Deviation by Model Year

Model Year*	Additional Number of Months with Water Levels in FCS Caused by Deviation	Range of Months with FCS Operations	Range of Peak Monthly Lake Rise into FCS (feet)	Range of Peak Monthly Lake Elevations (feet amsl)
2	0	February–June	2,155–2,157	4–6
3	1	January–June	2,153–2,174	2–23
4	1	January–June	2,151–2,157	<1–6
6	0	April–August	2,152–2,153	1–2
7	1	October–June	2,151–2,165	<1–14
9	0	February–May	2,151–2,156	<1–5
11	1	December–May	2,151–2,156	<1–5
13	1	May–June	2,151–2,153	<1–2

Model Year*	Additional Number of Months with Water Levels in FCS Caused by Deviation	Range of Months with FCS Operations	Range of Peak Monthly Lake Rise into FCS (feet)	Range of Peak Monthly Lake Elevations (feet amsl)
14	1	February–June	2,151–2,156	<1–5
19	2	January–June	2,151–2,162	<1–11
23	0	April–May	2,153	3
24	0	February–May	2,153–2,158	2–7
28	0	February–June	2,152–2,169	1–18
29	0	January–May	2,151–2,154	<1–3
30	1	March–May	2,151–2,152	<1–1
39	1	April–June	2,153–2,156	2–5
47	1	April–May	2,151–2,152	<1–1
53	0	December–May	2,151–2,156	<1–5
55	1	March–June	2,151–2,156	1–5
56	2	March–May	2,151–2,153	<1–3
60	0	March–June	2,156–2,158	5–7
65	0	March–May	2,156	5–6
66	0	December–June	2,155–2,163	4–12
67	0	January–June	2,152–2,165	1–14
69	0	April–May	2,151–2,152	1
70	0	January–June	2,153–2,157	2–7
71	0	October–April	2,151–2,153	<1–3
72	1	December–June	2,153–2,158	2–7
73	1	March–May	2,154–2,156	3–5
74	1	March–June	2,151–2,156	<1–5
75	0	April–May	2,153–2,154	2–3
78	1	April–June	2,151–2,153	<1–2
79	0	February–June	2,152–2,156	1–5
80	1	December–June	2,153–2,168	2–17
81	0	April	2,151	<1
82	1	February–May	2,154–2,158	3–7
97	1	April–June	2,151–2,155	<1–4

* Based on water year (October–September).

2.1.2.1 Gartersnake, Cuckoo, Flycatcher, and Eagle Incidental Take

2.1.2.1.1 GARTERSNAKE

The effects of SRP's CS and normal FCS operations and the planned deviation are reasonably certain to result in incidental take of gartersnakes. Gartersnakes occur within the Roosevelt Lake CS and FCS on the Tonto Creek arm of Roosevelt Lake, and upstream of Roosevelt Lake along lower Tonto Creek (see Figures 8 and 9 in the RHCP addendum). Despite recent surveys, biologists have not detected gartersnakes on the Salt River arm within Roosevelt Lake's CS or FCS (see Chapter 2 in the RHCP addendum). SRP's Roosevelt Lake CS and normal FCS operations adversely affect gartersnakes by

1. altering the availability or amount of gartersnake habitat in the CS or FCS,
2. altering the location of gartersnake habitat associated with the lake edge in the CS, or
3. altering the quality of gartersnake habitat in the CS, FCS, and lower Tonto Creek.

In addition to the effects on gartersnakes and their habitat within the CS and FCS from managing lake levels, water storage in the CS (also a covered activity) impacts gartersnakes by creating and maintaining an environment that allows nonnative predatory fish, which already persist in the lake, to persist and proliferate in proximity to areas the gartersnakes would inhabit. Nonnative predatory fish in the lake affect gartersnakes within the CS and FCS, and also move upstream into lower Tonto Creek (when stream flows are between about 200 and 1,100 cubic feet per second [cfs]), and impact gartersnakes and gartersnake prey in that area. SRP's inclusion of lower Tonto Creek in the amended permit area is specifically associated with the effects of water storage in the CS on gartersnakes upstream.

Within the FCS, gartersnake habitat is associated with water in the Tonto Creek channel. Because inundation events in the FCS occur only during large inflow events and the WCM requires releases of water entering the FCS within 20 days (under normal FCS operations) or 120 days (under the planned deviation), SRP's periodic FCS operations, whether under current operations or the planned deviation, are not expected to measurably create or contribute to the presence of consistent aquatic habitat for nonnative predatory fish in the FCS.

The precise number of individual gartersnakes incidentally taken by the CS operations, normal FCS operations, and FCS operations under the planned deviation cannot be specifically quantified due to the gartersnake's secretive (cryptic) nature, the lack of information regarding its specific distribution and abundance, and difficulty in detecting and determining the cause(s) for gartersnake injury/death. Under these circumstances, developing surrogate habitat metrics can approximate the amount or extent of take. SRP uses two types of habitat-based surrogate metrics for the gartersnake in the RHCP addendum: "acre-years"[1] of reduced habitat availability for incidental take occurring in the CS or FCS, and "fish migration days" (as more fully defined in the RHCP addendum Subchapter 4.A.iii.1) for incidental take caused by nonnative predatory fish moving from the lake into lower Tonto Creek. The two metrics address the effect pathways leading to incidental take that are particular to the CS and FCS or the lower Tonto Creek portions of the permit area (see RHCP addendum Chapter 4 for further discussion on take metrics).

Take Occurring Within Modified Roosevelt—CS, FCS, and PDS Operations: Acre-Years Metric

The total maximum amount of gartersnake incidental take to be authorized by the ITP amendment for the area within the CS and the FCS under normal operations is 2,742.9 acre-years (see Table 3-8 in Section 3.2.2.2.1). The proposed quantification of incidental take of gartersnakes occurring in the CS and in the FCS under normal operations is based on the anticipated number of acres of gartersnake habitat made unavailable due to rising lake levels. The actual acres of gartersnake habitat altered by these covered activities may be less than calculated, but SRP does not expect it would be more.

The maximum amount of incidental take of gartersnakes associated with operation of the FCS under the planned deviation to be authorized is 9.6 acre-years. The planned deviation can result in the death, injury, or wounding of gartersnakes through the same mechanisms described above for CS and normal FCS operations. However, the exposure of gartersnakes to these adverse effects (and the likelihood of take

[1] SRP estimates the amount of take from its covered activities in the CS and FCS in terms of the cumulative reductions of, or adverse impacts to, acres of available habitat over the remaining term of the ITP. The incidental take estimates are derived from analysis of yearly or monthly data and summarized as "acre-years" of reduced habitat availability. This time-specific metric addresses the naturally dynamic nature of the habitat resources in the CS and FCS (and, by extension, the population of gartersnakes in the CS and FCS) arising from ever-changing Tonto Creek flows and Roosevelt Lake water elevation levels.

occurring as a result) of adverse effects are lower for the planned deviation than for the CS operations or normal FCS operations. Unlike CS operations, which occur annually and year-round, the planned deviation would occur only in 3 out of 5 years of the remaining permit duration, and, even then, would only last for a part of the year (i.e., evacuation of water from the FCS over 120 days). Therefore, compared to CS operations, gartersnakes in the FCS would have decreased exposure and likelihood of adverse effects from habitat inundation caused by the planned deviation.

Take Occurring on Lower Tonto Creek—CS Operations: Migration Days Metric

The maximum amount of gartersnake incidental take to be authorized by the ITP amendment for the lower Tonto Creek portion of the permit area is 906 fish migration days (see RHCP addendum Subchapter 4.A.iii.1). SRP based the proposed incidental take metric for lower Tonto Creek on the cumulative number of fish migration days from the CS into lower Tonto Creek for the duration of the amended ITP. SRP defined fish migration days in terms of Tonto Creek stream flows between 200 and 1,100 cfs, measured at the Gun Creek gage, between February 1 and May 31. Migration days represent the conditions under which predatory nonnative fish are most likely to swim out of the CS and upstream into lower Tonto Creek, adversely affecting gartersnakes and their habitat.

Changed Circumstances—Approaching Take Exceedance: Amendment Process Initiation

If the amount of incidental take associated with any covered activity approaches the total maximum amount authorized by the amended ITP (for gartersnakes or any covered species), then SRP would initiate an amendment of the RHCP and ITP pursuant to the relevant changed circumstances provision of the RHCP addendum to maintain its No Surprises assurances.

2.1.2.1.2 FLYCATCHER AND CUCKOO

The planned deviation will extend inundation during the flycatcher and cuckoo breeding seasons in the bottom 5 feet of the FCS (2,151 to 2,156 feet amsl), reducing the amount of available nesting habitat due to elevated water levels affecting habitat quality. The reduction and alteration of nesting habitat would result in incidental take in an amount equivalent to the acres of habitat alteration. Extended inundation past 3 months and for multiple consecutive years likely kills any germinating or young riparian vegetation, risks killing mature tamarisk (*Tamarisk* spp.), and increases the stress and risk to any mature cottonwood (*Populus* spp.) (should it be present). Mature willow (*Salix* spp.) can annually withstand months of inundation in excess of the planned deviation (see Appendix 4 of the 2002 RHCP).

The planned deviation and elevated water levels may reduce available flycatcher nesting habitat up to 17.1 acres (12.3 acres in the CS and 4.8 acres within the FCS), and nesting cuckoo habitat up to 5.2 acres (2.6 acres in the CS and 2.6 acres within the FCS). The planned deviation could also affect the availability of up to 75.9 acres of flycatcher and 43.0 acres of cuckoo nesting habitat in the FCS.

While the planned deviation is a new covered activity with effects in the FCS and the CS, the additional flycatcher and cuckoo incidental take associated with this activity would not exceed SRP's habitat-based take surrogate described in the 2002 RHCP and authorized in the 2003 ITP. The 2003 ITP authorized SRP to incidentally take (via harm equivalent to the acres of habitat alteration) flycatchers in an amount up to 750 acres (1,250 acres with adaptive management) and cuckoos in an amount up to 313 acres (1,113 acres with adaptive management), in any given year. SRP does not anticipate that, when the planned deviation occurs, the lake would grow to exceed the total acres of affected flycatcher and cuckoo habitats. Additionally, SRP has fully implemented conservation measures to minimize and mitigate the impacts of authorized flycatcher and cuckoo incidental take. SRP is not requesting an increase in the amount of flycatcher or cuckoo incidental take authorized by the ITP but is requesting the amended ITP

authorize the take associated with the additional effects on the flycatcher and cuckoo in FCS from the planned deviation.

2.1.2.1.3 BALD EAGLE

The RHCP addendum restates the amount of eagle take to be authorized under the amended ITP using three surrogate metrics. Each metric is rationally connected to the effects of SRP's covered activities that are likely to lead to incidental take and is practical to measure during implementation of the RHCP addendum. The updated metrics quantify incidental take and exceedance criteria in a manner that is measurable to account for the effects previously considered and addressed by Reclamation as part of the biological opinions for Modified Roosevelt and by SRP as part of the 2002 RHCP and the effects considered in the RHCP addendum for normal FCS operations and the planned deviation (Table 2-3).

Table 2-3. Bald Eagle Take Metrics and Exceedance Criteria

Surrogate Metric	Amount of Take	Measurement or Exceedance Criteria
Number of drowned fledglings	3 drowned fledglings	Detection of a drowned juvenile bald eagle at Modified Roosevelt that is: 1) reported between March 15 and June 15; and 2) reasonably believed to have fledged from a nest that is in the CS or FCS.
Number of destroyed nests	40 destroyed nests	Destroyed nests meet one or more of the following conditions: A. Detection of a bald eagle nest (active or alternate) in the CS or FCS: 1) that is damaged to the point where it is or would be unusable for nesting activities; and 2) where the cause of the destruction is wholly or substantially related to direct inundation by the lake or to a nest tree falling or breaking after a period of extended inundation or desiccation. B. Detection of a tree or snag supporting a bald eagle nest (active or alternate) in the CS or FCS: 1) that is damaged such that the nest is intact but unusable (e.g., the nest is intact on the ground, or the nest is intact but not upright); and 2) where the cause of the destruction is wholly or substantially related to inundation by the lake. C. Detection of a bald eagle nest with viable eggs or nestlings that are abandoned by the adult breeding pair, the nest fails due to abandonment, and the proximate and reasonably certain cause of the abandonment is high water under the nest, even if the nest itself is not ultimately destroyed. D. A bald eagle nest in the CS or FCS where eggs or nestlings have been salvage collected by other authorized parties based on a determination by SRP that inundation (and subsequent destruction) of the nest is imminent.
Reduced reproduction from low lake levels	4 reduced lake level events	A year in which: 1) Roosevelt Lake elevation is at or below 2,100 feet amsl for a substantial portion of the bald eagle breeding season (i.e., at least 60 consecutive days between January 1 and March 31 or more than 90 total days between January 1 and June 30); and 2) the combined productivity rate of monitored bald eagle breeding areas relying on Modified Roosevelt is less than 1.0.

2.1.2.2 Gartersnake Conservation Program

Under the Proposed Action, SRP would implement a Gartersnake Conservation Program in designated critical habitat, intended to fully offset the impacts of the requested incidental take and reduce primary threats to the snake from threats by nonnative predatory fish (i.e., predation, wounding, and competition) (FWS 2014a, 2020a, 2021a).

SRP would implement the following measures to address the impacts of gartersnake take (see RHCP addendum Subchapter 5.B): 1) suppress nonnative predatory fish by electrofishing in two separate lower Tonto Creek reaches; 2) stock native fish in two separate lower Tonto Creek reaches and the FCS; 3) stock lowland leopard frog (*Lithobates [Rana] yavapaiensis*) in the Gisela Reach of lower Tonto Creek and possibly the FCS; and 4) fund a lowland leopard frog breeding facility. SRP would implement a combination of some or all of these conservation measures to achieve a level of conservation benefit that fully offsets the impacts of the anticipated incidental take.

Following the suppression of nonnative predatory fish by electrofishing, native fish stocking would resupply and diversify prey available to gartersnakes and other wildlife. Small fish are prey for gartersnakes, as well as for other fish and wildlife of the Tonto Creek Basin. SRP anticipates stocking the following species native to the Tonto Basin: longfin dace (*Agosia chrysogaster*), native sucker species (*Catostomus* spp.), speckled dace (*Rhinichthys osculus*), and Gila topminnow (*Poeciliopsis occidentalis occidentalis*). SRP may stock other aquatic gartersnake prey species with concurrence from and in coordination with FWS and AGFD. SRP would stock captive-raised fish in pools where nonnative predatory fish suppression occurs. Stocking would occur at rates commensurate with the size of the pool treated and the availability of fish.

Lowland leopard frogs are a native prey species for gartersnakes and other fish and wildlife of the Tonto Creek Basin. Coupled with the suppression of predatory nonnative fish in the persistent pools of the Gisela Reach, stocking of lowland leopard frog could increase the availability and diversity of suitable native prey locally available to gartersnakes and other wildlife. SRP is not currently planning to stock captive-reared lowland leopard frogs in the pools of the FCS. However, if during the annual coordination meeting (see RHCP addendum Subchapter 5.B.iii), SRP and the FWS decide to stock lowland leopard frogs in this reach, this conservation action is eligible to generate conservation credit.

SRP would implement the following conservation measures in gartersnake critical habitat along two separate reaches of lower Tonto Creek (221 critical habitat acres) and the FCS (192.2 critical habitat acres) to mitigate for 5,176.4 acre-years and 906 fish migration days of impact associated with the requested incidental take:

- Lower Tonto Creek, from the Roosevelt Lake FCS upstream to East del Chi Drive, nonnative predatory fish suppression and native fish stocking:
    - This 14.1-mile reach of lower Tonto Creek terminates at East del Chi Drive where three 9-foot-diameter culverts are perched more than 1 foot above the downstream plunge pool elevation, creating a barrier to fish passage.
    - SRP has separated this lower Tonto Creek reach into four segments—Reach 1: A-Cross Road to Bar X Crossing (3 river miles); Reach 2: Bar X Crossing to East Greenback Valley Road (3.5 river miles); Reach 3: East Greenback Valley Road to Haufer Wash (3.5 river miles); and Reach 4: Haufer Wash to East del Chi Drive (5 river miles).
    - SRP would monitor daily mean flows at the Tonto Creek stream gage at Gun Creek during the spring runoff period of February 1 through May 31. In years when Tonto Creek daily mean flows at the gage are greater than 200 cfs but not more than 1,100 cfs for a period of 5 or more consecutive days, SRP would minimize take of gartersnakes through nonnative predatory fish suppression in persisting pools.
    - SRP would mobilize nonnative predatory fish suppression once spring runoff diminishes, and the maximum daily stream gage reading reaches 20 cfs daily mean flow or less (typically during May). The objective would be to remove as many nonnative predatory fish as possible by using electroshocking techniques or other practicable and appropriate methods.
    - Because Tonto Creek is intermittent, and pools and nonnative predatory fish persist closest to Roosevelt Lake, SRP's nonnative predatory fish suppression effort would be greatest closer to Roosevelt Lake. SRP would treat 100% of remaining pools in Reach 1, 50% in Reach 2, 25% in Reach 3, and 12% in Reach 4. SRP would only treat pools on federal lands and would not treat pools on private property.
    - SRP does not propose to stock native fish in lower Tonto Creek above the FCS but will provide AGFD with sufficient funds to rear and stock native fish (e.g., longfin dace, sucker species, chub species [family Cyprinidae]) in lower Tonto Creek. SRP anticipates that the funding it will provide to support stocking activities will result in the release of native fish

into at least one lower Tonto Creek pool above the FCS in years when the trigger conditions are met for implementing nonnative fish suppression in the lower Tonto Creek.

- Lower Tonto Creek–Gisela Reach nonnative predatory fish suppression and native fish stocking:
  - The Gisela Reach is a 3-mile reach of Tonto Creek, outside the permit area, between the town of Gisela and the 76 Ranch at Rye Creek confluence. SRP has divided the Gisela Reach into three approximately 1-mile-long segments (Segments A, B, and C) (see Figure 25 in the RHCP addendum).
  - To the extent practicable (e.g., subject to weather conditions), SRP would conduct nonnative predatory fish suppression in each of the first 5 years after approval of the amended ITP and in 2 out of 3 years, on average, thereafter through the remaining permit term.
- Roosevelt Lake FCS native fish stocking:
  - To offset impacts of gartersnake take, SRP would conduct native fish stocking in the FCS in sustained pools below 2,175 feet amsl. Conservation credit for native fish stocking in the FCS is applied toward fully offsetting the impacts of take occurring in the CS and FCS, including those impacts of take that result from the planned deviation. This action would be coupled with conservation actions applied to offset the impacts of take in lower Tonto Creek (i.e., suppression of nonnative predatory fish from sustained pools in reaches of lower Tonto Creek) and would occur only in years when those actions are triggered. Based on historical flow data, SRP estimates this would occur in 75% of years. In those years, native fish acquisition and stocking in the FCS would proceed as described for the Gisela Reach.
- Lowland leopard frog breeding facility:
  - There are currently no breeding facilities available to produce lowland leopard frogs for stocking, although captive propagation methods exist and are feasible. If SRP can find a qualified and FWS-approved organization interested in breeding lowland leopard frogs suitable for stocking in the Tonto Basin, SRP would commit up to $625,000 (subject to further investigation) toward establishing, operating, and maintaining a breeding facility over the remaining permit term.

2.1.2.3 Monitoring, Reporting, and Adaptive Management of Gartersnake Conservation Measures

SRP's gartersnake take estimates are based on the "worst case" 30-year periods of the Reservoir Planning Model and historical Tonto Creek gage data (see Chapter 6 of the RHCP addendum). SRP's take estimates include an additional allowance for uncertainty and anticipate that the estimated amount of incidental take would not be exceeded. SRP does not propose to use activity-specific estimates of take as separate limits of authorized take. Instead, as described in Chapter 6.A of the RHCP addendum, SRP would monitor the actual amount of take that occurs in each year of RHCP implementation and implement an annual accounting process for debiting actual takings from the total authorized amount.

SRP's monitoring strategy is composed of three parts: 1) monitoring and reporting the exceedance of authorized gartersnake take (see RHCP addendum Subchapter 6.A.i); 2) monitoring and reporting the implementation of the conservation measures to offset take and tracking conservation credits (see RHCP addendum Subchapter 6.A.ii); and 3) effectiveness monitoring and adaptive management that describes measures that might be used to modify conservation measures, as well as monitoring and research that may be conducted to address data gaps for future permit applications (see RHCP addendum Subchapter 6.A.iii).

SRP would monitor and report the actual takings to FWS (see RHCP addendum Subchapter 6.A.ii) and ensure that authorized take is not exceeded by:

- monitoring the actual changes in available habitat acres and the actual number of migration days that occur each year of the ITP term;
- debiting these amounts from the authorized cumulative total, which will be tracked on an annual basis in a running ledger of authorized, actual, and remaining take;
- reporting the ledger to the FWS each year with the RHCP annual report; and
- establishing triggers for reengaging with the FWS on an amendment to the RHCP and ITP if the remaining amount of take reaches a certain level (i.e., changed circumstances).

In addition, SRP would contribute $150,000 in 2022 dollars[2] over the term of the permit to fund periodic gartersnake presence/absence surveys or, alternatively, other research opportunities to further the understanding of the status of the species and its habitats on lower Tonto Creek in coordination with FWS. SRP would also perform monitoring of the anuran (i.e., frogs and toads) populations at the Gisela Reaches and the lower Tonto Creek portion of the permit area above the FCS. This monitoring would occur at a frequency of at least once every 3 years, with the intent to collect long-term data on species composition and relative abundance (using indices of abundance such as call detections per unit of survey effort or other indirect measures of abundance) of the anuran community at these mitigation locations.

SRP would adaptively manage implementation of gartersnake conservation measures to achieve effective and efficient conservation. SRP would also contribute to monitoring and research that would help address uncertainties and data gaps important to preparing an ITP renewal or amendment for a future permit term. This monitoring and research also fulfill the purpose of adaptive management. SRP would host an annual coordination meeting to discuss implementation of the Gartersnake Conservation Program on or before November 30 of each year to support implementation of the RHCP addendum. Invited attendees would include representatives from SRP, FWS, USFS, AGFD, and Reclamation.

SRP expects its adaptive management approach will support annual review and feedback on the RHCP addendum conservation measure implementations. Adaptive management increases conservation success by providing the opportunity to implement remedial actions to address potential problems. Effective monitoring is an essential element of adaptive management because it provides reliable feedback on the effects of conservation actions. Based on the monitoring results, and through annual reports and meetings, SRP and FWS would be able to determine how well their actions are meeting the RHCP addendum's goals and objectives, and what steps SRP may take to modify activities to increase success (see RHCP addendum Subchapter 6.A.iii).

2.1.2.4 Potential Alternate Locations for Gartersnake Conservation Actions

After working with FWS, SRP may implement gartersnake conservation actions such as those described above in Section 2.1.2.2, in one or both of the following alternate locations after assessing the first 5 years of mitigation activities on Tonto Creek near Gisela (see Figure 36 and Subchapter 6.A.iii in the RHCP addendum):

[2] SRP intends to spend these funds in increments of approximately $25,000 (in 2022 dollars) on 5-year intervals for the remainder of the ITP term. This amount is consistent with spending by SRP on similar gartersnake monitoring implemented under SRP's ESA Section 10(a)(1)(A) Recovery Permit (Permit Number ES62371D-1). Applying the average annual inflation rate over the last 30 years (about 2.34%, based on the average annual inflation rate between 1993 and 2022 reported by the U.S. Bureau of Labor Statistics), the inflation-adjusted value of $25,000 spent in Year 5 of the amendment period will be $28,065, in Year 10 will be $31,506, in Year 15 will be $35,369, in Year 20 will be $39,705, in Year 25 will be $44,573, and in Year 30 will be $50,038. The total inflation-adjusted value of the dollars spent by SRP on this type of monitoring will not exceed $229,256 (i.e., the sum of the inflation-adjusted spending increments).

- San Pedro River and Babocomari River within the San Pedro Riparian National Conservation Area is located approximately 128 miles south of Roosevelt Lake and managed by the Bureau of Land Management. The San Pedro Riparian National Conservation Area contains 5,237.8 acres of gartersnake critical habitat. It provides habitat for more than 80 mammal species, two native species and several introduced species of fish, more than 40 species of amphibians and reptiles, and 100 species of breeding birds. It also provides habitat for 250 species of migrant and wintering birds and contains archaeological sites showing remnants of human occupation from 13,000 years ago (Bureau of Land Management 2023).
- Santa Cruz River within the San Rafael State Natural Area is located approximately 157 miles south of Roosevelt Lake in the San Rafael Valley and owned and managed by the Arizona State Parks Board. The San Rafael State Natural Area contains 110.8 acres of gartersnake critical habitat. It also serves to preserve pristine native grasslands and provides habitat for a variety of big game and other wildlife and rare species (Arizona State Parks 2023).

Mitigation activities to improve gartersnake aquatic prey conducted in these areas could be in lieu of or in tandem with similar activities in the Gisela Reach of Tonto Creek as needed to generate sufficient mitigation credits to offset take (see RHCP addendum Subchapter 5.B.ii). Implementation of conservation actions at alternate locations would result in impacts to resources similar to those described for the Gartersnake Conservation Program under the Proposed Action. If it is determined that conservation actions would need to be implemented at either or both locations, additional coordination with land managers and associated environmental analyses would be conducted.

2.1.2.5 Changed Circumstances

The RHCP addendum identifies provisions to address potential changes in circumstances that could affect covered species (e.g., a change in listing status). If circumstances were to change, SRP would implement the changed circumstances provisions included in the RHCP addendum. Changed circumstances identified in the RHCP addendum are: 1) if gartersnake occupancy within the permit area changes; 2) if actual take approaches the authorized take limit; 3) if SRP's implementation of mitigation has substantially lagged behind the anticipated pace of take for more than 5 years; or 4) if the gartersnake is extirpated in a mitigation reach. For more detailed information on changed circumstances, see Chapter 7 in the RHCP addendum.

2.1.2.6 Funding

SRP would ensure adequate funding of mitigation and monitoring efforts to meet all its obligations under the RHCP addendum. Cost estimates based on currently available information are outlined in Subchapter 8.B of the RHCP addendum.

During the first 5 years of the amended permit period, SRP would include funds in its annual budget to minimize, mitigate, and monitor impacts from the taking of covered species and to implement the permit. SRP's conservation efforts include providing funds to remove nonnative fish and stock native prey species in pools on two lower Tonto Creek reaches, support native prey hatchery operations, investigate the feasibility of developing a lowland leopard frog propagation facility, monitor effectiveness of mitigation efforts, and hire and maintain staff to implement these measures.

No later than 5 years after the permit is issued, SRP shall ensure that permanent funding is available to meet its continuing obligations. Unless SRP selects other methods of ensuring permanent funding, principal would be placed in a non-wasting account designated solely for that purpose. The account would be in the form of a separate trust account that has already been established for the RHCP. Principal in the account would be an amount that would generate an annual cash flow sufficient to satisfy SRP's continuing obligations under the RHCP, as agreed to by the FWS and SRP.

2.2 NO PLANNED DEVIATION ALTERNATIVE – ISSUANCE OF AMENDED SECTION 10(A)(1)(B) PERMIT WITH NO PLANNED DEVIATION FROM THE WCM

Under this alternative, FWS would issue the amended ITP to authorize incidental take of gartersnakes at Modified Roosevelt from CS operations and normal FCS operations and expand the permit area to include the FCS and approximately 14.1 miles of lower Tonto Creek immediately upstream of the lake (see Section 2.1.1). However, under this alternative, the planned deviation would either not be approved by the Corps or SRP would not seek approval and, therefore, would not be implemented by SRP. Incidental take, conservation measures, and monitoring under this alterative would be the same as those described above for the current CS and FCS operations, but would not include the incidental take, mitigation measures, and monitoring associated with the planned deviation.

2.3 NO ACTION ALTERNATIVE

NEPA requires evaluation of a No Action Alternative, which serves as a baseline for comparison of potential effects. Under the No Action Alternative, FWS would not issue the requested ITP amendment and SRP would not implement the Conservation Program of the RHCP addendum. SRP would continue to operate Modified Roosevelt under the 2002 RHCP and 2003 ITP (which expires February 26, 2053) for the four covered species (cuckoo, flycatcher, rail, and bald eagle). Also, under the No Action Alternative, the Corps would not take action on a planned deviation to the WCM for flood control operations. SRP would continue to operate Modified Roosevelt in accordance with the criteria identified in the 1997 WCM and within the 1996 WCA.

Under the No Action Alternative, with respect to adverse effects on listed species covered by the original ITP, SRP could perform only those activities for which it currently has incidental take coverage. For more recently listed species however, ESA compliance issues might arise. For example, the gartersnake was listed in 2014 and occurs in areas affected by SRP's operation of Modified Roosevelt. Without an amended ITP, SRP would need to manage water levels to avoid a take from inundating gartersnake habitat in the CS or FCS and implement other take avoidance measures to address nonnative predatory fish, possibly requiring additional environmental and operational analyses. SRP would endeavor to avoid rising lake levels at Modified Roosevelt, subject to hydrological inputs, physical limitations for releases, and human health and safety considerations. This would be a temporary measure until SRP and the FWS developed and implemented a long-term ESA compliance solution. Based upon prior ESA compliance efforts at Modified Roosevelt and Horseshoe and Bartlett Reservoirs, SRP anticipates that it could take approximately 3 years to secure alternative authorization for gartersnake take.

Aside from take avoidance measures, no additional mitigation measures beyond those described in the 2002 RHCP would be implemented under the No Action Alternative. This alternative does not satisfy FWS's or the Corps' purpose and need for the Proposed Action (see Section 1.4). However, to comply with NEPA regulations (40 CFR 1502.14[c]), this alternative is carried forward for analysis in this EA.

2.4 ALTERNATIVES TO THE PLANNED DEVIATION CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

SRP considered alternatives related to the planned deviation. The development of these alternatives and the rationale for their dismissal from detailed EA analysis are provided in Appendix E. Alternatives to amending the ITP were limited to the Proposed Action and No Action Alternative, as no other feasible alternatives were available.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter presents the existing conditions within the resource-specific analysis areas, as well as the environmental effects[3] that would be reasonably expected from implementing the alternatives. Environmental consequences are analyzed based on direct, indirect, and cumulative effects on resources under consideration. The resources analyzed in detail in this NEPA analysis are restricted to those that would be directly or indirectly affected by the Proposed Action or alternatives. This includes cultural resources, land use/recreation, socioeconomics/environmental justice, vegetation, water resources, general wildlife, covered species, and other protected species. Resources that were dismissed from detailed analysis are addressed in Table 3-1. This EA also examines cumulative effects, including reasonably foreseeable environmental trends and projects that could, along with the Proposed Action or alternatives, result in adverse effects on the human environment. Cumulative effects analysis can be found in (Appendix F).

Resource-specific analysis areas are defined in the resource sections (see Sections 3.2 and 3.3, below) and include the permit area plus other geographic areas that could be directly and indirectly affected by the Proposed Action or alternatives.

Table 3-1. Resources and Rationale for Elimination

Resource	Not Present	Present, Not Impacted	Rationale
Air Quality		X	The alternatives would not result in a measurable increase in emissions and no impacts to air quality are anticipated.
Geology/Soils		X	There would be no impacts to geology from the alternatives because there is no correlation between seismicity and reservoir levels (Lockridge et al. 2012). Therefore, the change in the water release rate at Modified Roosevelt would not impact seismicity or geologic conditions. Under all alternatives, there would be no new impacts to soils along the reservoir shoreline; these are already subject to inundation and shoreline wave action under the current WCM. Impacts on erosion and sedimentation would be negligible (see Section 3.6.2.1.3).
Hazardous Materials/Waste		X	No hazardous materials would be associated with implementation of the alternatives. No significant impacts are expected.
Indian Trust Assets		X	Through consultation with potentially affected Tribes, it was determined that the Proposed Action and alternatives would have no impacts on Indian Trust Assets (see Section G.1.1 in Appendix G).
Livestock Grazing		X	While livestock grazing occurs on USFS lands adjacent to Roosevelt Lake, there would be no impacts to livestock grazing associated with the alternatives, as livestock allotments would continue to be managed per existing management plans.
Noise		X	Implementation of the alternatives is not expected to generate noise and would not result in a change in noise in the permit area vicinity beyond what is currently experienced, and no impacts from noise are anticipated.
Prime Farmlands	X		No prime farmlands are present in the permit area or vicinity of the permit area. Outside of the permit area, in areas proposed for off-site mitigation, land use would remain the same and no impacts to prime farmlands, if present, are anticipated.

[3] This EA uses the terms impact and effect interchangeably.

Resource	Not Present	Present, Not Impacted	Rationale
Public Health and Safety		X	Reclamation's Dam Safety Advisory Team identified a risk-neutral finding for the planned deviation under the Proposed Action to downstream communities—a critical finding in support of safely managing flood events (see Section 3.6.2.1.3). Issuance of the amended ITP would have no effect on public health and safety. Under the No Action Alternative, the circumstances and characteristics of flood control operations may differ from current operations, but the absolute timing, frequency, volume, and rate of spill would remain within the overall range of variability observed in the past and estimated by the Reservoir Planning Model (SRP 2023a).
Visual Resources		X	Implementation of the alternatives is not expected to result in a change in the visual character in the permit area; therefore, no impacts to visual resources are expected.

Impacts to resources may be either adverse (negative) or beneficial (positive); however, where adverse or beneficial is not specifically noted, the reader should assume the impact is adverse. With regard to duration, impacts are described as long-term, short-term, or temporary (see Table 3-2). This EA uses a four-level classification scheme (negligible, minor, moderate, and major) to characterize the intensity of the potential impacts of the alternatives as defined in Table 3-3.

Table 3-2. Definitions of Effects Durations

Duration	Definitions
Long-term impacts	Impacts that last for a long period of time (e.g., decades or longer, including impacts beyond the life of the permit).
Short-term impacts	Impacts that extend beyond the implementation phase, potentially lasting for several months, but not for several years or longer.
Temporary impacts	Impacts that end as soon as the activity ceases.

Table 3-3. Definitions of Impact Levels

Impact Level	Definitions
Negligible	Either no impact or no measurable impact.
Minor	A small and measurable impact. If adverse, the affected resource would recover completely without remedial or mitigating action.
Moderate	A notable and measurable impact. If adverse, the affected resource would recover completely when remedial or mitigating action is taken.
Major	A regional or population-level impact. The affected resource would not fully recover, even after the impacting agent is gone and remedial or mitigating action is taken.

3.2 BIOLOGICAL RESOURCES

The analysis area for direct and indirect impacts to biological resources consists of the Roosevelt Lake permit area, lower Tonto Creek permit area, the Gisela Reach mitigation site, and the lower Salt River. While the alternatives differ in the timing and volume of releases from Modified Roosevelt, any impacts to biological resources below Modified Roosevelt are expected to be negligible because the seasonal fluctuations in water levels that support riparian vegetation along the lower Salt River would continue to occur under all alternatives. Additionally, any changes in Salt River flows would be attenuated by the system of dams and reservoirs, beginning immediately below Modified Roosevelt with Apache Lake. Given the anticipated negligible impacts to biological resources downstream of Modified Roosevelt under

any alternative, impacts occurring within and along the lower Salt River are not discussed in detail in this EA. Impacts to general wildlife and other protected species, including migratory birds, Species of Greatest Conservation Need (SGCN), and USFS-sensitive species, would be negligible and are described in Appendix H.

3.2.1 Vegetation

3.2.1.1 Affected Environment

The 2002 RHCP EIS (FWS 2002a) describes vegetation at Roosevelt Lake and is summarized below as appropriate. Conditions within the Roosevelt Lake permit area have changed since the publication of the 2002 RHCP EIS, and the analysis area has been expanded to reflect the additions to the permit area and new mitigation site. Therefore, the description of existing vegetation has been updated and expanded based on data from the 2016 Southwest Regional Gap Analysis Project (U.S. Geological Survey [USGS] 2016) and other sources, including vegetation studies conducted by SRP (ERO Resources Corporation and GEI Consultants, Inc. [ERO-GEI] 2022a; SWCA Environmental Consultants [SWCA] 2020), as appropriate.

Currently, Modified Roosevelt Dam operations lead to fluctuating water levels in the CS that promote cycles of riparian vegetation growth and decline that are similar to natural riparian ecosystems but occur more frequently. At times, higher lake levels inundate and kill vegetation, but saturation of the lakebed can also create conditions that favor the establishment of new vegetation or rejuvenate existing vegetation. As the lake recedes, newly deposited sediment is exposed, allowing new riparian vegetation to become established. However, this eventually leads to desiccation of riparian vegetation in the upper portions of the reservoir.

The most prevalent riparian vegetation communities are Invasive Southwest Riparian Woodland and Shrubland, North American Warm Desert Wash, and North American Warm Desert Riparian Woodland and Shrubland (USGS 2016). Riparian vegetation in the CS and at Roosevelt Lake in general is composed primarily of tamarisk, Goodding's willow (*Salix gooddingii*), arrowweed (*Pluchea sericea*), and Fremont cottonwood (*Populus fremontii*) (FWS 2002a; SWCA 2020). Riparian vegetation in the CS primarily occurs at the mouths of streams where slopes are gentle and there is available water from stream inflows, saturated soils, and the lake. This is most evident at the Tonto Creek and Salt River inlets. Riparian vegetation along the perimeter of the lake is limited due to the steep banks and fluctuations in water level (FWS 2002a).

Upland vegetation at Roosevelt Lake is characteristic of the Sonoran Paloverde-Mixed Cacti Desert Scrub and Apacherian-Chihuahuan Mesquite Upland Scrub vegetation communities (USGS 2016). Common species include paloverde (*Cercidium* spp.), mesquite (*Prosopis* spp.), ironwood (*Olneya tesota*), catclaw acacia (*Acacia greggii*), crucifixion thorn (*Canotia holacantha*), and a variety of cacti; grasses and forbs are also present, though the herbaceous layer is generally sparse (FWS 2002a; SWCA 2020). Upland vegetation communities can develop at higher elevations in the CS when lake levels are low, but generally do not persist because of frequent inundation (FWS 2002a).

Marsh vegetation, consisting of cattails (*Typha* spp.) and other herbaceous emergent vegetation, also shifts as lake levels change, becoming inundated as lake levels rise and then forming temporarily along the perimeter of the lake once the water recedes. These ephemeral marshes can be found in the CS at times, primarily along the Tonto Creek and Salt River inflows. Marsh vegetation along these inflows is also influenced by scouring flows after major precipitation events, especially when the lake level is lower and flood flows are not attenuated by the reservoir pool (FWS 2002a).

The vegetation communities present in the FCS are similar to those described above for the CS. However, vegetation in the FCS is not as strongly influenced by Modified Roosevelt Dam operations because the lake elevation has rarely entered the FCS (twice in 2009 and twice in 2010) and because inundation events are brief (i.e., no more than 20 days). As a result, upland vegetation communities currently dominate the FCS, and riparian vegetation is mostly restricted to the broad alluvial basins associated with lower Tonto Creek and the Salt River inflow. Limited emergent marsh vegetation may also be found in these areas, but their persistence in the FCS is more strongly influenced by stream flows than the lake's elevation.

Vegetation communities in the lower Tonto Creek permit area are similar to those described above; riparian vegetation is present along the braided, intermittent stream channel. Outside of the streambed, upland vegetation communities prevail (see Appendix E of the RHCP addendum). Emergent marsh vegetation is generally lacking as the intermittent flows in lower Tonto Creek do not provide the necessary hydrologic conditions.

Similar vegetation communities are found farther upstream at the Gisela Reach mitigation site; however, the Tonto Creek channel in this area is narrower and less braided, which further limits the lateral extent of riparian vegetation communities.

3.2.1.2 Environmental Consequences

3.2.1.2.1 PROPOSED ACTION ALTERNATIVE

Conservation Space Operations

The Proposed Action would not modify SRP's operations of Modified Roosevelt Dam within the CS. The effect of continued CS operations on vegetation communities in the CS would be similar to those described for the Full Operation Alternative in the 2002 RHCP EIS (FWS 2002a: Section 4.3.2.2), which concluded that the amount of riparian vegetation in the CS would fluctuate as reservoir levels rise and recede. Upland vegetation communities may occasionally develop on exposed areas of the lakebed when lake levels are low but are unlikely to persist due to frequent inundation of the CS. Emergent marsh vegetation may become temporarily established in the CS, particularly near the Tonto Creek and Salt River inflows, but are also unlikely to persist because of the scouring flood flows at these inlets and the frequency of CS inundation.

Flood Control Space Operations

SRP's current flood control operations were analyzed in the 1996 EA for the WCM (Reclamation 1996), which concluded that inundation of the FCS would be too brief and infrequent to lead to readily detectable impacts on vegetation and other resources. However, the most recent Reservoir Planning Model anticipates a more frequent and extended presence of water in the FCS. Back-to-back fill events would be expected to result in alternating inundated and dry periods, with as little as 1 day of dryness between inundation events in the bottom 1 foot of the FCS (i.e., 2,151 to 2,152 feet amsl). At higher elevations, the duration of each inundation event is decreased, and the dry period between inundation events is increased.

Seedlings and young saplings in the bottom 1 foot of the FCS could be killed as a result of this inundation, but recruitment would be expected with recession of water levels if the water table remains high (Levine and Stromberg 2001; Stromberg et al. 1993). This would be especially true for tamarisk die-off and regeneration (Warren and Turner 1975). Ellis et al. (2008) documented rapid regeneration of riparian habitat at Roosevelt Lake, with tamarisk recruitment occurring within months of receding water levels, and tamarisk growing approximately 4.9 feet within 1 year. Recruitment of Goodding's willows

and Fremont cottonwoods were favored when substrates were moistened by receding floodwaters and high water tables during spring months, as typically occurs under normal flood control operations. As a result of the infrequency of anticipated back-to-back fill events, the short-term (maximum 20-day) period of inundation, and the interim dry periods between fill events, there would be infrequent and short-term impacts to seedlings and saplings, which would be minimized by subsequent regeneration.

The effects of intermittent inundation on mature riparian vegetation are not addressed in the literature; however, mature willows are tolerant of prolonged inundation (see Appendix 4 of the 2002 RHCP) and would not be expected to suffer detrimental effects from the intermittent inundation anticipated under normal flood control operations. Similarly, mature cottonwoods would tolerate partial submersion for 4 months (Markovchick 2021) and would not be expected to suffer detrimental effects from intermittent inundation. Mature tamarisk would be more susceptible to stress from consecutive fill events compared to native vegetation (Ellis et al. 2008; Gladwin and Roelle 1998; Stromberg 1997; Stromberg et al. 1993). Any effects, which could include branch dieback or sparse foliage, would be limited to tamarisk rooted in the lower portion of the FCS. Temporary flooding of the FCS could also result in increased soil moisture availability, promote the development of dense foliage in existing vegetation, and support the germination and development of new vegetation in the FCS.

Upland vegetation communities, and in particular, the xeric-adapted shrub and cacti communities found in the analysis area, are generally less tolerant of inundation than riparian species (Stevens and Waring 1985). While upland vegetation loss in the FCS would occur more often due to the increased frequency of FCS operations, these vegetation communities would experience the same benefits from increased soil moisture following the lake's recession.

Planned Deviation

By increasing the duration of inundation in the PDS to 120 days in 3 years over a consecutive 5-year period, the planned deviation would increase the effects on vegetation in the bottom 5 feet of the FCS. Increased water availability for vegetation that is rooted either within or near the PDS could result in increased vegetation vigor. Conversely, prolonged submersion of the root crown can reduce vegetation vigor and eventually cause mortality, and mortality increases as depth and duration of inundation increase (see Appendix 4 of the 2002 RHCP). The literature reviewed for the RHCP indicate that the effects vary among species. Goodding's willows showed little mortality after 12 months of inundation and had higher growth rates when their root crowns were inundated. Mature cottonwoods showed no mortality after 73 days of inundation but had complete mortality after 2 years. No studies evaluating intermediate time periods were found in the literature; however, cottonwood researchers indicated that trees would tolerate partial submersion for 4 months (Markovchick 2021). Tamarisk appeared to be more sensitive to inundation than either cottonwoods or willows, with some mortality possible after 80 or more days of inundation, although mortality rates varied widely between studies. Tamarisk survival was higher for plants that were tall enough to extend above the water surface. Sublethal effects (e.g., reduced growth rates or branch dieback) were not evaluated.

The expected maximum duration of inundation in the PDS ranges from 87 days between 2,155 and 2,156 feet amsl to 120 days between 2,151 and 2,152 feet amsl. No mortality would be expected for mature cottonwoods (Markovchick 2021) or Goodding's willows for these inundation periods, and growth rates could be increased (see Appendix 4 of the 2002 RHCP). Some mortality or dieback could occur for tamarisk; these effects would occur on a gradient, increasing in intensity from 2,156 to 2,151 feet amsl. Many tamarisk rooted in the bottom 5 feet of the FCS are tall enough that most of the plant would be above the water for the duration of the planned deviation; therefore, widespread tamarisk mortality would not be expected. Mortality and dieback of vegetation could be more pronounced in the Salt River arm of Roosevelt Lake (Salt Arm), which is primarily tamarisk, than in the Tonto Creek arm of Roosevelt Lake (Tonto Arm), where the overstory is primarily Goodding's willows. Overall, vegetation

within areas exposed to the longest inundation times would be expected to exhibit lower density, less canopy cover, and more canopy gaps (Ellis et al. 2008). Inundation longer than 30 days would also be expected to result in the death of developing vegetation, which could decrease the ability of the bottom 5 feet of the FCS to develop mature vegetation during the planned deviation and in the years immediately following.

Fluctuating water levels from the planned deviation mimic some aspects of normal dynamic stream flooding, but the timing of lake recession is likely to stimulate tamarisk growth. After the water recedes, vegetation can germinate and grow, taking advantage of increased soil moisture and groundwater, minimizing the temporary impacts of inundation in the FCS from the planned deviation. The planned deviation could result in water receding from the bottom 5 feet of the FCS as late as August, rather than in May or earlier. Exposing sediments in the FCS in summer rather than spring may favor the establishment of tamarisk—which releases seeds from late April through September—over native riparian plants that release seeds earlier in the spring. Thus, while the 3 years of extended inundation from the planned deviation could potentially kill mature tamarisk in the bottom 5 feet of the FCS, it would also favor reestablishment of tamarisk during this time, though it may take several years for vegetation to mature enough to resist future inundation.

Following the planned deviation, normal flood control operations would resume, favoring establishment of native riparian vegetation. Normal flood control operations typically occur in winter and spring and are similar in timing and duration with the natural hydrologic regime. Cottonwood and willow trees are most likely to germinate and grow following normal flood control operations because seeding occurs with the winter/spring flood regime.

Any upland vegetation present in the bottom 5 feet of the FCS may be killed by repeated and extended inundation during the planned deviation but would also benefit from the increased water table following the lake's recession. Although water would be present in the bottom 5 feet of the FCS more frequently and for extended durations, the planned deviation would be unlikely to create consistent emergent marsh habitat.

Gartersnake Conservation Actions

Under the Proposed Action, field crews implementing the Gartersnake Conservation Program might temporarily disturb some vegetation while performing nonnative fish suppression and native fish stocking. These activities are brief, infrequent, and performed by small crews on foot working mostly within the water or adjacent unvegetated areas and would not notably impact vegetation.

Conclusion

Overall, SRP's covered activities under the Proposed Action would have minor, temporary effects on vegetation that would primarily be localized to the CS and, to a lesser extent, the FCS. These effects would be both adverse (e.g., death from inundation or desiccation) and beneficial (e.g., increased growth and vigor from the increased availability of water). The cycles of riparian vegetation growth and dieback that would occur would be similar to those that occur under current operations of Modified Roosevelt; therefore, it is unlikely that SRP's covered activities would cause a long-term shift in the composition of vegetation communities within the CS or FCS. Vegetation in the lower Tonto Creek permit area and the Gisela Reach mitigation site lie above the elevation that is influenced by fluctuations in the lake's level and would not be impacted by SRP's covered activities. Implementation of the Gartersnake Conservation Program would have negligible, short-term, localized impacts on vegetation in the analysis area.

3.2.1.2.2 NO PLANNED DEVIATION ALTERNATIVE

Under the No Planned Deviation Alternative, SRP's ongoing CS operations, normal flood control operations, and the Gartersnake Conservation Program would have the same effects on vegetation as described for the Proposed Action. But overall, effects on vegetation would be slightly reduced because the planned deviation would not occur.

3.2.1.2.3 NO ACTION ALTERNATIVE

Conservation Space Operations

As described in Section 2.3, without an amendment to their ITP, SRP would temporarily operate the CS in a manner that avoids, to the extent possible, lake elevation increases that would inundate gartersnake habitat until the alternative authorization for gartersnake take is achieved. The No Permit Alternative considered in the 2002 RHCP EIS (FWS 2002a) also entailed managing the CS to avoid elevation increases. Therefore, the short-term effects on vegetation in the CS under the No Action Alternative would be similar to those described in Section 4.3.2.1 of the 2002 RHCP EIS (FWS 2002a), which concluded that gradual mortality of riparian vegetation at higher elevations within the CS would occur in the absence of periodic inundation or increased groundwater levels. If normal CS operations are restored, the cycle of riparian growth and dieback driven by the fluctuating lake elevation would resume. Once the lake elevation stabilizes, riparian vegetation would reestablish along the new lake shoreline. In either scenario, the effects on riparian vegetation along the margins of lower Tonto Creek and the Salt River would likely be less pronounced since stream flows would continue to provide the hydric conditions needed to support riparian species.

Flood Control Space Operations

Under the No Action Alternative, SRP would avoid flood control operations to the extent possible and there would be no inundation of vegetation in the FCS, nor would there be increased water availability for vegetation in the FCS. Since the lake has not entered the FCS since 2010 until recently (briefly in April 2023), this would have the effect of perpetuating the existing conditions for vegetation in the FCS.

Planned Deviation

The planned deviation would not be approved under the No Action Alternative, and the effects on vegetation described for the planned deviation under the Proposed Action would not occur.

Conservation Actions

The Gartersnake Conservation Program would not be implemented under the No Action Alternative; SRP would implement nonnative fish suppression in lower Tonto Creek to reduce gartersnake impacts and endeavor to avoid incidental take. The negligible impacts to vegetation from suppression activities would be similar to those described above for the Proposed Action. There would be no effects on vegetation at the Gisela Reach mitigation site since no activities would occur in these locations.

3.2.2 Covered Species

3.2.2.1 Affected Environment

The SRP RHCP addendum identifies five covered species: two are currently federally listed as endangered, two are currently federally listed as threatened, and one is federally protected under the BGEPA. Of these, the northern Mexican gartersnake is the only species that was not included as a

covered species in the 2002 RHCP EIS (FWS 2002a). Table 3-4 lists the covered species and the current listing status. A brief description of each covered species and its baseline status at Roosevelt Lake follows.

Table 3-4. List of Covered Species

Common Name	Scientific Name	Federal Listing Status
Bald eagle	*Haliaeetus leucocephalus*	BGEPA
Northern Mexican gartersnake	*Thamnophis eques megalops*	Threatened
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered
Western yellow-billed cuckoo	*Coccyzus americanus*	Threatened
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	Endangered

3.2.2.1.1 NORTHERN MEXICAN GARTERSNAKE

A detailed description of the northern Mexican gartersnake's (gartersnake) life history, baseline status in the analysis area, and critical habitat is provided in Subchapter 2.A of the RHCP addendum, which is summarized below.

The FWS listed the gartersnake as a threatened species across its historical range (including Mexico) under the ESA in 2014 (FWS 2014a). The FWS (2014a) identified predation from and competition with nonnative aquatic species as the most significant threat to gartersnake populations. The FWS (2014a) also identified wide-ranging declines in amphibian prey populations (due to disease and other factors) as a substantial factor in gartersnake declines. Other threats to gartersnakes are land uses that reduce, alter, or pollute aquatic habitats; drought and anthropogenic modifications to aquatic habitats such as dams, water diversions, flood control projects, and groundwater pumping; and altered flow regimes (e.g., by the impoundment of water) (FWS 2014a).

Approximately 85% of the gartersnake's historical range is in Mexico; in the United States, it primarily occurs in Arizona, with only a few records from New Mexico in the upper Gila and San Francisco River basins (FWS 2014a; Jones et al. 2020). The gartersnake historically occurred in every Arizona county and nearly every river subbasin, but now occurs at very low densities or may be extirpated across 90% of its range within the United States. It is most frequently encountered in the southern two-thirds of Arizona (FWS 2014a, 2021b). The lower Tonto Creek gartersnake population was included in the list of five viable populations where gartersnakes were consistently detected at the time of listing (FWS 2014a). However, along lower Tonto Creek (Servoss 2022) and across its range, it is difficult to fully document the gartersnakes' distribution and abundance due to their cryptic and fossorial nature, especially where density is low or where dense cover is present (Emmons and Nowak 2016; FWS 2013a, 2021b; Jones et al. 2020; Nowak and Emmons 2014).

Gartersnakes use a variety of aquatic and riparian habitats and adjacent terrestrial habitats at elevations between 140 and 8,500 feet amsl. The presence of water (whether perennial, intermittent, or ephemeral), cover (e.g., vegetation, rocks, debris), and a suitable prey base are important components of gartersnake habitat (Burger 2007; Burger et al. 2010; Emmons 2017; Emmons and Nowak 2016; FWS 2014a, 2020a, 2021b; Myrand 2019; Nowak et al. 2019; Sprague 2017). Studies of gartersnake habitat associations detected gartersnakes most frequently in riparian edge, pond edge, and wetland edge habitats, followed by terrestrial habitats (Emmons and Nowak 2016; Myrand 2019; Nowak et al. 2019; Sprague and Bateman 2018). Gartersnakes may cross open water, but rarely use open water habitats for foraging. During the active season (March–November), gartersnake home ranges extend beyond the aquatic boundary into adjacent riparian and upland areas (Emmons and Nowak 2016; Nowak et al. 2019).

Gartersnake brumation sites include cavities and animal burrows beneath boulders, wood debris, trash piles, or other forms of cover in a variety of riparian and upland habitats (Emmons 2017; Emmons and Nowak 2016; FWS 2014a, 2020a; Nowak et al. 2019; Sprague 2017). Brumation sites at Lake Roosevelt ranged from as little as 2.3 feet to as much as 1,257 feet from the water's edge and included rodent and crayfish burrows, cavities formed by partially buried debris and cracked clay soils, and spaces under piles of flood debris surrounded by or adjacent to dense vegetation (Nowak et al. 2019).

Sampling at 13 pools along the Tonto Creek between the lake edge and A-Cross Road detected one native fish species and eight nonnative fish species, including six species of predatory sportfish. Largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and common carp (*Cyprinus carpio*) were the most abundant species collected, collectively representing 77% of all fish collected (ERO-GEI 2022b [see RHCP addendum Appendix F]). Stomach contents from 231 fish, representing five different predatory sportfish species collected during this study, did not contain any visually identifiable snakes or snake fragments. While predation was not documented in this study, a recent study led by Northern Arizona University (Owens et al. 2023) found gartersnake DNA in three of 98 largemouth bass fecal samples collected from Roosevelt Lake and lower Tonto Creek, confirming that the presence of these nonnative fish presents an ongoing risk of predation for gartersnakes (FWS 2021b).

Habitat for gartersnakes is present in the Tonto Arm, which consists of an intermittent braided stream, side channels, shallow water, and beaver ponds, which create a mosaic of riparian woody vegetation and herbaceous marsh, interspersed with open areas of sand or cobble (ERO 2020 [see Appendix G in the RHCP addendum]). Together, the combination of riparian vegetation with a low-lying canopy, open space, and aquatic edge with emergent vegetation supports gartersnake sheltering, basking, and foraging (Myrand 2019; Nowak et al. 2015; Nowak et al. 2019; SWCA 2022a [see Appendix G in the RHCP addendum], 2022c).

The Salt Arm is 20 linear miles away from the Tonto Arm and is separated by the lake's steeply sloped (and sometimes rugged) shoreline. In contrast to the Tonto Arm, the Salt Arm consists of a single, wide, and deep perennial stream channel dominated by tamarisk with intermittent patches of giant reed (*Arundo donax*), cattail, Goodding's willow, and Fremont cottonwood (ERO 2020). The Salt River's higher flows, deeper channel, and greater turbidity may affect amphibian prey abundance and gartersnake foraging success (SRP 2022a). The combination of vegetative cover, hydrologic conditions, water quality and depth, low prey diversity, and presence of nonnative predatory aquatic competitors likely reduce the Salt Arm's gartersnake habitat availability.

Figure 11 in the RHCP addendum depicts selected gartersnake observations in the permit area and surrounding vicinity. Nowak et al. (2019) recorded 81 unique gartersnakes across three study sites that fall within the CS, FCS, and lower Tonto Creek permit area. Surveys by Holycross et al. (2006) detected 17 gartersnakes at two sites; one site was near the boundary between the CS and FCS and the other site was along Tonto Creek above the permit area. Other gartersnake detections in the area include three observed in July 2010 (Burger et al. 2010) and three in July 2012 (Madara 2012), all of which were within the FCS. One gartersnake was also recorded adjacent to the lower Tonto Creek permit area near Punkin Center in June 2018 (Cobbold 2018). Multiple surveys failed to detect gartersnakes in the Salt Arm (Baker et al. 2019; Grimsley-Padron et al. 2020; Nowak et al. 2015).

Surveys in 2004, 2005, and 2010 through 2017 consistently detected gartersnakes along the segment of Tonto Creek known as the Gisela Reach (FWS 2021b).

Critical Habitat

The FWS designated 20,236 acres as gartersnake critical habitat across its range, divided into eight critical habitat units; the Tonto Creek Critical Habitat Unit is in the analysis area (FWS 2021b). The FWS

identified seven critical habitat physical and biological features (PBFs) essential to gartersnakes (FWS 2020a, 2021b). PBFs 1 through 3 are the habitat features, hydrologic conditions, and prey resources essential to gartersnake populations, and PBF 5 is the gartersnake's elevational range (130 to 8,497 feet amsl) (FWS 2020a). PBF 4 is the absence or low occurrence of nonnative fish species. The Tonto Creek Critical Habitat Unit is in a degraded condition due to the presence and abundance of predatory nonnative fish. Table 3-5 provides the acres of gartersnake critical habitat in the analysis area. Gartersnake critical habitat was not designated in the CS or Salt Arm. Gartersnake critical habitat in the Gisela Reach mitigation site is shown in Figure 3-1.

Table 3-5. Northern Mexican Gartersnake Critical Habitat in the Analysis Area

	Acres
Conservation Space (2,136–2,151 feet amsl)	0
Planned Deviation Space (2,151–2,156 feet amsl)	55.4
Remainder of Flood Control Space (2,156–2,175 amsl)	177.0
Lower Tonto Creek Permit Area	2,143.1
Gisela Reach	221.0
Total	**2,596.5**

3.2.2.1.2 SOUTHWESTERN WILLOW FLYCATCHER

The southwestern willow flycatcher (flycatcher) is a covered species in the 2002 RHCP, and a detailed description of the flycatcher's life history, baseline status in the permit area, and critical habitat is provided in the 2002 RHCP EIS (FWS 2002a) and Subchapter 2.B of the RHCP addendum, which is summarized below.

The FWS listed the flycatcher as endangered in 1995, due to declining numbers and reduction in its historic range (FWS 1995a). The flycatcher's decline was attributed to loss and modification of its riparian habitat due to agricultural conversion, livestock grazing, urban development, dams, increased surface and groundwater use, increase in nonnative plant species, and recreational use (FWS 1995a).

The most recent flycatcher range-wide review estimated that there were 1,629 flycatcher territories in 2011, 679 of which were in Arizona (approximately 42%), and 99 of which were in the Roosevelt Management Unit (approximately 6%) (Durst 2017). The AGFD (2012) lists the flycatcher as an SGCN.

Flycatcher breeding habitat consists of medium to tall dense riparian vegetation interspersed with small openings and patches of shorter, sparser vegetation near slow-moving or still surface water or saturated soil (Bent 1940; FWS 2002a; Harris et al. 1987; Spencer et al. 1996; Stafford and Valentine 1985). At Roosevelt Lake, aggregations of multiple occupied patches may create a riparian mosaic of 494 acres or more (Paradzick et al. 1999).

Suitable flycatcher nesting habitat is either: 1) native-dominated, 2) exotic-dominated, or 3) a mix of native and exotic plants (FWS 2002b). At lower elevations, the habitat typically consists of a mixture of tamarisk, willows, cottonwoods, boxelder (*Acer negundo*), ash (*Fraxinus* spp.), alder (*Alnus* spp.), and buttonbush (*Cephalanthus occidentalis*). Canopy height varies from 13 to 98 feet, often with a distinct overstory canopy and a dense mid-story and understory layer, though dense monotypic stands of willow or tamarisk are also used (FWS 2001a).

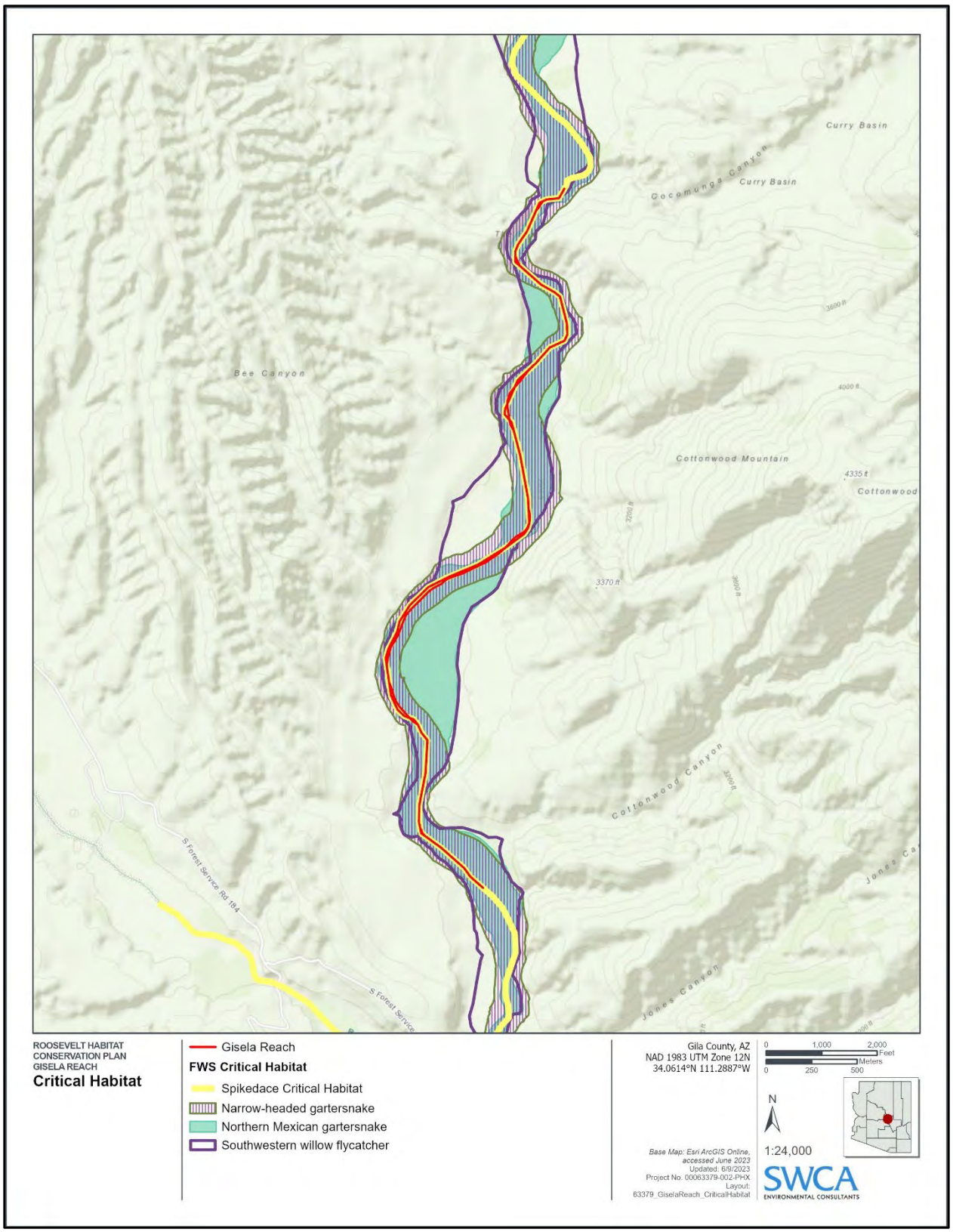

Figure 3-1. Critical habitat in the Gisela Reach.

The location and amount of flycatcher breeding habitat and territories within the Roosevelt Lake CS fluctuate regularly because of changing reservoir levels. Low water levels can lead to the decay of riparian vegetation at higher elevations while also allowing new riparian vegetation to develop on exposed sediments, and high reservoir levels can submerge or alter the vegetation (Paxton et al. 2007).

At the Salt and Tonto Arms of Roosevelt Lake within the FCS, flycatcher habitat is influenced by Tonto Creek and Salt River flows, and periodically, through dam operations. These two factors can affect plant species occurrence/dominance (willow, cottonwood, and tamarisk) through the timing of floods and water storage/recession, and also the persistence and quality of flycatcher habitat through time.

The flycatcher habitat suitability model estimated 563.2 acres of suitable flycatcher nesting habitat within the Roosevelt Lake CS in 2019, and 164.8 acres in 2020, when the lake was approximately 30 feet higher (SRP 2020). Salt Arm flycatcher habitat primarily is dense monotypic stands of tamarisk, yet can include to a lesser degree willow or tamarisk-dominated patches that have an overstory of willows or possibly cottonwoods. Tonto Arm flycatcher habitat occurs in several distinct patches, some of which are a tamarisk understory with some cottonwood/willow overstory, and others which are composed almost entirely of tamarisk.

Within the permit area, Roosevelt Lake flycatcher surveys in 2020 (Liknes and Ashbeck 2021) identified 236 flycatcher territories below 2,175 feet amsl (the top of the FCS). Of these, 220 territories fell within the CS. Approximately 58% of the territories were located in the Tonto Arm and the remaining 42% were located in the Salt Arm. Although targeted at areas above 2,151 feet amsl (the top of the CS), surveys in 2021 detected 45 flycatcher territories centered within the CS (near 2,151 feet amsl), all but three of which were located in the Salt Arm (Liknes and Ashbeck 2022).

Of the 236 flycatcher territories identified during the 2020 surveys (Liknes and Ashbeck 2021), 11 territories were within the first 5 feet of the FCS, and five territories were within the FCS above 2,156 feet amsl. During the 2021 surveys (Liknes and Ashbeck 2022), eight territories were detected in the FCS above 2,156 feet amsl (five in the Tonto Arm and three in the Salt Arm); no flycatcher territories were detected in the first 5 feet of the FCS. Many of the territories detected during these surveys were located within 10 horizontal meters (approximately 33 feet) of an elevation of 2,151 feet amsl, and it is likely that the area used by those flycatchers overlaps both the CS and FCS elevation bands.

Flycatchers have been consistently detected in the lower Tonto Creek permit area, with abundance generally decreasing as distance from Roosevelt Lake increases, and with very few records upstream of Bar-X Road (Ellis et al. 2008). Flycatcher nesting habitat in this area is variable and influenced by flooding regimes and associated groundwater levels. More frequent flooding often leads to a short-term increase in flycatcher nesting habitat. Farther upstream, suitable flycatcher nesting habitat is present at the Gisela Reach mitigation site and flycatcher territories have been documented as recently as 2014 (AGFD 2022).

Critical Habitat

No designated flycatcher critical habitat existed at the time of the 2002 RHCP EIS (FWS 2002a). The FWS (2013b) revised flycatcher critical habitat in 2013, totaling approximately 1,975 stream miles range-wide. The FWS determined that flycatcher critical habitat along lower Tonto Creek and the Tonto and Salt Arms surrounding Roosevelt Lake contains the primary constituent elements (PCEs) essential for conservation, has substantial recovery value, and was occupied at the time of listing (FWS 2013b). The two PCEs in the critical habitat designation are: 1) dense riparian vegetation (trees and shrubs) along a dynamic river or lakeside and 2) the availability of insect prey populations. Table 3-6 provides the acres of flycatcher critical habitat in the analysis area. Flycatcher critical habitat was not designated in the CS. Approximately 43% of flycatcher critical habitat in the FCS is on the Tonto Arm, and the remaining

57% is on the Salt Arm (see Figures 10 and 11 of the RHCP addendum). Flycatcher critical habitat in the Gisela Reach mitigation site is shown in Figure 3-1.

Table 3-6. Southwestern Willow Flycatcher Critical Habitat in the Analysis Area

	Acres
Conservation Space (2,136–2,151 feet amsl)	0
Planned Deviation Space (2,151–2,156 feet amsl)	208.2
Remainder of Flood Control Space (2,156–2,175 amsl)	681.2
Lower Tonto Creek Permit Area	342.6
Gisela Reach	67.7
Total	**1,299.7**

3.2.2.1.3 WESTERN YELLOW-BILLED CUCKOO

The western yellow-billed cuckoo (cuckoo) is a covered species in the 2002 RHCP. A detailed description of the cuckoo's life history, baseline status in the permit area, and critical habitat is provided in Section 4.6.1.4 of the 2002 RHCP EIS (FWS 2002a) and Subchapter 2.C of the RHCP addendum, which is summarized below.

At the time of the 2002 RHCP, the western population of the cuckoo was a candidate for ESA listing (FWS 2001b), and following the RHCP's publication, the cuckoo was listed as threatened in 2014 (FWS 2013c, 2014c). The primary cause for the cuckoo's decline is the degradation, modification, and loss of riparian habitat (Franzreb 1987; FWS 2001b; Hughes 1999; Laymon and Halterman 1989). Other threats to the cuckoo and its habitat include decreased water tables (Phillips et al. 1964) and possibly pesticide use (Corman and Magill 2000; Gaines and Laymon 1984; Hughes 1999; Laymon and Halterman 1986; Rosenberg et al. 1991).

Arizona has the largest remaining population of cuckoos west of the Rocky Mountains (FWS 2001b). In 2019, the FWS estimated that there were 500 cuckoo breeding pairs in Mexico and 800 in the United States, 450 of which were in Arizona (FWS 2020b). The AGFD (2012) lists the cuckoo as an SGCN.

The cuckoo typically breeds at elevations below 6,600 feet amsl in large blocks of riparian habitat, particularly in cottonwood and willow stands (Ehrlich et al. 1988; FWS 2001c). Cuckoos in Arizona have also been documented breeding in xeroriparian vegetation such as mesquite bosques, and occasionally in stands dominated by tamarisk (Corman and Magill 2000; Pima County 2022). The presence of dense understory vegetation and the size and shape of riparian vegetation patches appear to be important factors in breeding site selection (FWS 2001c; Laymon 1998, 1999). Tamarisk can be a component of cuckoo habitat (although typically less commonly than with flycatchers).

The 2002 RHCP EIS (FWS 2002a) defined suitable cuckoo nesting and foraging habitat at Roosevelt Lake as patches of tall, dense, native riparian woodlands that are 10 acres or larger (or may expand to 10 acres or more). Vegetation maps were used to estimate the amount of suitable cuckoo habitat present at that time (ERO 2001). There were an estimated 167 acres of suitable cuckoo habitat in the Salt Arm in 2001 and 187 acres in the Tonto Arm. Most of this habitat (253 acres, or 71%) occurred in the elevation band from 2,111 feet to 2,136 feet amsl.

In 2020, cuckoo surveys up to 2,175 feet amsl (i.e., the top of the FCS) detected nine possible cuckoo territories. The 2020 surveys were not complete because a wildfire prevented access to some sites during the second survey period (Liknes and Ashbeck 2021). Two cuckoo territories (one each in the Tonto and Salt Arms) were entirely within the CS. Four territories (three in the Tonto Arm and one in the Salt Arm)

recorded during the 2020 surveys (Liknes and Ashbeck 2021) were entirely within the FCS. The remaining three territories were partially within the CS and partially within the FCS. Eight of the nine territories fell at least partially within the PDS. Surveys of the FCS in 2021 identified one cuckoo territory in the Salt Arm and two territories in the Tonto Arm (Liknes and Ashbeck 2022), all near 2,175 feet amsl. There are multiple unverified cuckoo records in the lower Tonto Creek permit area above the FCS (eBird 2023).

Mapped riparian vegetation communities (USGS 2016) indicate suitable cuckoo nesting and migratory stopover habitat may be present at the Gisela Reach mitigation site. Although there are no verified records of the cuckoo along the Gisela Reach mitigation site, the bird has been recorded within the surrounding 3 miles as recently as 2011 (AGFD 2022), and there are unverified records within the mitigation site from as recently as 2017 (eBird 2023).

Critical Habitat

Cuckoo critical habitat was proposed in 2014 (FWS 2014b); the final designation in 2021 included 298,845 acres across portions of its U.S. breeding range (FWS 2021c). Cuckoo critical habitat at Roosevelt Lake and lower Tonto Creek provides the PBFs essential to the bird's conservation, including suitable habitat (PBF 1), an adequate prey base (PBF 2), and the appropriate hydrologic regime (PBF 3), and cuckoos are known to nest in those locations (FWS 2021c). Table 3-7 provides the acres of cuckoo critical habitat in the analysis area. Cuckoo critical habitat was not designated in the CS or Gisela Reach. Approximately 50% of cuckoo critical habitat in the FCS is on the Tonto Arm, and the remaining 50% is on the Salt Arm (see Figures 12 and 13 of the RHCP addendum).

Table 3-7. Western Yellow-Billed Cuckoo Critical Habitat in the Analysis Area

	Acres
Conservation Space (2,136–2,151 feet amsl)	0
Planned Deviation Space (2,151–2,156 feet amsl)	198.9
Remainder of Flood Control Space (2,156–2,175 amsl)	654.2
Lower Tonto Creek Permit Area	244.0
Gisela Reach	0
Total	**1,097.1**

3.2.2.1.4 YUMA RIDGWAY'S RAIL

The Yuma Ridgway's rail (rail) is a covered species in the 2002 RHCP, at which time it was named the Yuma clapper rail (*Rallus longirostris yumanensis*). A detailed description of the rail's life history and baseline status in the permit area is in Section 4.6.1.2 of the 2002 RHCP EIS (FWS 2002a) and Subchapter 2.D of the RHCP addendum and is summarized below.

The rail/Yuma clapper rail was listed as endangered in 1967 (FWS 1967). The rail's current range in the United States includes the lower Colorado River from the border with Mexico to the upper end of Lake Mead, the Virgin River in Nevada, the Imperial Valley and Salton Sea area in California, and the lower Gila River from its confluence with the Colorado River to the Phoenix metropolitan area. Yuma Ridgway's rail breeding habitat typically consists of dense cattail or bulrush (*Scirpus* spp.) marsh, but nests can be found in sparser marsh vegetation. A mosaic of vegetation of different ages and patches of open water is favorable.

Until Yuma Ridgway's rail was confirmed along lower Tonto Creek at Roosevelt Lake in May 2002, the nearest record was approximately 60 miles downstream, on the Salt River near the Granite Reef

Diversion Dam (GRDD). Biologists previously assumed that suitable rail habitat was lacking at Roosevelt Lake. The 2002 rail was documented in a strip of cattails approximately 3,000 feet long and 20 to 60 feet wide, with patches of standing water, at an elevation of approximately 2,100 feet amsl (Messing 2002). One other strip of marsh habitat was identified at Roosevelt Lake during a June 2002 helicopter survey, but this strip of marsh appeared to be less suitable for rails because it was smaller (1,250 feet long × 20 to 30 feet wide) and was not bordered by dense riparian vegetation (Messing 2002). Together, these two strips of cattail marsh in the Tonto Arm covered an area of less than 4 acres. The extremely low Roosevelt Lake levels likely contributed to the development of rail habitat.

The Roosevelt Lake FCS does not currently contain any marsh habitat for Yuma Ridgway's rail. Yuma Ridgway's rail surveys in 2003, 2004, 2015, and 2016, did not detect any rails within the RHCP permit area (SRP 2017). No rail surveys occurred in the following years because of the lack of marsh habitat. There is no proposed or designated Yuma Ridgway's rail critical habitat. No habitat for the species is present in the lower Tonto Creek permit area or Gisela Reach mitigation site (USGS 2016), and the rail has not been recorded at these locations.

3.2.2.1.5 BALD EAGLE

Legislation protecting the bald eagle was first passed in 1940 (Stokes and Stokes 1989), and in 1978, thespecies was listed as endangered in 43 states (including Arizona) and threatened in five others (the eagle was not listed in Alaska and does not inhabit Hawaii) (FWS 1978). The eagle was downlisted to threatened in the lower 48 states in 1995 (FWS 1995b) and then delisted in 2007, after successful recovery (FWS 2007a). The Sonoran Desert population of bald eagles was temporarily returned to the list of threatened species in 2008 (FWS 2008), but was delisted again in 2011, when the FWS determined that bald eagles nesting in the Sonoran Desert areas of central Arizona did not qualify as a distinct population segment (FWS 2011a).

Although no longer afforded protection under the ESA, protection under the BGEPA (16 USC 668–668c) continues to prohibit the unauthorized take of bald eagles, and the species is protected under several other state and federal laws (see Section 1.2.2). The BGEPA prohibits the "taking" of bald or golden eagles, including their parts (e.g., feathers), nests, or eggs without a permit. "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." Regulations at 50 CFR 22.6 further define "disturb." In addition to immediate impacts, this definition also includes effects that result from human-induced alterations at a previously used nest site at a time when eagles are not present, if that alteration interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment (FWS 2022a).

Many of the threats that led to the bald eagle's listing continue to persist today, despite its recovery. In Arizona, these threats include reduced or altered availability of water sources due to diversion and impoundment to meet increasing human demand, loss of riparian habitat, reduced diversity and abundance of native fish, and impacts from recreation such as entanglement in fishing line, poisoning from lead gunshot, and increased human activity and development in bald eagle habitat (Driscoll et al. 2006). AGFD established a bald eagle conservation assessment and strategy (Driscoll et al. 2006), which, along with implementing a memorandum of understanding signed by various managing agencies, non-federal entities (including SRP), and tribes, helps guide and continue management.

At the time the bald eagle was removed from the list of threatened and endangered species in 2007, the population in the lower 48 states had increased from 487 breeding pairs in 1963, to an estimated 9,789 breeding pairs (FWS 2007a). In 2020, there were 90 known bald eagle breeding areas in Arizona and 73 pairs of laid eggs (McCarty et al. 2020). These breeding areas are primarily located along central Arizona rivers, creeks, and lakes, with most (60%) occurring at or below 3,000 feet amsl.

The bald eagle is a covered species in the 2002 RHCP. Bald eagle use of Roosevelt Lake and the Tonto and Salt Arms is well documented (Driscoll et al. 2006; Hunt et al. 1992; McCarty et al. 2020) and has been the subject of numerous previous Roosevelt Dam ESA Section 7 consultations (see Appendix C in the RHCP addendum). A detailed description of the bald eagles' life history and baseline status in the permit area is provided in Section 4.6.1.3 of the 2002 RHCP EIS (FWS 2002a) and Subchapter 2.E of the RHCP addendum, and is summarized below.

At Roosevelt Lake, cottonwood and willow trees, snags, cliffs, and slopes provide sites for bald eagle nesting, roosting, and hunting (Driscoll et al. 2006; Hunt et al. 1992; McCarty et al. 2020). The Tonto and Salt Arms and Roosevelt Lake are important bald eagle foraging areas for fish and waterfowl (Hunt et al. 1992). Tree and snag nests and perches primarily occur along Tonto and Salt Arms, and smaller drainages around the lake's perimeter. Perches (and possibly nest sites) can establish as vegetation develops when the lake recedes. Bald eagles that rely on Roosevelt Lake food resources have also nested on nearby and distant cliffs and trees. Some bald eagle tree nests were located miles from the lake at higher elevations in the Four Peaks and Sierra Ancha Wilderness areas. Bald eagle breeding areas and nest sites are expected to change location and abundance during the remaining permit duration based upon changes to vegetation and prey resources, eagle competition, and the previous knowledge acquired about eagle territory abundance and nest site movement since the 1980s (Hunt et al. 1992; McCarty et al. 2020).

Breeding eagles at and surrounding Roosevelt Lake rely (or partially rely) on Roosevelt Lake for food, some pairs more regularly than others (FWS 2003; Hunt et al. 1992). Six bald eagle breeding areas (Tonto, Pinal, Pinto, Sheep, Rock Creek, and Dupont) were addressed in the 2002 RHCP EIS (FWS2002a), and four (Campaign Bay, Armer Gulch, Two Bar, and Bachelor Cove) were established/discovered in the vicinity of Roosevelt Lake subsequent to the 2002 RHCP EIS publication (McCarty et al. 2013, 2014, 2015). Eight bald eagle breeding areas (Tonto, Pinal, Pinto, Sheep, Campaign Bay, Armer Gulch, Two Bar, and Bachelor Cove) are on the current list of active sites (McCarty et al. 2020). The Tonto breeding area straddles the boundary of the CS and FCS on the Tonto Arm; the Tonto breeding pair has used nine different nest trees within the breeding area since its discovery. The only nest tree currently used by the Tonto eagles is a cottonwood rooted near the top of the CS. The Pinto breeding area on the Salt Arm has had 10 tree nests identified in its history, occurring within both the CS and the FCS. The Pinto breeding area's current and only known nest is in a mature cottonwood tree approximately 37 feet tall within the first 5 feet of the FCS (AGFD 2020a; McCarty et al. 2017). The Campaign Bay breeding area was occupied only in 2013, and its tree nest no longer exists; it will likely be relegated to historical status following the 2023 season after 10 consecutive years of unoccupancy. The Bachelor Cove eagle's cottonwood tree nest is currently above the FCS, at approximately 2,214 feet amsl. The four remaining currently active breeding areas that likely use Roosevelt Lake (Pinal, Sheep, Armer Gulch, and Two Bar) have nests on cliffs and trees well outside the CS and FCS (SRP 2013, 2014, 2019). The Rock Creek and Dupont breeding areas, with nests located in the Sierra Ancha and Four Peaks Wilderness areas, were relegated to historical status after being unoccupied for 10 consecutive years.

Suitable bald eagle breeding and foraging habitat also occurs along Tonto Creek within the permit area and at the Gisela Reach mitigation site. Nesting occurs in these areas (Sheep and 76 breeding areas) and has been consistently monitored since the 1980s, but known since the 1970s (Hunt et al. 1992).

According to the recent LAP analysis (see Appendix B), the authorized take of bald eagles at Roosevelt Lake has not significantly impacted local area bald eagle populations and has been determined to be consistent with the FWS's management objective. In FWS's review of known unauthorized bald eagle take in the area, they did not identify evidence to conclude local sources of eagle take differ from those discussed in the Eagle Rule Revision Programmatic Environmental Impact Statement (PEIS) (FWS 2016b). Further, the take authorized by SRP's permit does not exceed the regional eagle management unit (EMU) take limit, so the take would not significantly impact the EMU population.

The mitigation, minimization, and monitoring measures required under the permit ensure the permit is compatible with the preservation of bald eagles at the local and regional EMU population scale.

3.2.2.2 Environmental Consequences

3.2.2.2.1 PROPOSED ACTION ALTERNATIVE

Northern Mexican Gartersnake

Under the Proposed Action, the covered activities cause two important types of physical effects relevant to gartersnakes: 1) the long-term presence (storage) of water in the CS due to conservation storage operations; and 2) consistently changing water elevations in the CS and, occasionally, the FCS, influenced in part by SRP storage and release of water from Modified Roosevelt. These physical effects impact gartersnakes by changing their habitat in one or more of the following ways:

- The availability or amount of habitat in the CS or FCS is altered (a direct consequence of long-term storage in the CS and changing lake levels arising from conservation storage and flood control operations).
- The location of lake edge habitat in the CS is altered (a direct consequence of changing lake levels arising primarily from conservation storage operations).
- The habitat quality or suitability in the CS, FCS, and in lower Tonto Creek is altered (a direct consequence of changing lake levels arising from conservation storage and flood control operations and an indirect consequence of long-term conservation storage).

The long-term storage of water in the CS (also a covered activity) provides an environment that allows previously established nonnative predatory sportfish to persist and proliferate. These nonnative predatory sportfish can prey on both gartersnakes and their prey, reducing the quality of gartersnake habitat where they are present. When there is hydrologic connectivity between the lake and Tonto Creek, nonnative fish can move upstream and interact with gartersnakes and their prey in the FCS and in lower Tonto Creek above the FCS.

The Proposed Action can adversely affect gartersnakes by altering essential behaviors such as breeding, feeding, sheltering, and dispersal or movement. The effects on gartersnakes range from possibly occurring to being certain to occur. Responses may also have positive, negative, or neutral consequences on gartersnake fitness, depending on the type of impact and the circumstances. When the Proposed Action, directly or indirectly, results in a gartersnake's death, physical wounding, or injury (where injury in this context is approximated by reduced reproduction), then incidental take occurs (see the Incidental Take and Impacts of Take section below for estimates and impacts of take).

Conservation Space Operations

The effects on the gartersnake and its habitat are greatest in the Roosevelt Lake CS relative to other portions of the permit area because the water elevation is continuously rising or falling. As described above, changing lake elevations can alter gartersnake habitat location, availability, and quality across the permit area. These habitat changes can affect gartersnake breeding, feeding, and sheltering, and increase predation and competition that kills, physically wounds, or injures gartersnakes. At the population level, CS operations can affect gartersnake survivorship, recruitment, and resiliency.

The Reservoir Planning Model estimates that the typical daily changes in CS lake elevation and gartersnake habitat are small (i.e., 0.2 vertical foot per day, 25 horizontal feet per day, or about 1 horizontal foot per hour) and may persist for months or years. These daily changes typically have slow water velocities (i.e., slower than walking speed) and are within gartersnakes' abilities to respond

(Emmons and Nowak 2016). As habitats undergo small daily changes, gartersnakes will move. These movements can alter gartersnake breeding, feeding, and sheltering, and kill, physically wound, or injure gartersnakes.

The daily changes in water elevation accumulate over time, causing approximately 20 to 30 vertical feet of changes to the lake elevation, temporarily reducing available gartersnake habitat over several months and increasing its susceptibility to effects. The 20 to 30–foot vertical change equates to approximately 3,000 to 4,500 feet of horizontal movement of the lake edge. Gartersnake reproductive success and foraging success can be impacted from habitat reduction and habitat quality changes associated with increasing gartersnake exposure to nonnative predators and competitors. Gartersnakes can also be killed, physically wounded, or injured in association with reductions in habitat, forced movement, and changes to habitat quality.

CS activities also generate a persistent aquatic environment for nonnative predatory fish to persist and proliferate, then, during high flow events (200 to 1,100 cfs), move upstream into the FCS and lower Tonto Creek and adversely affect gartersnakes and prey. The upstream movement of nonnative predatory fish is associated with hydrologic connections independent of the covered activities and likely does not occur year-round (ERO-GEI 2022b [see Appendix G in the RHCP addendum]). Tonto Creek's intermittent flow likely limits upstream fish movement from March through June (ERO-GEI 2022b [see 0Appendix G in the RHCP addendum]). Following spawning, these nonnative predatory fish can move back to the CS or be trapped in isolated pools in the FCS or on lower Tonto Creek and ultimately perish as isolated pools dry up. While in the FCS and lower Tonto Creek, nonnative predatory fish can consume and reduce other gartersnake prey and prey diversity (native fish and amphibians) and smaller fish can provide gartersnake food. Larger nonnative predatory fish can consume and wound gartersnakes. The intermittent nature of lower Tonto Creek would likely minimize some of the adverse effects nonnative predatory fish have on gartersnakes and their prey.

Flood Control Space Operations

Under the Proposed Action, normal flood control operations in the FCS would be added to SRP's covered activities in the RHCP addendum.

Normal flood control operations inundate occupied gartersnake habitat in the FCS and can cause death, injury, or wounding via the same mechanisms described for the CS. The Reservoir Planning Model estimates that Roosevelt Lake will inundate the FCS in 37 out of 106 years, and the WCM would require the FCS to be evacuated within 20 days of a fill event. Under current operations, water can be in the FCS from December through May, but most often in January through March. Because flood control operations are rarer, compared to CS operations, inundation effects on the gartersnake and its habitat in the FCS are less frequent and persistent.

HABITAT AVAILABILITY

Normal flood control operations, through infrequent rise and fall of water levels in the FCS, can affect gartersnakes and their habitat along Tonto Creek's backwaters, pools, and riparian areas (Burger 2010; Madara 2012; Nowak et al. 2019). Tonto Creek, not Roosevelt Lake, primarily supports and forms the aquatic and riparian habitats where Tonto Creek overlaps with the FCS because Roosevelt Lake does not frequently enter the FCS. When FCS inundation does occur, it makes gartersnake habitat unavailable. When lake elevations slowly or modestly inundate the FCS, gartersnakes can move away from floodwaters. When FCS water is evacuated (within 20 days), gartersnake habitat would become available. The changes in FCS water levels and resulting effects on gartersnakes and their habitat are relatively brief and infrequent, and as a result, are unlikely to substantially influence long-term gartersnake resources in the FCS.

HABITAT QUALITY

While normal flood control operations are not expected to cause a long-term shift in the vegetation communities in the FCS, FCS inundation along the Tonto Arm can alter gartersnake habitat quality via cyclical changes in the density or vigor of vegetation (see Section 3.2.1.2.1) used for foraging and sheltering. Gartersnake habitat quality in the FCS can also be altered through changes to predator, competitor, and prey communities. The effect pathways are the same as previously described; however, flood control operations should cause fewer changes to gartersnake habitat quality relative to CS operations, because flood control operations are infrequent and brief.

Normal flood control operations likely change gartersnake habitat quality in the FCS relative to the baseline conditions and other factors. Baseline FCS stream (channel inundation/formation and pool persistence) and vegetation conditions along the Tonto Arm are primarily generated and supported by Tonto Creek flows and not periodic short-term lake inundation. FCS inundation affects gartersnake foraging and sheltering by temporarily covering vegetation, open space, and pools with deeper open water.

Because flood control operations are periodic and short in duration, its operational contribution to the FCS fish community is minimized because nonnative fish commonly reach this area from normal Tonto Creek flows and day-to-day CS operations. Nonnative predatory fish can enter the FCS either from the reservoir or from areas upstream. Nonnative predatory fish movement into the FCS from the CS and Tonto Creek occurs regardless of the reservoir elevation level (SWCA 2022b [see Appendix J in the RHCP addendum]). When flows of Tonto Creek exceed 1,100 cfs, nonnative predatory fish can be carried downstream.

FCS inundation can reduce gartersnake access to prey, and following the lake's recession, increase nonnative predatory fish, prey competition, and alter prey communities. SRP's responsibility for nonnative predatory fish effects in the FCS is proportional to its periodic and short-duration operations, and the historical and ongoing stocking of nonnative predatory fish by others (SRP 2022a). Therefore, while there are some effects attributable to the FCS operations, not all effects from nonnative predatory fish in the FCS are the result of flood control operations.

BREEDING

Flood control operations between December and May are most likely to affect essential gartersnake brumating, mating, and gestating behaviors (Emmons 2017; Emmons and Nowak 2016; Jones et al. 2020; Myrand et al. 2021; Nowak et al. 2019; Rosen and Schwalbe 1988; SWCA 2022b [see Appendix J in the RHCP addendum]). Because gartersnakes typically give birth to live young in June and July (SRP 2022a), the specific birthing process should not be disrupted by FCS operations.

FCS inundation on the Tonto Arm can disrupt gartersnake mating and gestation, adversely affecting reproduction. Nowak et al. (2019) documented two instances of gartersnake mating behaviors in riparian habitats. Habitat inundation, relocation, and interruption of breeding gartersnakes can cause minor delays to termination of breeding activity depending on the timing and extent of snake dispersal/relocation. Inundation of terrestrial areas could also disrupt female gestation, negatively affecting reproductive success. Forcing typically sedentary pregnant female gartersnakes to move (Rosen and Schwalbe 1988; Sprague and Bateman 2018) could cause physiological stress and increase predation exposure, resulting in death of pregnant females and/or unborn offspring. Pregnant female use of shallow aquatic habitats with elevated amounts of nonnative predatory fish could also expose them to predation or wounding. These effects are not expected to occur for all mature female gartersnakes, since not all females reproduce every year (Boyarski et al. 2019; Rosen and Schwalbe 1988).

FEEDING

Gartersnake foraging behavior could be interrupted when moving to avoid FCS inundation, but gartersnakes would be expected to resume foraging along the shifted habitats. Gartersnake telemetry studies demonstrate that adult gartersnakes move due to shifts in Tonto Creek's aquatic edges (Myrand 2019; Nowak et al. 2019) and are likely to respond similarly to shifts in aquatic edges from flood control operations. Studies of gartersnake diet and foraging behavior indicate that they will continue to forage on readily available prey near the changing Tonto Creek shoreline (Emmons et al. 2016; Manjarrez et al. 2013; Nowak et al. 2019) and in the FCS following the lake's recession.

Normal flood control operations can have both negative and positive effects on gartersnakes and foraging success. Gartersnake prey resources, availability, and foraging success likely decrease in the FCS when infrequent and short-term inundation converts shallow pools and terrestrial areas to deeper open water. After the lake recedes, nonnative predatory fish will likely increase in the stream and pools. The increased occurrence of fish can elevate gartersnake prey availability/foraging success, and concurrently, the risk of gartersnakes being wounded/eaten by predatory nonnative fish. Additionally, the availability of nonnative predatory fish with spiny rays or barbs could elevate gartersnake injury or death by consuming these hardened fish features (internal punctures). Because flood control operations are infrequent and short duration, they would be unlikely to have substantial or long-term influence on prey availability.

SHELTERING

FCS inundation can impact sheltering and brumating gartersnakes and reduce availability of cover. Brumating or sheltering gartersnakes forced to move by inundation and be exposed with reduced cover can experience increased predation risk. Adverse effects on gartersnake physiology and survivorship may occur from expending energy during their brumation period (Emmons 2017; Emmons and Nowak 2016; Myrand 2019; Nowak et al. 2019; Sprague 2017). In contrast to more regular water elevation changes in the CS, forced movement of brumating/sheltering snakes in the FCS would be less frequent.

Studies of gartersnake brumation document their ability to change brumation sites when necessary (Nowak et al. 2019) and survive if a brumation site is flooded (Emmons and Nowak 2016). Although the totality of effects on brumating gartersnakes from FCS inundation is unknown, death from inundation (versus wounding or injury) is likely uncommon because of the infrequency of flood control operations and gartersnakes' documented ability to move and escape rising waters.

Planned Deviation

Under the Proposed Action, the inundation of occupied gartersnake habitat in the FCS by the planned deviation may result in gartersnake death, injury, or wounding via the same mechanisms described above for CS and normal FCS operations. The 120-day inundation would extend into the later portions of gartersnake active season (i.e., August), increasing the likelihood of effects on essential breeding/birthing behavior and reproduction. The planned deviation's frequency is limited to 3 years out of a consecutive 5-year period (beginning in water year 2023/2024) and would only last for a part of the year (i.e., evacuation of water from the FCS over 120 days). This would add to the adverse effects of normal CS operations which occur annually and year-round, and FCS operations, which are estimated to occur in 37 out of 106 years. However, the exposure of gartersnakes to adverse effects of habitat inundations (and the likelihood of take occurring as a result) are lower for the planned deviation than for the CS operations or normal FCS operations.

HABITAT AVAILABILITY

SRP's gartersnake habitat model (see Subchapter 4.A.ii.1 in the RHCP addendum) indicates there are a maximum of 192.2 acres of habitat likely to be occupied by gartersnakes in the FCS, all of which is in the Tonto Arm. The planned deviation would inundate up to 37.7 acres of modeled gartersnake habitat in the bottom 5 feet of the FCS (see Figure 23 in the RHCP addendum), which is approximately 20% of the modeled gartersnake habitat in the FCS as a whole. In contrast to the 20-day FCS inundation under normal flood control operations, the planned deviation would extend inundation to 120 days, increasing the cumulative amount of unavailable gartersnake habitat in the years it would be implemented.

HABITAT QUALITY

The planned deviation's extended inundation time further reduces the density and quality of herbaceous cover and woody vegetation for gartersnakes. Following the lake's recession, herbaceous cover is anticipated to return within 2 months (SWCA 2020). As described in Section 3.2.1.2.1, there is uncertainty in the long-term effects on mature riparian vegetation from 3 years of inundation for up to 120 days (across 5 years), and the recent tamarisk leaf beetle (*Diorhabda* spp.) colonization at Roosevelt Lake adds to this uncertainty (see Appendix F, Cumulative Effects). Should the planned deviation cause (or contribute to) the temporary reduction of riparian vegetation in the bottom 5 feet of the FCS, it could adversely affect gartersnake habitat quality. Any effects would be limited to 37.7 acres of modeled gartersnake habitat in the bottom 5 feet of the FCS. Following the third year of the planned deviation, normal FCS operations would resume, but it may take a few additional years without FCS inundation before the lower canopy develops, and even longer for any mature vegetation killed by inundation to be replaced.

Gartersnake habitat quality can be affected by the longer duration that nonnative predatory fish and other aquatic competitors/predators associated with the lake (and lake edge) are present in the FCS. After the lake recedes, the effects of these nonnative predators and competitors can persist in residual channel pools.

The planned deviation and longer FCS inundation could extend the duration that nonnative predatory fish and other aquatic competitors and predators could move into the FCS. The complexity of the interactions between gartersnake and nonnative predatory fish include both negative and positive effects. When the planned deviation is implemented, in contrast to the shorter duration of normal flood control operations, the extended duration of inundation into the gartersnake active breeding season would increase the likelihood of effects occurring.

BREEDING

The planned deviation may extend FCS inundation into later portions of the season when gartersnakes are birthing (Emmons and Nowak 2016; Nowak and Boyarski 2012; Nowak et al. 2019; Rosen and Schwalbe 1988; Sprague 2017), affecting breeding success and neonate survivorship from predation. Sprague and Bateman (2018) found pregnant females close to water and hypothesize that females may select these sites to be close to suitable foraging habitats. Nonnative predatory fish are known to prey on neonate gartersnakes (Young and Boyarski 2013). Extended FCS inundation can increase nonnative predatory fish in the shallow waters of the FCS, which would increase predation risks to female gartersnakes birthing near inundated areas and neonates foraging in shallow aquatic habitats.

FEEDING

The planned deviation may have both negative and positive effects on gartersnakes and foraging success. Since gartersnakes forage on aquatic and terrestrial prey, typically along vegetated streamside shorelines

(Emmons et al. 2016; Jones et al. 2020; Manjarrez et al. 2013), converting FCS gartersnake habitat to deep open water reduces prey resources, availability, and foraging success. In contrast to normal flood control operations, the planned deviation would extend the inundation of terrestrial and aquatic gartersnake foraging habitat. Some prey resources could move and become concentrated in the remaining adjacent non-inundated terrestrial and aquatic habitats in the FCS, where gartersnakes may have improved feeding success.

SHELTERING

The extended duration of the planned deviation (up to 120 days) is likely to affect gartersnake brumating and sheltering activities in the FCS longer compared to normal flood control operations (typically up to 20 days). Inundation forces brumating or sheltering gartersnakes to move and be exposed with reduced cover, increasing predation risk. Adverse effects on gartersnake physiology and survivorship may occur from expending energy during their brumation period (Emmons 2017; Emmons and Nowak 2016; Myrand 2019; Nowak et al. 2019; Sprague 2017). Possibly reducing the effect, some Roosevelt Lake gartersnakes have responded to rising lake waters by relocating to new brumation sites (Nowak et al. 2019) and can use a variety of cavities, burrows, and structures (Emmons 2017; Emmons and Nowak 2016; FWS 2014a, 2020a; Nowak et al. 2019; Sprague 2017).

Gartersnake Critical Habitat

SRP's covered activities may adversely affect gartersnake critical habitat, specifically PBFs 1 through 4 (see Section 3.2.2.1.1). The covered activities would have no effect on PBF 5 (gartersnake elevational range). SRP's CS operations provide a consistent aquatic habitat for nonnative predatory fish in Roosevelt Lake, which contributes to the degradation of PBFs 3 (prey resources) and 4 (absence or low occurrence of nonnative fish) that occurs when Tonto Creek flows increase enough to form a hydrologic connectivity between the reservoir and Tonto Creek that allows nonnative predatory fish to move upstream.

Flood control operations (both current and the planned deviation) temporarily inundate gartersnake critical habitat and then evacuate water over prescribed periods (i.e., 20 days or 120 days), which may affect PBFs 1 through 4 as described below.

PBF 1: Perennial or spatially intermittent streams that provide both aquatic and terrestrial habitat that allows for gartersnake populations, and contain: a) slow-moving water, in and off–channel pools, and backwaters; b) organic and inorganic structural features; c) terrestrial habitat that includes riparian vegetation, burrows, boulders, rock crevices, and downed woody debris for shelter, foraging opportunities, brumation, and protection from predators; and d) water quality.

Flood control operations would likely have temporary adverse effects on PBF 1 in lower Tonto Creek by covering and converting the diversity of gartersnake habitat in the FCS to deep, uniform open water. As water is evacuated from the FCS, it creates pools and deposits debris.

Inundation can affect herbaceous and woody riparian vegetation (see Section 3.2.1.1) and temporarily cover gartersnake habitat terrestrial features. Following evacuation of the FCS, the increased groundwater elevation and soil moisture can help develop/germinate herbaceous and riparian vegetation (Bagstad et al. 2005).

PBF 2: Hydrologic processes that maintain aquatic and terrestrial habitat through: a) a natural or regulated flow regime that allows for periodic flooding; and b) a physical hydrologic and geomorphic connection between a stream channel and its adjacent riparian areas.

The rise and fall of FCS water levels will likely cause temporary, adverse effects on PBF 2 that are partially minimized by operations mimicking some aspects of natural dynamic stream flooding.

The hydrologic connections between stream channel and riparian areas can be created or can disappear via conversion to open water and water evacuation.

PBF 3: A combination of amphibians, fish, small mammals, lizards, and invertebrate prey species such that prey availability occurs across seasons and years.

CS and FCS operations may adversely affect gartersnake prey availability across seasons and years (PBF 3). Gartersnake shallow aquatic and terrestrial prey and habitat in the FCS is reduced when inundated and converted to deeper open water. CS operations create consistent aquatic habitat for nonnative predatory fish, which contributes to the presence of nonnative predatory fish in lower Tonto Creek. Flood control operations allow nonnative predatory fish from Roosevelt Lake to enter the FCS. Nonnative predatory fish and crayfish consume aquatic prey (see Appendix F in the RHCP addendum) (Fernandez and Rosen 1996; FWS 2014a) and frogs (Fernandez and Rosen 1996; FWS 2014a) and can reduce their availability in the lower Tonto Creek Critical Habitat Unit. Smaller nonnative predatory fish can also become gartersnake prey (Emmons et al. 2016; FWS 2014a).

PBF 4: An absence of nonnative fish species or occurrence at low enough levels such that recruitment of northern Mexican gartersnakes is not inhibited and maintenance of viable prey populations is still occurring.

SRP's CS and FCS operations may increase nonnative predatory fish in lower Tonto Creek that can inhibit gartersnake recruitment and viable prey populations. Despite the presence of nonnative predatory aquatic species, gartersnake neonates, juveniles, and adult males and females have been detected in the permit area (Madara 2012; Nowak et al. 2015; Nowak et al. 2019), indicating that reproduction and recruitment is occurring. Nowak et al. (2015) and Nowak et al. (2019) gave no indication that gartersnakes are emaciated or in poor body condition associated with prey availability. Although data on gartersnake population trends and dynamics are lacking for the permit area, recruitment is occurring, and populations persist.

The Gartersnake Conservation Program would also affect gartersnake critical habitat in lower Tonto Creek, including the Gisela Reach mitigation site. SRP's Gartersnake Conservation Program may mitigate the permitted incidental take of gartersnakes from covered activities by reducing nonnative predatory fish (PBF 3) and increasing the native fish species (PBF 4). These suppression and stocking actions would not affect PBFs 1 and 2.

Incidental Take and Impacts of Take

SRP uses two types of gartersnake habitat-based surrogate metrics for incidental take: "acre-years" for inundation effects in the CS and FCS and "fish migration days" for predatory nonnative fish effects in lower Tonto Creek. The two metrics address the effect pathways leading to incidental take in the CS, FCS, and lower Tonto Creek portions of the permit area (see Section 2.1.2.1.1 of this EA and Chapter 4 of the RHCP addendum for take metrics discussion). The estimated amount of gartersnake incidental take from all covered activities in the CS and FCS is in units of cumulative acre-years of reduced habitat availability, totaling 2,742.9 acre-years (Table 3-8). Along lower Tonto Creek, SRP estimates the amount of incidental take as 906 fish migration days (see Table 3-8) (see RHCP addendum Subchapter 4.B).

Table 3-8. Summary of Gartersnake Take and Impacts of Take

Covered Activity and Permit Area Location	Estimated Take	Estimated Impact of Take	Average Annual Impact of Take over 30 Years	Overall Ratio of Impact to Take*
Conservation storage operations in the conservation space	2,507.0 acre-years	4,935.1 acre-years	164.5 acres	2.0
Normal flood control operations in the flood control space	226.3 acre-years	241.3 acre-years	8.0 acres	1.1
Planned deviation of flood control operations in the flood control space	9.6 acre-years	10.6 acre-years	0.4 acre	1.1
Conservation storage and flood control operations in lower Tonto Creek	906 fish migration days	See qualitative discussion in RHCP addendum Subchapter 4.B	N/A	N/A
Total	**2,742.9 acre-years and 906 migration days**	**5,187.0 acre-years plus the nominal additional impact of take for lower Tonto Creek**	**172.9 acres**	**1.9**

* Ratio of impact to take is calculated using only the estimates for the CS and FCS conservation space and flood control space. The take and impacts associated with effects along lower Tonto Creek are in a different metric and are not comparable to the acre-year estimates.

Conservation Actions

SRP's Gartersnake Conservation Program goals aim to offset the impacts of northern Mexican gartersnake incidental take to the maximum extent practicable from CS and FCS operations (see Section 2.1.2.2 in this EA and Chapter 5 of the RHCP addendum). Gartersnake conservation actions are intended to reduce competition with and predation by nonnative predatory sportfish (in the lower Tonto Creek permit area and Gisela Reach) and improve native prey base for gartersnakes (in lower Tonto Creek, the FCS, and Gisela Reach). SRP would suppress nonnative predatory sportfish in lower Tonto Creek's persistent pools (including the Gisela Reach) (see Figure 25 in the RHCP addendum) followed by stocking native fish and (possibly) lowland leopard frogs. Lower Tonto Creek conservation actions would occur in years when creek flow creates a hydrologic connection with Roosevelt Lake that allows sportfish to move upstream (i.e., greater than 200 cfs at the Gun Creek gaging station). Along the Gisela Reach, nonnative fish suppression and native fish stocking are not based upon flows, but treated annually for the first 5 years and in 2 out of every 3 years thereafter.

The Gartersnake Conservation Program's activities would primarily benefit gartersnakes and long-term gartersnake recovery by focusing on the lower Tonto Creek permit area and the Gisela Reach. Because of Roosevelt Lake's constant and sometimes dramatic change to surface water that restricts conservation action effectiveness, actions are not proposed within the CS (and are limited in the FCS). Gartersnakes are still likely to use the CS and FCS when lake levels are lower and could benefit from increased stocked native fish and (possibly) lowland leopard frogs in the FCS. Any gartersnakes using the CS or FCS that move upstream when lake levels rise could move into improved lower Tonto Creek habitat.

When the necessary conditions are met to implement the Gartersnake Conservation Program in the lower Tonto Creek's four identified sections, the percentage of treated pools decreases with distance from the lake—from 100% of pools in Reach 1 (closest to Roosevelt Lake) to 12% of pools in Reach 4 (farthest from Roosevelt Lake). This strategy places the greatest emphasis on the occurrence of nonnative predatory fish from Roosevelt Lake. When treatments occur, the two lowest Tonto Creek sections above the FCS (Reach 1 and Reach 2 as described in Subchapter 5.C in the RHCP addendum) would be treated more regularly because of the lack of stream flow and persistent pools in Reach 3 and Reach 4. The upper portion of the lower Tonto Creek permit area (Reach 3 and Reach 4 as described in Subchapter 5.C in the

RHCP addendum) would be treated in the wettest years when flows greater than 20 cfs persist. Thus, most of the beneficial effects of the Gartersnake Conservation Program in the lower Tonto Creek permit area would occur where most gartersnake detections occur.

The overall response of an individual gartersnake or the local population to the Gartersnake Conservation Program is difficult to evaluate because of the difficulty in studying/monitoring gartersnake populations, and the fact that SRP's covered activities vary, and conservation actions are not likely to benefit snakes equally. The Gartersnake Conservation Program's targeted goals are to reduce adverse effects from nonnative predatory fish predation on adult and neonate gartersnakes (and gartersnake prey) when predatory fish are most concentrated and isolated in Tonto Creek pools. It would also increase native fish and frogs accessible to foraging gartersnakes. The program's long-term goals are to offset SRP's impacts from covered activities by suppressing the ongoing abundance of nonnative predatory fish in Tonto Creek treated areas, and through regular stocking, improve gartersnake prey abundance/availability/continuity, foraging success, survivorship, and abundance. SRP would also contribute $150,000 in 2022 dollars over the term of the permit to fund periodic gartersnake presence/absence surveys or, alternatively, other research opportunities to further the understanding of the status of the species and its habitats on lower Tonto Creek in coordination with FWS.

Over the remaining 30 years of the permit, there could be shifts in gartersnake distribution in the permit and broader analysis area, with populations stabilizing, increasing, expanding, or possibly decreasing. Given gartersnakes' low detection rate and historical decline, it is likely the analysis area can support more gartersnakes (if habitat conditions allow). Thus, the Gartersnake Conservation Program's beneficial effects on gartersnakes may not be limited to habitats where conservations actions occur, and gartersnakes may expand into other portions of Tonto Creek and its tributaries.

Conclusion

In summary, SRP's covered activities under the Proposed Action would have moderate, temporary, localized effects on the gartersnake and its critical habitat that would be both beneficial (e.g., improved riparian habitat conditions following temporary inundation) and adverse (e.g., decreased habitat availability during inundation and from mortality of riparian vegetation). The beneficial effects of SRP's Gartersnake Conservation Program were developed to fully offset the incidental take of gartersnakes resulting from its covered activities and allow for adaptive management strategies through the use of potential alternate locations of the Gartersnake Conservation Program. While there is some uncertainty regarding the long-term effects of the Proposed Action, monitoring is a key element of SRP's commitments in the RHCP addendum and the actions SRP may adapt over time to offset any effects that are not currently known. Therefore, as there is some remaining uncertainty in the long term, effects of the Proposed Action on the gartersnake and its critical habitat would likely be minor to moderate.

Southwestern Willow Flycatcher

Conservation Space Operations

SRP's CS operations are included as a covered activity in the 2002 RHCP and would not be modified under the Proposed Action. The effect of CS operations on the flycatcher are described under the Full Operation Alternative (Alternative 2–Preferred Alternative) in Section 4.6.2.1 of the 2002 RHCP EIS (FWS 2002a), which concluded that fluctuating lake levels in the CS would lead to incidental take of flycatchers through changes in habitat availability and habitat quality and reduced flycatcher productivity in the CS. Because of the cyclical changes in riparian habitat in the CS and the difficulty in making long-term predictions of habitat availability, the 2002 RHCP EIS conservatively assumed that up to 750 acres of habitat for the flycatcher could be adversely affected each year. To mitigate for these habitat impacts, SRP acquired 1,500 acres of riparian habitat at a number of locations, which it manages to provide habitat

for flycatchers. Under the Proposed Action, SRP would continue annual flycatcher habitat monitoring in the CS and would implement adaptive management measures if the amount of habitat affected in any year exceeds 750 acres.

Flood Control Space Operations

The effects of normal flood control operations on flycatchers in the FCS were considered in the 1995 Biological Assessment (Reclamation and SWCA 1995) and subsequent 1996 Biological Opinion (FWS 1996), which found that no effects were anticipated on flycatchers in the FCS because water levels would rise in the winter and spring prior to flycatcher arrival, mimicking the timing, duration, and effects of Tonto Creek flood flows, and decline into the flycatcher breeding season. Although the Reservoir Planning Model anticipates a more frequent and extended presence of water in the FCS, the model continues to support the finding that no effects on flycatchers in the FCS from direct inundation are expected.

The 1995 Biological Assessment (Reclamation and SWCA 1995) and subsequent 1996 Biological Opinion (FWS 1996) also concluded that FCS inundation under normal flood control operations would be too brief to affect tall, dense vegetation. As described in Section 3.2.1.2.1, the more frequent and extended presence of water in the FCS predicted under the current Reservoir Planning Model is not expected to adversely affect mature native riparian vegetation (i.e., Goodding's willow and cottonwood) in the FCS. Seedlings and young saplings in the bottom 1 foot of the FCS could be killed by inundation, and mature tamarisk rooted near the bottom of the FCS may produce less foliage or experience branch dieback. Temporary flooding of the FCS could also result in increased soil moisture availability, promote the development of dense foliage in existing vegetation, and support the germination and development of new vegetation in the FCS. Although adverse effects on individual tamarisk plants rooted in the bottom few inches of the FCS could occur, this would not be expected to alter essential breeding, feeding, or sheltering behaviors to an extent that death or injury of a flycatcher occurs.

Planned Deviation

In the 3 years it is implemented, the planned deviation may extend inundation in the first 5 feet of the FCS (2,151 to 2,156 feet amsl) during the flycatcher breeding season, reducing the amount of available nesting habitat and affecting habitat quality. The reduction and alteration of nesting habitat would result in incidental take via harm in an amount equivalent to the acres of habitat alteration.

The planned deviation would not alter the typical yearly pattern of water levels at Modified Roosevelt, in which lake levels peak in late April or early May and then decrease. Since flycatchers arrive at Roosevelt Lake in late April and May when the lake elevation has peaked (or receded), water in the FCS is unlikely to rise and inundate established flycatcher nests, eggs, or nestlings. Flycatchers at Roosevelt Lake have previously established territories and built nests when elevated water surrounds vegetation. Lake levels surrounding the bases of nest trees during the flycatcher breeding season have been associated with increased nest success (Moore and Ahlers 2018).

Based on the flycatcher habitat model (Hatten and Paradzick 2003), vegetation height measured by LIDAR, and flycatcher territory locations identified during 2020 and 2021 surveys, SRP estimates there are currently 75.9 acres of flycatcher habitat in the bottom 5 feet of the FCS that could be adversely affected by changes in riparian vegetation (see Subchapter 3.B.ii in the RHCP addendum for additional details). Because of the uncertainty in impacts to vegetation from extended inundation and the recent occurrence of tamarisk leaf beetles (see Appendix F, Cumulative Effects), it is difficult to predict nesting flycatcher occurrence, quantify plant species composition within territories, and predict effects from the planned deviation. Should flycatchers rely on tamarisk within territories, it would also be difficult to distinguish habitat effects from leaf beetles and inundation. SRP is conservatively estimating flycatcher

effects in the FCS independent of the leaf beetle to ensure that any harm is addressed from covering nesting habitat with water and altering nesting habitat from inundation.

Since flycatchers at Roosevelt Lake typically use habitat with vegetation that is at least 20 feet tall, inundation can also temporarily reduce the availability of habitat for nesting flycatchers by reducing the height of vegetation above the water's surface (see Subchapter 3.B.ii in the RHCP addendum for additional details). When the lake reaches 2,156 feet amsl (the top of the PDS) there would be 17.1 acres (12.3 acres in the CS and 4.8 acres in the FCS) of vegetation that are no longer suitable for flycatchers because of the reduced height of vegetation above the water's surface. Of the 4.8 acres in the FCS, 2.6 acres overlap with the 75.9 acres of habitat that could be affected by changes in riparian vegetation (leaving 2.2 acres that do not overlap); thus, the total amount of flycatcher habitat in the bottom 5 feet of the FCS that could be impacted by the planned deviation is approximately 78.1 acres. When added to the 12.3 acres of vegetation that may be affected in the CS, the total reduction in flycatcher habitat from the planned deviation would be approximately 90.4 acres in each of the 3 years it is implemented.

Effects on the riparian vegetation that could experience dieback or mortality would last up to 5 years (the assumed period to full recovery under the vegetation model used in the 2002 RHCP) after the final year of the planned deviation. While the planned deviation is a new covered activity that would result in incidental take (via harm in an amount equivalent to the 78.1 acres of habitat modification) not contemplated in the 2002 RHCP, the amount of the additional take and the impacts of these takings on the flycatcher are fully offset by the amount of currently authorized incidental take and the conservation measures implemented to address the impacts of the authorized take. See Subchapter 4.B in the RHCP addendum for additional details.

Conservation Actions

The Gartersnake Conservation Program is expected to have negligible effects on southwestern willow flycatchers and their habitat. Suppressing nonnative predatory fish and stocking native fish in the lower Tonto Creek permit area would occur primarily in the stream, adjacent to vegetation, and in open gravelly areas, by small crews traveling on foot during the flycatcher nesting season. As described in Subchapter 5.B.viii of the RHCP addendum, SRP and its field crews would minimize impacts to covered birds that may occur near areas where gartersnake conservation measures are implemented. Prior to mobilizing field crews, SRP would coordinate with FWS and AGFD to understand the present distribution of flycatchers, cuckoos, rails, and bald eagles in or near the Gisela Reach and lower Tonto Creek. SRP and its field crews would, to the extent practicable, avoid working in or traveling through areas known to be occupied by nesting covered birds. Where it is impractical to avoid work in or travel through areas occupied by nesting covered birds, SRP and its field crews would minimize impacts to covered birds by using roads, trails, or existing open areas and minimize instances of "bushwacking" through riparian habitat. Crews may disrupt a perched or foraging flycatcher infrequently and for short duration (or step on a germinating plant), but these instances are expected to be inconsequential to flycatcher habitat, territory establishment, and nest success.

Flycatcher Critical Habitat

While there is no flycatcher critical habitat present in the CS, under the Proposed Action, SRP's continued CS operations may benefit PCE 1 (riparian vegetation) for flycatcher critical habitat in the bottom few feet of the FCS by providing increased soil moisture for riparian vegetation rooted near the boundary of the CS and FCS. SRP's normal flood control operations and the planned deviation may have adverse effects on flycatcher critical habitat (PCE 1) along Tonto Creek and the Salt River within the FCS (2,151 to 2,175 feet amsl). These effects would likely occur on all 889.4 acres of designated flycatcher critical habitat in the FCS, with the greatest effect likely occurring on the 227.2 acres that fall within the bottom 5 feet of the FCS (2,151 to 2,156 feet amsl). Normal flood control operations and the

planned deviation mimic aspects of dynamic stream flows, but under the planned deviation the increased frequency and extended duration of inundation increases impacts to riparian vegetation (PCE 1) and its regeneration and growth (see Section 3.2.1.2). Increased water surrounding flycatcher habitat in the FCS is not likely to have a noticeable adverse effect on flycatcher insect prey (PCE 2) and may increase flying and aquatic insect production.

The Gartersnake Conservation Program will likely have insignificant effects on flycatcher critical habitat in lower Tonto Creek permit and the Gisela Reach mitigation sites. Crews implementing fish suppression and stocking may trample and kill a few small riparian plants (PCE 1) while walking along streams but they would not affect mature trees. The small number of riparian plants affected is unlikely to influence overall riparian forest maintenance or flycatcher habitat suitability. It is difficult to determine with precision whether fish removal and stocking (possibly including frogs) would influence insect prey populations (PCE 2) (AGFD and FWS 2021). Because flycatchers are generalists, eating a suite of flying and aquatic insects (FWS 2002b), and because nonnative fish species also prey on insects, any effect on flycatcher insect prey (PCE 2) would likely be undetectable and inconsequential.

Incidental Take and the Impacts of Take

By adding the FCS to SRP's RHCP and ITP, the effects on flycatchers from normal FCS operations and the planned deviation would not exceed SRP's existing habitat-based incidental take surrogate described in the 2002 RHCP and authorized in the 2003 ITP. The 2003 ITP authorized SRP to incidentally take flycatchers in the CS in the form of up to 750 acres of habitat removal (1,250 acres with adaptive management) in any given year. SRP does not anticipate that when the planned deviation or normal flood control operations occur, the lake would grow to exceed 750 total acres of affected annual flycatcher habitat in the CS and FCS. Therefore, the incidental take of flycatchers from SRP's covered activities under the Proposed Action would continue to be fully offset by the ongoing implementation of SRP's flycatcher mitigation measures.

Conclusion

In summary, SRP's covered activities under the Proposed Action would have moderate, temporary, localized effects on the flycatcher and its critical habitat that would be both beneficial (e.g., improved riparian habitat conditions following temporary inundation) and adverse (e.g., decreased habitat availability during inundation and from mortality of riparian vegetation). The beneficial effects of SRP's ongoing flycatcher mitigation measures are still anticipated to continue to fully offset the incidental take of flycatchers resulting from its covered activities. Therefore, the effects of the Proposed Action on the flycatcher and its critical habitat would be short-term and minor.

Western Yellow-billed Cuckoo

Conservation Space Operations

SRP's CS operations are included as a covered activity in the 2002 RHCP and would not be modified under the Proposed Action. The effect of CS operations on the cuckoo are described under the Full Operation Alternative (Alternative 2–Preferred Alternative) in Section 4.6.2.4 of the 2002 RHCP EIS (FWS 2002a), which concluded that, as with flycatchers, fluctuating lake levels in the CS would lead to incidental take of cuckoos through changes in habitat availability and habitat quality and reduced cuckoo productivity in the CS. Because of the cyclical changes in riparian habitat in the CS and the difficulty in making long-term predictions of habitat availability, the 2002 RHCP EIS conservatively assumed that up to 313 acres of habitat for the cuckoo could be adversely affected each year. These effects did not require additional mitigation because cuckoos would also benefit from the off-site mitigation for flycatchers and bald eagles. Under the Proposed Action, SRP would continue annual cuckoo habitat monitoring in the

CS and would implement adaptive management measures if the amount of habitat affected in any year exceeds 313 acres.

Flood Control Operations

Under normal flood control operations, the lake elevation peaks in April or May and is likely to be receding when cuckoos arrive at Roosevelt Lake in May and June; thus, water levels are unlikely to rise and inundate cuckoo nests, eggs, or nestlings in the FCS. Shallow surface water and/or saturated soils could benefit nesting cuckoos in the FCS by deterring predators, moderating microclimate, or possibly increasing insect prey. Cuckoos fledging in nests in the FCS are unlikely to fall into water and drown since water would be evacuated prior to the fledging period in summer.

It is not likely that the normal flood control operations would cause active cuckoo nest trees to fall over, killing eggs or nestlings, or leave surrounding water for young cuckoos to fledge into and drown. In contrast to CS operations (see Subchapter III.B of the RHCP addendum), normal flood control operations are not likely to cause active cuckoo nest trees to fall because they typically use larger, deep- rooted, stable trees that are unlikely to be killed by 20 days of inundation (see Section 3.2.1.2.1). As described for the flycatcher, there could be effects on individual tamarisk plants rooted in the bottom few inches of the FCS, but these would not be expected to alter essential breeding, feeding, or sheltering behaviors to an extent that death or injury of a cuckoo occurs.

Planned Deviation

At Roosevelt Lake, cuckoos and flycatchers use similar vegetation as breeding habitat, and as a result, habitat for cuckoos would experience similar effects from the planned deviation (see the Southwestern Willow Flycatcher section above). In the 3 years it would be implemented, the planned deviation may extend inundation in the first 5 feet of the FCS (2,151 to 2,156 feet amsl) during the cuckoo breeding season, reducing the amount of available nesting habitat and affecting habitat quality. The reduction and alteration of nesting habitat would result in incidental take via harm in an amount equivalent to the acres of habitat alteration.

The planned deviation would not alter the typical yearly pattern of water levels at Modified Roosevelt, in which lake levels peak in late April or early May and then decrease. Since cuckoos will arrive at Roosevelt Lake in May and June when the lake elevation has peaked (or receded), water in the FCS is unlikely to rise and inundate established cuckoo nests, eggs, or nestlings. Surface water and/or saturated soils beneath the nest could benefit nesting cuckoos by deterring predators and moderating microclimate. The planned deviation could extend inundation of the FCS into the cuckoo fledging season and increase the risk of fledging cuckoos drowning, but depending on the timing of the fill event, water could be evacuated from the FCS before late-season cuckoo nests fledge. Since cuckoos typically use large, deep-rooted, and stable trees for nesting, the increased frequency and duration of inundation under the planned deviation is unlikely to cause direct mortality of cuckoos from the death and collapse of active nest trees.

Based on the flycatcher habitat model (Hatten and Paradzick 2003) and vegetation height measured by LIDAR, SRP estimates that there is a maximum of 43.0 acres of cuckoo habitat in the bottom 5 feet of the FCS that could be affected by adverse impacts to riparian vegetation (see Subchapter 3.B.ii in the RHCP addendum for additional details). Because of the recent tamarisk leaf beetle occurrence and anticipated effects (see Appendix F, Cumulative Effects), it is difficult to predict nesting cuckoo occurrence, quantify plant species composition within territories, and estimate effects from the planned deviation. Cuckoos likely rely on tamarisk less than flycatchers, but the degree of its importance is not understood. Should nesting cuckoos rely on tamarisk within territories, it would also be difficult to distinguish habitat effects from leaf beetles and inundation. SRP is conservatively estimating cuckoo effects in the FCS independent

of the leaf beetle to ensure that any harm is addressed from covering nesting habitat with water and altering nesting habitat from inundation.

As with the flycatcher, the increased Roosevelt Lake elevation during the planned deviation would inundate cuckoo nesting habitat in the FCS and reduce the height of vegetation above water in the FCS and the upper portion of the CS. SRP used the conservative 8.8-meter (28.9-foot) average tree height at cuckoo nests from the Bill Williams (Halterman 2001) and San Pedro Rivers (Halterman 2002) to estimate how lake elevations would affect cuckoo nesting habitat. When the lake reaches 2,156 feet amsl (the top of the PDS), there would be 5.2 acres (2.6 acres in the CS and 2.6 acres in the FCS) of vegetation that are no longer suitable for cuckoos because of the reduced height of vegetation above the water's surface. Of the 2.6 acres in the FCS, 0.3 acre overlaps with the 43.0 acres of habitat that could be affected by changes in riparian vegetation (leaving 2.3 acres that do not overlap); thus, the total amount of cuckoo habitat in the bottom 5 feet of the FCS that could be impacted by the planned deviation is approximately 45.3 acres. When added to the 2.6 acres of vegetation that may be affected in the CS, the total reduction in cuckoo habitat from the planned deviation would be approximately 47.9 acres in each of the 3 years it is implemented.

Effects on riparian vegetation that could experience dieback or mortality would last up to 5 years (the assumed period to full recovery under the vegetation model used in the 2002 RHCP) after the final year of the planned deviation. While the planned deviation is a new covered activity that would result in incidental take (via harm in an amount equivalent to the 45.3 acres of habitat modification) not contemplated in the 2002 RHCP, the amount of the additional take and the impacts of these takings on the cuckoo are fully offset by the amount of currently authorized incidental take and the conservation measures implemented to address the impacts of the authorized take (see Subchapter 4.B in the RHCP addendum for additional details).

Conservation Actions

The Gartersnake Conservation Program is expected to have negligible effects on cuckoos or their habitat. Suppressing nonnative predatory fish and stocking native fish (and possibly lowland leopard frogs) in the lower Tonto Creek permit area would occur primarily in the stream, adjacent to vegetation, and in open gravelly areas, by small crews traveling on foot during the cuckoo nesting season. If frogs are stocked, it could improve the cuckoos forage base. Crews would familiarize themselves with cuckoo distribution before initiating fieldwork to avoid territories. They would not move through vegetation where cuckoos place nests and would conduct activities in stream channels for short duration far enough away to prevent impacts to nesting activity. Crews may disrupt a perched or foraging cuckoo infrequently and for short duration (or step on a germinating plant), but these instances are expected to be inconsequential to cuckoo habitat, territory establishment, and nest success.

Cuckoo Critical Habitat

While there is no cuckoo critical habitat present in the CS, under the Proposed Action, SRP's continued CS operations may benefit PBF 1 (riparian vegetation) for cuckoo critical habitat in the bottom few feet of the FCS by providing increased soil moisture for riparian vegetation rooted near the boundary of the CS and FCS. SRP's normal flood control operations and planned deviation may have adverse effects on the 853.1 acres of cuckoo critical habitat along Tonto Creek and the Salt River within the FCS (2,151 to 2,175 feet amsl), with the greatest effect occurring on the 198.9 acres that fall within the bottom 5 feet of the FCS (2,151 to 2,156 feet amsl). Normal flood control operations mimic dynamic stream flows, but under the planned deviation, the increased frequency and extended duration of inundation increases adverse impacts to riparian vegetation (PBF 1) but also enhances its regeneration and growth (see Section 3.2.1.2.1), which may also enhance PBF 3 (hydrologic processes). Water would not be present in the

FCS during the cuckoo breeding season under normal flood control operations or the planned deviation; therefore, PBF 2 (adequate prey base) would not be affected.

The Gartersnake Conservation Program would likely have negligible effects on cuckoo critical habitat in the lower Tonto Creek FCS and permit area. Crews implementing fish suppression and stocking may trample and kill a few small riparian plants (PBFs 1 and 3) while walking along streams but they would not affect mature trees. The small number of riparian plants affected is unlikely to influence overall riparian forest maintenance or cuckoo habitat suitability. The cuckoo prey base is unlikely to be notably altered by nonnative sportfish suppression and subsequent native fish stocking, but if lowland leopard frogs are stocked in the FCS, this may improve PBF 2 (adequate prey base) by increasing the availability of amphibian prey.

Incidental Take and the Impacts of Take

By adding the FCS to SRP's HCP and ITP, the effects on cuckoos from normal FCS operations and the planned deviation would not cause SRP to exceed the existing habitat-based incidental take surrogate described in the 2002 RHCP and authorized in the 2003 ITP. The 2003 ITP authorized SRP to incidentally take cuckoos in the CS up to 313 acres (1,113 acres with adaptive management) in any given year. SRP does not anticipate that when the planned deviation or normal flood control operations occur the lake would grow to exceed 313 total acres of affected annual cuckoo habitat in the CS and FCS. Under the Proposed Action, SRP's ongoing flycatcher mitigation measures (which also benefit the cuckoo) would continue to fully offset the incidental take of cuckoos from SRP's covered activities.

Conclusion

In summary, SRP's covered activities under the Proposed Action would have minor, temporary, localized effects on the cuckoo and its critical habitat that would be both beneficial (e.g., improved riparian habitat conditions following temporary inundation) and adverse (e.g., decreased habitat availability during inundation and decreased habitat quality from mortality of riparian vegetation). The beneficial effects of SRP's flycatcher mitigation measures (which also benefit the cuckoo) are anticipated to continue to fully offset the incidental take of cuckoos resulting from its covered activities. Therefore, in the long term, the effects of the Proposed Action on the cuckoo and its critical habitat would be minor.

Yuma Ridgway's Rail

Conservation Space Operations

The Proposed Action would not modify SRP's operation of Modified Roosevelt Dam within the CS. The effect of continued CS operations on the rail would be similar to those described for the Full Operation Alternative in the 2002 RHCP EIS (FWS 2002a:171–172), which conservatively estimated that up to 5 acres of emergent marsh habitat could be impacted in any one year by SRP's CS operations. The initial conservation plan in the RHCP was to establish 5 acres of marsh vegetation at the Rockhouse Farm mitigation site. Through adaptive management procedures, SRP's mitigation site was shifted to the Arlington Wildlife Management Area on the Gila River, where in conjunction with AGFD and Ducks Unlimited, SRP created 5 acres of wetland rail habitat (SRP 2005, 2006). Under the Proposed Action, SRP would continue rail habitat monitoring and would implement adaptive management measures if the amount of occupied habitat in any year exceeds 5 acres.

Flood Control Space Operations

No habitat for rails currently exists in the FCS, and even with the increased frequency of flood control events predicted by the latest Reservoir Planning Model, normal flood control operations would continue

to be too brief, infrequent, and dynamic to establish emergent marsh habitat for rails in the FCS. Therefore, normal flood control operations would have no effect on the rail or its habitat.

Planned Deviation of Flood Control Operations

While the planned deviation would increase the frequency and duration of FCS inundation in the 5 years immediately following issuance of the amended RHCP, the formation of persistent emergent marsh vegetation remains unlikely. Should suitable habitat for rails develop in the FSC during this period, it would be unlikely to persist when normal flood control operations resume, and the amount of occupied rail habitat affected in any year would be unlikely to exceed the 10 acres of incidental take (with adaptive management) via habitat modification authorized under the 2003 ITP.

Conservation Actions

The rail and its habitat do not occur in lower Tonto Creek or the Gisela Reach, and thus, would not be affected by the Gartersnake Conservation Program. The Gartersnake Conservation Program efforts to suppress nonnative predatory fish and stock native fish and (possibly) lowland leopard frogs in lower Tonto Creek and the Gisela Reach would not lead to future development of rail habitat at these locations.

Incidental Take and the Impacts of Take

SRP's existing ITP, which allows for the loss of up to 10 acres of rail habitat annually, sufficiently addresses the potential incidental take under the Proposed Action. SRP would continue to monitor vegetation at Roosevelt Lake and would implement adaptive management if the amount of occupied habitat in the permit area exceeds 5 acres. In the unlikely event that operation of Modified Roosevelt leads to the development of more than 10 acres of occupied rail habitat, an amendment to the ITP would be required.

Conclusion

In summary, the Proposed Action would have no short-term effects on the rail or its habitat which are not currently present in the permit area. Since adaptive management measures would be implemented in the unlikely event that rail habitat develops in the permit area in the future, any effects that do occur in this event would be negligible.

Bald Eagle

Conservation Space Operations

SRP's CS operations are included as a covered activity in the 2002 RHCP and would not be modified under the Proposed Action. The effect of CS operations on the bald eagle are described under the Full Operation Alternative (Alternative 2–Preferred Alternative) in Section 4.6.2.3 of the 2002 RHCP EIS (FWS 2002a), which concluded that the fluctuating lake levels would not increase effects on eagles from inundation of nest trees (which was addressed in previous FWS consultation) and would be unlikely to increase impacts to existing breeding areas. The formation of additional breeding habitat in the CS was determined to be unlikely because the frequency of inundation would prevent any cottonwoods that germinate in the lakebed when lake levels are low from developing to maturity before the lake level rises and inundates those area. Lower lake levels were also expected to reduce bald eagle productivity because the concentration of prey resources could increase intraspecific competition between breeding pairs that forage Roosevelt Lake. To mitigate for these effects, SRP implemented a number of conservation measures for eagles, including the ongoing implementation of conservation measures identified through previous consultation with FWS.

The Proposed Action would change the surrogate metrics used to measure incidental take of bald eagles. SRP would continue annual bald eagle nest monitoring to ensure take does not exceed the limits described in Table 17 of the amended RHCP. In the unlikely event that these take limits are exceeded, an amendment to the RHCP would be necessary.

Flood Control Space Operations

Although normal flood control operations were not included as a covered activity in the 2002 RHCP EIS (FWS 2002a), the loss of active bald eagle nest trees in the FCS from repeated inundation was addressed in the 1990 Biological Opinion (FWS 1990; consultation number 2-21-83-F-10) for modifications to Roosevelt Dam, which concluded that FCS operations would result in the inundation and loss of the Pinto breeding pair's nest. SRP implemented conservation measures to offset the take that would result from the loss of this nest. The Pinto breeding pair relocated their nest to another cottonwood, also in the FCS, after the original nest tree fell in 2016. No other breeding areas or nests have been established in the FCS since the 2002 RHCP EIS (FWS 2002a). Therefore, there would be no new or modified impacts to bald eagles in the FCS under the Proposed Action, and adding normal flood control operations as a covered activity would not be expected to result in take that exceeds the limits described in Table 17 of the amended RHCP.

Planned Deviation

Implementation of the planned deviation would extend the duration of inundation in the PDS from 20 to 120 days in up to 3 of the 5 consecutive plan years immediately following the issuance of an amended ITP. Extended inundation of nest and perch trees is a type of effect previously analyzed (i.e., extended inundation could cause the death of nest and perch trees, eventually reducing the availability of these habitat resources and influencing eagle use and the reproductive output of breeding areas at Modified Roosevelt). The planned deviation would increase the likelihood that: 1) water would be present under or near an active nest at the time when juveniles are fledging, and 2) that extended inundation would affect trees rooted in the PDS for the period of the planned deviation—although the degree to which the planned deviation would cause such effects is also dependent on actual streamflow during the deviation period. At present, the Pinto breeding area maintains a nest at or near an elevation of 2,156 feet amsl and is likely the only breeding area that could be affected by the planned deviation. Since SRP's incidental take coverage for normal flood control operations already accounts for the potential effects on the Pinto breeding pair, the planned deviation would not lead to additional incidental take of bald eagles; however, the take metrics have been revised to account for the possibility that fledglings could drown.

Lake elevation can affect foraging opportunities for bald eagle by changing the amount of shallow-water habitat present. Lower lake levels during the breeding season could result in reduced foraging opportunities and increased competition, while higher lake levels increase shallow-water foraging habitat and reduce competition. By retaining water in the bottom 5 feet of the FCS for an additional 100 days in the years it is implemented, the planned deviation would result in shallow-water foraging habitat created by flood control operations persisting longer into the bald eagle breeding season, which would benefit bald eagles that forage at Roosevelt Lake.

Conservation Actions

The Sheep and 76 breeding areas are located in the lower Tonto Creek permit area and Gisela mitigation site, respectively, where SRP would implement the Gartersnake Conservation Program. Biologists conducting shocking, stocking, and monitoring activities would avoid nest sites to prevent disturbance to nesting eagles. Eagles foraging on Tonto Creek rely on a combination of exotic and native fish (primarily catfish, carp, and suckers) that they typically capture in shallow water (Hunt et al. 1992). Spawning native suckers are an important prey item that eagles target early in the nesting season while

birds are incubating eggs and young nestlings. Fish shocking and stocking will likely occur at the very end of the eagle nesting season (June), minimizing its influence on eagle nesting success and possibly creating a short-term carrion supply for adult and newly fledged eagles. Suppressing largemouth bass is not likely to affect eagles, because it is not a readily available and targeted prey species on free-flowing streams (Hunt et al. 1992). Reducing largemouth bass effects on native suckers would likely benefit sucker persistence and eagles. While SRP would suppress channel catfish (*Ictalurus punctatus*) in select pools, channel catfish would still persist as a prey species and its reduction would help improve sucker persistence. In the long term, improving the abundance, distribution, persistence, and availability of native sucker species (a key bald eagle prey item) by stocking and reducing predatory fish effects on native sucker species is likely to benefit breeding eagles, and the selective and localized suppression of channel catfish would likely be inconsequential.

Conclusion

In summary, the Proposed Action is not expected to substantially increase the amount of incidental take that would occur as a result of SRP's covered activities, and the impacts of the take are anticipated to continue to be fully offset through the ongoing conservation measures implemented under the 2002 RHCP and prior biological opinions. No additional mitigation would be warranted. Therefore, the Proposed Action would have minor effects on bald eagles.

3.2.2.2.2 NO PLANNED DEVIATION ALTERNATIVE

Northern Mexican Gartersnake

Impacts from this alternative would be the same as those described under the Proposed Action above, except the planned deviation would not be approved and the effects attributed to the planned deviation would not occur. The addition of the gartersnake as a covered species, the expansion of the permit area to include the FCS and lower Tonto Creek, and the implementation of the Gartersnake Conservation Program are anticipated to fully offset the incidental take of gartersnakes under this alternative. Therefore, the No Planned Deviation Alternative would have minor effects on the gartersnake.

Gartersnake Critical Habitat

Impacts to gartersnake critical habitat from this alternative would be the same as those described under the Proposed Action above, except the planned deviation would not be approved, and the effects attributed to the planned deviation would not occur.

Southwestern Willow Flycatcher

Under the No Planned Deviation Alternative, effects on flycatchers and their habitat would be the same as described for the Proposed Action above except the effects attributed to the planned deviation would not occur. Since SRP would continue to implement mitigation that fully offsets the incidental take of flycatchers, the No Planned Deviation Alternative would also have negligible to minor effects on the flycatcher.

Flycatcher Critical Habitat

Under this alternative, adding SRP's normal flood control operations as a covered activity in the RHCP addendum and implementing the Gartersnake Conservation Program would have the same effects on flycatcher critical habitat as described for the Proposed Action above. The planned deviation would not be approved, and the effects on flycatcher critical habitat described for the planned deviation under the Proposed Action would not occur.

Western Yellow-billed Cuckoo

Under this alternative, the effects on cuckoos and their habitat would be the same as those described for the Proposed Action above except the effects attributed to the planned deviation would not occur. Since SRP would continue to implement mitigation that fully offsets the incidental take of cuckoos, the No Planned Deviation Alternative would also have negligible effects on the cuckoo.

Cuckoo Critical Habitat

Under this alternative, adding SRP's normal flood control operations as a covered activity in the RHCP addendum and implementing the Gartersnake Conservation Program would have the same effects on cuckoo critical habitat as described for the Proposed Action. The planned deviation would not be approved, and the effects on cuckoo critical habitat described for the planned deviation under the Proposed Action would not occur.

Yuma Ridgway's Rail

Under this alternative, amending the RHCP to include normal flood control operations would not be expected to impact the rail for the reasons described under the Proposed Action above. Although the Gartersnake Conservation Program would be implemented, there is currently no suitable habitat for rails in the FCS, lower Tonto Creek permit area, or Gisela Reach mitigation site, and these conservation activities would have no impact on existing vegetation at these sites. Therefore, the Gartersnake Conservation Program, and the No Planned Deviation Alternative overall, would have no effect on the rail.

Bald Eagle

Under this alternative, the effects on bald eagles and their habitat would be the same as those described for the Proposed Action above except the effects attributed to the planned deviation would not occur. SRP would continue to maintain coverage for incidental take of bald eagles resulting from its covered activities using the updated take metrics established in the RHCP addendum. As with the Proposed Action, the impacts of the take would continue to be fully offset through the ongoing conservation measures implemented under the 2002 RHCP and prior biological opinions. Therefore, the No Planned Deviation would also have minor effects on the bald eagle.

3.2.2.2.3 NO ACTION ALTERNATIVE

Northern Mexican Gartersnake

Conservation Space Operations

As described in Section 2.3, without an amendment to their ITP, SRP would operate the CS in a manner that avoids, to the extent possible, lake elevation increases that would inundate gartersnake habitat until alternative authorization for gartersnake take is achieved. While this would avoid the effects on gartersnakes and their habitat from periodic inundation, the analysis of the No Permit Alternative in the 2002 RHCP EIS (FWS 2002a) concluded that, in the long term, this would lead to a reduction in the riparian habitats that support gartersnakes. Gartersnakes in the CS would most likely be restricted to a narrow fringe of riparian habitat along the Tonto Creek inflow. The remaining riparian habitats would also be more likely to experience temporary reductions after scouring flood flows. The CS would continue to provide consistent aquatic habitat for predatory sportfish, which contributes to their negative impacts on the quality of habitat for gartersnake in the CS, FCS, and lower Tonto Creek.

However, nonnative fish suppression efforts would lessen these impacts in lower Tonto Creek. Therefore, effects on the gartersnake would likely be negligible to minor in the CS under the No Action Alternative.

Flood Control Space Operations

Under the No Action Alternative, SRP would temporarily prevent Roosevelt Lake from entering the FCS to the greatest extent possible, to avoid impacts to gartersnakes and their habitat from inundation of the FCS.

Planned Deviation

The planned deviation would not be approved under the No Action Alternative; therefore, there would be no effects on the gartersnake from the planned deviation.

Conservation Actions

SRP would not implement the Gartersnake Conservation Program described in the RHCP addendum, but instead would endeavor to avoid take of gartersnakes. SRP would also conduct nonnative fish suppression efforts which would further reduce impacts to gartersnakes by lessening the effects of competition and predation by nonnative predatory fish in lower Tonto Creek.

Critical Habitat

Under the No Action Alternative, operation of Modified Roosevelt would not affect PBFs 1, 2, or 5 for critical habitat in the FCS and on lower Tonto Creek; effects on PBFs 3 and 4 could occur during higher-flow events (200 to 1,100 cfs), when nonnative predatory fish inhabiting the CS could move upstream and become trapped in residual pools. However, SRP would conduct nonnative fish suppression efforts that would reduce these impacts to gartersnakes in lower Tonto Creek.

Southwestern Willow Flycatcher

As described in Section 2.3, without an amendment to their ITP, SRP would operate the CS in a manner that avoids, to the extent possible, lake elevation increases. The No Permit Alternative considered in the 2002 RHCP EIS (FWS 2002a) entailed managing the lake to avoid elevation increases within the CS. Therefore, the short-term effects on flycatchers in the CS under the No Action Alternative would be similar to those described in Section 4.6.2.1 of the 2002 RHCP EIS (FWS 2002a), which concluded that there would be a reduction in riparian vegetation at higher elevations within the CS, which nesting flycatchers depend on, due to the absence of periodic inundation and/or higher groundwater levels.

Critical Habitat

Under the No Action Alternative, operating the CS in a manner that avoids, to the extent possible, lake elevation increases would eliminate the minor beneficial impacts to PCE 1 (riparian vegetation) for flycatcher critical habitat in the bottom few feet of the FCS from increased soil moisture. Avoiding FCS operations would have the effect of perpetuating the existing conditions for flycatcher critical habitat in the FCS since the lake had not entered the FCS since 2010 until recently (briefly in April 2023) and would avoid future inundation of flycatcher critical habitat. Flooding along Tonto Creek would continue to influence flycatcher critical habitat. The planned deviation would not occur and would not affect flycatcher critical habitat in the FCS. The negligible flycatcher impacts associated with the Gartersnake Conservation Program also would not occur since the program would not be implemented under this alternative.

Western Yellow-billed Cuckoo

As described in Section 2.3, without an amendment to their ITP, SRP would operate the CS in a manner that avoids, to the extent possible, lake elevation increases. The No Permit Alternative considered in the 2002 RHCP EIS (FWS 2002a) also entailed managing the lake to avoid elevation increases within the CS. Therefore, the short-term effects on cuckoos in the CS under the No Action Alternative would be similar to those described in Section 4.6.2.4 of the 2002 RHCP EIS (FWS 2002a), which concluded that riparian vegetation at higher elevations within the CS, which nesting cuckoos depend on, would dry out and decay in the absence of periodic inundation or increased groundwater levels.

Critical Habitat

Under the No Action Alternative, temporarily operating the CS in a manner that avoids, to the extent possible, lake elevation increases would eliminate the minor beneficial impacts to PBF 1 (riparian vegetation) for cuckoo critical habitat in the bottom few feet of the FCS from increased soil moisture. Avoiding FCS operations would have the effect of perpetuating the existing conditions for cuckoo critical habitat in the FCS since the lake has not entered the FCS since 2010 until recently (briefly in April 2023) and would avoid future inundation of cuckoo critical habitat. The planned deviation would not occur and would not affect cuckoo critical habitat in the FCS. The negligible impacts to cuckoo critical habitat associated with the Gartersnake Conservation Program also would not occur since the program would not be implemented under this alternative.

Yuma Ridgway's Rail

There is no existing occupied rail habitat in the analysis area, but under the No Action Alternative, temporarily operating the CS in a manner that avoids, to the extent possible, lake elevation increases would have similar effects to those described for the No Permit Alternative in Section 4.6.2.2 of the 2002 RHCP EIS (FWS 2002a), which concluded that less fluctuation in water levels could eventually lead to the development of persistent emergent marsh vegetation suitable for the rail.

Bald Eagle

Under the No Action Alternative, temporarily operating the CS in a manner that avoids, to the extent possible, lake elevation increases would have similar effects as those described for the No Permit Alternative in Section 4.6.2.3 of the 2002 RHCP EIS (FWS 2002a), which concluded that inundation of the Pinto and Tonto nest trees would be avoided, but these trees could still be adversely affected by the loss of supporting hydrologic conditions at lower lake levels. Bald eagle productivity and prey selection could be affected by the reduction in shallow-water habitat for prey species, which could also increase intraspecific competition between eagles and limit future establishment of breeding areas in the vicinity of Roosevelt Lake. Under the No Action Alternative, SRP and the FWS would work together to ensure compliance with the BGEPA, and SRP would continue to maintain coverage for incidental take of eagles through its existing 2002 RHCP and 2003 ITP.

3.3 CULTURAL RESOURCES

3.3.1 Affected Environment

The area of potential effects (APE) for cultural resources consists of the lake elevation from 2,151 to 2,175 feet amsl, representing the FCS (3,596 acres). The APE also includes Tonto Creek from the FCS to 1.4 miles upstream. Impacts to cultural resources were accounted for in the footprint of the lake by the previous analysis; any new cultural impacts presented herein are results of the proposed deviation from the WCM and the proposed ITP amendment.

Because the deviation from the WCM would occur in the PDS, a Class I records search was conducted for the PDS and a 20-meter (approximately 66-foot) buffer, incorporating cultural resource data from the Tonto National Forest, AZSITE, Reclamation, and SRP (Hesse and Tremblay 2022). In consideration of the possible discrepancies in location due to potential errors in mapping and/or projection, and to ensure all sites were accounted for, a 20-meter buffer was added to the upslope of the PDS. The 2022 Class I records search produced 128 archaeological sites; four of those sites are currently under water but may extend into the FCS. Because of the uncertainty of their location, these four sites are not considered in this analysis, which leaves 124 archaeological sites. Of the 124 sites considered in this analysis, 111 sites listed in or eligible for listing in the National Register of Historic Places (NRHP) or the Arizona Register of Historic Places (ARHP) are found within the deviation space and the 20-meter buffer. These sites have been recommended or determined eligible for the NRHP under Criterion D for their potential to provide important information about the past. Also within the PDS are three ineligible sites and 10 unevaluated or unknown NRHP-status sites. Federal agencies treat unevaluated sites or sites of unknown NRHP eligibility as eligible until determined eligible or ineligible.

Of the 124 sites, 103 sites are prehistoric, 15 are historic-era, and six are multicomponent. Prehistoric site types include artifact scatters, lithic quarries, agricultural sites, habitations, platform mound sites, water control features and agricultural sites, and petroglyphs. Historic-era sites include a construction camp associated with dam construction, construction facilities, building foundations, ranches, the Power Canal (previously mitigated through Historic American Engineering Record documentation), and roads. The multicomponent sites are historic buildings (house and station) with prehistoric artifact scatters and/or features, historic and prehistoric artifacts, and a canal. The Theodore Roosevelt Dam National Register District is within the analysis area; however, all the contributing resources within the analysis area are historic-age archaeological sites. These resources are discussed as archaeological sites in the following analysis.

Because effects on historic properties would result primarily from freshwater inundation and shoreline processes, a white paper discussing the effects of inundation on archaeological sites and previous research conducted for the Modified Roosevelt Dam was also prepared (Ainis et al. 2020). The paper concluded that freshwater inundation and shoreline processes do have a negative impact on archaeological sites, and the longer the duration of inundation the greater the impact. These impacts are similar to those considered in Reclamation's EIS for the Central Arizona Water Control Study (Reclamation 1984), which concluded that the Modified Roosevelt Dam would have an adverse impact on archaeological sites. Under the NHPA Section 106 process, a memorandum of agreement (MOA) was developed and executed in 1988 that included stipulations regarding the resolution of adverse effect for the Roosevelt Dam modifications, titled *Memorandum of Agreement for Theodore Roosevelt Dam (MOA), Executed with the Advisory Council on Historic Preservation (ACHP) and the Arizona State Historic Preservation Office (SHPO) on December 19, 1988* (ACHP and Arizona SHPO 1988).

Per the 1984 EIS and 1988 MOA, a mitigation plan for archaeological data recovery for the Modified Roosevelt Dam modifications was prepared and implemented (Ainis et al. 2020). The implementation of the plan included data recovery of a 22% sample of prehistoric sites (139 of 615 prehistoric sites) and was split into three projects: the Roosevelt Platform Mound Study, the Roosevelt Rural Sites Study, and the Roosevelt Community Development Study. In addition, Reclamation sponsored two more studies, which collected survey data on the bajada of the Tonto Basin and on five parcels around Roosevelt Lake within the Tonto National Forest, to provide additional complementary data to that of the data recovery investigations. Mitigation on historic-era sites focused on sites associated with the construction of the dam and included data recovery and Historic American Engineering Record documentation, as well as the creation of historic contexts for dam construction and water resource development in Arizona, a preservation plan, and an interpretive exhibit. The implementation of the MOA and the mitigation plan resolved adverse effects on historic properties from the dam modifications. The current APE falls within

the project area for the Modified Roosevelt Dam as defined in the 1984 EIS and mitigation plan. The data recovery and other mitigation methods used for the Modified Roosevelt Dam were comparable to modern methods and adequately addressed the research questions posed in the mitigation plan (Ainis et al. 2020).

3.3.2 Environmental Consequences

As discussed above, the APE falls within Reclamation's Modified Roosevelt Dam analysis area. Pursuant to the terms of the 1988 MOA, adverse effects on historic properties within the analysis area were previously mitigated prior to raising the height of Theodore Roosevelt Dam and the full reservoir space. If the implementation of the alternatives would have additional adverse effects on historic properties within the analysis area which have not been previously avoided or mitigated, then those adverse effects would need to be resolved through the NHPA Section 106 process.

3.3.2.1 Proposed Action

Under the Proposed Action, the FWS would issue the requested ITP amendment and the Corps would approve SRP's requested planned deviation from the WCM, allowing SRP to hold water up to 120 days in the first 5 feet of the FCS. Within the PDS and 20-meter (approximately 66-foot) buffer, there are 121 archaeological sites that are NRHP or ARHP listed, are NRHP eligible, or are unevaluated or of unknown NRHP status (i.e., historic properties or potential historic properties). Table 3-9 shows sites within the analysis area by time period and NRHP status.

Table 3-9. Historic Properties and Potential Historic Properties within the Deviation Space and 20-meter Buffer and NRHP Status

Time Period	Listed	Eligible	Unknown/Unevaluated	Total
Prehistoric	1	91	8	**100**
Historic	1 **(State Register)**	12	2	**15**
Multicomponent	0	6	0	**6**
Total	**2**	**109**	**10**	**121**

The increased length of time of inundation could negatively impact archaeological sites primarily through increased erosion and material displacement from wave action. Thirty-five sites were selected as part of the sample for the mitigation program and subject to archaeological testing and/or data recovery. Therefore, no additional impact from the Proposed Action is expected compared to the current Modified Roosevelt Dam operations. A summary of ongoing Section 106 and tribal consultation is provided in Appendix G.

3.3.2.1.1 CONCLUSION

In summary, impacts under the Proposed Action would be negligible as no additional impacts to the cultural resources are expected under the Proposed Action beyond that which have already been accounted for under the current Modified Roosevelt operations.

3.3.2.2 No Planned Deviation Alternative

Under this alternative, the Modified Roosevelt Dam would be operated as described for the Proposed Action, except that the planned deviation would not be implemented. Adverse effects on historic properties within the analysis area from SRP's CS and normal FCS operations on cultural resources were previously mitigated prior to raising the height of Theodore Roosevelt Dam and the full reservoir space. No new impacts would occur.

3.3.2.3 No Action Alternative

Under the No Action Alternative, there would be no new impacts to cultural resources beyond those described in Section 4.9.2.2 of the 2002 RHCP EIS (Full Operation Alternative) (FWS 2002a) for Modified Roosevelt Dam as analyzed in Reclamation's 1984 EIS in Chapter 4 Section B.4.a, Section B.4.c(1)(d), and Section B.4.c(2)(d) (Reclamation 1984:183, 191, 192).

3.4 RECREATION

The analysis area for recreation resources evaluated in this EA includes Roosevelt Lake and the area adjacent to the lake, which captures the developed and passive recreation sites found within Tonto National Forest as well as the 14.1-mile stretch of lower Tonto Creek. Maps in Appendix I illustrate the recreation resources in the analysis area.

3.4.1 Affected Environment

Recreational opportunities occur within two primary areas: Roosevelt Lake and Tonto Creek. Recreation is permitted in both areas on Tonto National Forest lands, subject to laws and regulations with respect to recreational motorized use, fishing, and hunting, as enforced by AGFD. Tonto Creek is managed by the Tonto National Forest, AGFD, and other partners for recreation, including camping, picnicking, hiking, bird watching, fishing, hunting, and water activities. The area includes picnic units and vault toilets within the Horton Day Use Area and the Upper Tonto Creek Campgrounds. The primary AGFD management emphasis for Tonto Creek is a coldwater sport fishery broken up into two management approaches. Above the Highway 260 Bridge, Tonto Creek's primary management will follow an Intensive Use approach to be supported by frequent stockings of rainbow trout (*Oncorhynchus mykiss*). Below the Highway 260 Bridge to Hell's Gate, primary management follows AGFD's "Featured Species" approach for wild brown trout (*Salmo trutta*) based on the lack of access and a naturally reproducing trout population that provides a unique angling opportunity. From the Highway 260 Bridge to Hell's Gate downstream to Roosevelt Lake the stream is managed as a "Native Fish-Self Sustaining" water primarily for roundtail chub (*Gila robusta*). Portions of lower Tonto Creek above Gun Creek are difficult to access and some areas require extensive hiking. There are also sections of private property that limit public access. Downstream of Bear Flat, the only access is via hiking, as this section of creek enters the Hells Gate Wilderness. The stream through this section is rugged and remote until the stream exits the wilderness just upstream of Gisela in an area known as "The Box" (AGFD 2020b).

Lands surrounding Roosevelt Lake are managed by the Tonto National Forest as part of the Lakes and Rivers Management Area as designated in the *Tonto National Forest Final Land Management Plan* (USFS 2022). The purpose of this management area is to prioritize and manage high-use developed and dispersed recreational opportunities in and around the lakes and major rivers of the Tonto National Forest (USFS 2022). Recreation and fishing are not legislatively authorized purposes of Modified Roosevelt; however, the lake has become a popular sport fishery because of ongoing stocking activities and funding support from the FWS's Wildlife and Sport Fish Restoration Program (WSFR) and the AGFD. In 1941, the AGFD began stocking and managing Roosevelt Lake as a sport fishery and established multiple nonnative species in 1949 (AGFD 2019). While only 5% to 7% of Arizona residents participate in recreational angling statewide (Eiden 2017), Roosevelt Lake represents a popular warmwater fishery in Arizona within the angling community. The AGFD states that "Roosevelt Lake provides an estimated 451,242 angler use days per year and is considered one of the top bass fishing lakes in Arizona. Roosevelt Lake is a very popular tournament lake, hosting multiple bass tournaments every week for most of the year" (AGFD 2020a:2). In 2013, it was the most heavily fished water in the state of Arizona, with an economic impact of $72,284,250 (Fedler 2014). Fishing tournaments are held annually at Roosevelt Lake for largemouth bass, with five bass tournaments held in the year 2021 alone. The lake also attracts anglers

with a number of other sportfish. AGFD continues to stock millions of fish in the lake to sustain a multi- species sport fishery.

Reclamation previously mitigated for impacts to USFS recreation sites surrounding Roosevelt Lake caused by the modifications to Roosevelt Dam. Recreation facilities, including campgrounds, marinas, interpretive sites, picnic grounds, and ranger and aid stations, were moved to higher ground, upgraded, and expanded by Reclamation under Plan 6. Plan 6 was the development alternative chosen in 1984 for modification of Roosevelt Dam under the Central Arizona Water Control Study (Reclamation 1990). All new recreation facilities were built above 2,175 feet amsl in anticipation of periodic inundation below this elevation. The Visitor's Center was built above the new flood surcharge pool behind Modified Roosevelt (elevation 2,218 feet amsl) to ensure safety under any flood. Mitigation measures identified in the Central Arizona Water Control Study Final EIS (Reclamation 1984) and 1990 Final EA for the Theodore Roosevelt Dam modifications (Reclamation 1990) to reduce adverse impacts to land use and recreation have been completed. This includes acquisition of land that would be inundated during operation of Modified Roosevelt Dam for flood control, and replacement of existing recreational facilities and/or construction of new recreational facilities above the FCS. Additionally, per the 1999 EA for land withdrawal (Reclamation 1999), under probable maximum flood conditions, recreation facilities are to be closed and recreation activities suspended until the flooding abates.

Recreational uses on Tonto National Forest lands surrounding Roosevelt Lake are allowed either for free or by permit and are open to hunting and fishing with a valid license. Multiple recreational activities are available on Tonto National Forest lands without recreational permits, such as picnicking, wildlife viewing/bird watching, hiking, horseback riding, and dispersed camping (typically limited to 14 days per stay), all of which occur within the analysis area and may be subject to a day-use fee. Recreation, such as motorized/non-motorized boating, camping in designated campgrounds, or motorized travel, is allowed with the appropriate recreational passes. Tonto National Forest Recreational Permits vary, depending on the recreational area, but include all the above non-consumptive recreational activities, as well as geocaching, bicycling events, photography, and limited off-highway vehicle use (restricted to designated roads and trails) for non-commercial and non-competitive purposes.

Both day-use and overnight camping sites accommodate many visitors along Roosevelt Lake. The number of developed camping and day-use sites at Roosevelt Lake currently exceeds the public demand and the USFS's resources to maintain the sites. Several sections of existing developed sites have been decommissioned and more are scheduled for decommissioning to address this concern (USFS 2022).

Both Gila County and the Tonto Basin community account for recreation in their 2003 Comprehensive Master Plan (Gila County 2003) and Land Use and Resource Policy Plan (Gila County 2010). One of the community land use values identified in the Comprehensive Master Plan includes abundant recreational opportunities, along with easy access to Tonto National Forest. While Gila County does not have any designated recreation areas within the Tonto Basin (likely due to proximity to Tonto National Forest), it supports outdoor recreation and tourism for the benefit of all.

The Arizona National Scenic Trail passage segments 19f and 20a are adjacent to the Roosevelt Lake shoreline. In 2009, the National Trails System Act was amended through the Omnibus Public Land Management Act (Public Law 111-11) to include the Arizona National Scenic Trail. There are no wilderness areas or special recreation management areas within the permit area; however, the National Park Service's Tonto National Monument is within 1 mile of the permit area.

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action Alternative

3.4.2.1.1 CONSERVATION SPACE OPERATIONS

Under the Proposed Action, there would be no additional impacts to recreation occurring from CS operations beyond those accounted for in Section 4.11.2.2 of the 2002 RHCP EIS (Full Operation Alternative; FWS 2002a).

3.4.2.1.2 FLOOD CONTROL OPERATIONS

Impacts to recreation due to normal FCS operations are the same as those described in the 1996 EA (Reclamation 1996) for the WCM. The designated recreation facilities located within the FCS are depicted in Appendix I.

3.4.2.1.3 PLANNED DEVIATION

The planned deviation would directly impact 241 acres of Roosevelt Lake shoreline within the PDS, as they would not be accessible for up to 120 days for a single flood control event that occurs within a year and only in up to 3 years within the given 5-year period. However, shore-based recreation would continue to fluctuate depending upon the favorability for a user's recreation as described above, and no effects on water-based recreation along the shoreline of Roosevelt Lake are expected.

Public aquatic recreation such as fishing, boating, and swimming would be impacted under the planned deviation. During these conditions, certain designated recreation facilities, campsites, access roads, and parking lots within the PDS would be temporality inaccessible for a longer period of time; however, boaters would have access to several boating facilities that are otherwise inaccessible during lower water levels, as depicted in Appendix I. Although no data exist to determine precise estimates of recreation use at alternative reservoir levels, research related to recreation economics has generally identified a positive relationship between water levels and recreation use (Platt 2000). As water levels increase or decrease, so does recreation use in a roughly bell-shaped curve. The tails for the curve represent high and low reservoir levels, where visitation is lower than optimum conditions. Under the planned deviation, because floodwaters would be held back within the PDS for up to 120 days for a single flood control event that occurs within a year and only in up to 3 years within the given 5-year period, annual visitation during a flood year is likely to be slightly lower than years with normal lake levels, resulting in a short-term and minor adverse impact to recreational use.

The planned deviation could temporarily reduce fishing opportunities within Tonto Creek with impact depending on the fish species. Fishing opportunities in sections of lower Tonto Creek with relatively low- elevation gradients may serve as suitable habitat for sportfish as they change from narrow channels to wider pools during water level fluctuations. These new habitat areas could result in exclusion areas that would result in a temporary and minor adverse impact to recreational fishing opportunities.

No designated campsites would be impacted under planned deviation conditions. The Arizona National Scenic Trail passage segments 19f and 20a are adjacent to the Roosevelt Lake shoreline. While the U.S. Department of Agriculture's current guidance/policy on the trail's nature and purpose shows that the Proposed Action would not interfere with the provided guidance (U.S. Department of Agriculture 2018), portions of these trail segments and other USFS-designated trails may be temporarily inaccessible during flood control operations for longer periods of time due to the planned deviation.

3.4.2.1.4 CONSERVATION ACTIONS

The mechanical removal of nonnative centrarchid and ictalurid fishes to suppress their local populations would occur in persistent pools in lower Tonto Creek. SRP would also remove nonnative fish from discrete permanent pools within one or more selected segments of the Gisela Reach. Nonnative fish removal would occur by electrofishing to promote a greater prevalence of native fish species. The AGFD will continue to stock sportfish in Roosevelt Lake and the Gartersnake Conservation Program does not conflict with AGFD's coldwater trout fishery management, and therefore any adverse impacts to sport fishing from mechanical removal of nonnative fish in Tonto Creek would be temporary and negligible. No other effects on recreation resources would occur from the implementation of the Gartersnake Conservation Program.

3.4.2.1.5 CONCLUSION

In summary, impacts to recreational resources from the Proposed Action would be temporary and minor, primarily due to the effects of the planned deviation.

3.4.2.2 No Planned Deviation Alternative

Under this alternative, the impacts on recreation experiences and opportunities would be the same as described for normal CS and FCS operations and the Gartersnake Conservation Program under the Proposed Action.

3.4.2.3 No Action Alternative

3.4.2.3.1 CONSERVATION SPACE OPERATIONS

Under the No Action Alternative, it would be necessary (to the extent feasible) to maintain Roosevelt Lake at a constant level (below the top of the CS) until alternative authorization for gartersnake take is achieved. The lake could decrease in elevation, but once decreased, subsequent rises would be avoided and conservation storage at Modified Roosevelt might be reduced if SRP is unable to store new inflow in excess of delivery. A reduction in the average surface area of Roosevelt Lake is likely to result in a decrease in aquatic recreation use compared to current conditions. This would have a minor adverse effect on recreation; however, these conditions would be temporary until ESA compliance is reached, which may require additional environmental analysis where additional effects to recreation would be analyzed.

3.4.2.3.2 FLOOD CONTROL SPACE OPERATIONS

Effects on recreation from normal flood control operations as described in the 1996 EA (Reclamation 1996) for the WCM would generally not occur under this alternative, as SRP would endeavor to avoid rising lake levels at Modified Roosevelt, subject to hydrological inputs, physical limitations for releases, and human health and safety considerations, for this limited period (likely less than 3 years).

3.4.2.3.3 PLANNED DEVIATION

Under this alternative, the planned deviation would not be implemented. No effects on recreation would occur.

3.4.2.3.4 CONSERVATION ACTIONS

While the Gartersnake Conservation Program would not be implemented under this alternative, SRP would conduct nonnative fish suppression efforts, and impacts to sport fishing in lower Tonto Creek would be similar to those described above under the Proposed Action.

3.5 TRANSPORTATION

The analysis area for transportation resources evaluated in this EA includes the area adjacent to Roosevelt Lake as well as the areas adjacent to lower Tonto Creek, which capture the roadway system in the permit area vicinity that serve the Tonto Basin community and visitors. Maps in Appendix I illustrate the transportation resources in the analysis area.

3.5.1 Affected Environment

State Route 188 serves as the primary access route to the analysis area, running parallel to the west side of Tonto Creek and later Roosevelt Lake (see Appendix I). The secondary roadway system is composed of various USFS routes and county roads that serve the local community as minor arterial roadways with limited access. These secondary routes continue to branch off in Tonto National Forest land. A-Cross Road is identified as a rural collector road within the analysis area. Collector roads help diffuse traffic between arterial and local streets. Few sidewalks or bike lanes are available within the Tonto Basin community, with no local transit services in place. The only airport in the community is the private Roosevelt Dam airport owned by SRP.

In the permit area, there are 32 total named roads that intersect the permit area (see Appendix I). The affected roads include A-Cross Road, Apache Trail, Bachelor Cove Overlook, Bar-X Road, Bermuda Flat Day Use Parking, Bermuda Flat entry, Cholla Boatlaunch Road, Cholla Lower Boat Ramp Park, Coyote Split A, Coyote Split B, Forest Road (FR) 135B, FR 1518, FR 179, FR 227, FR 3695, FR 3696, FR 660, FR 663, FR 92, FR 97A, Frazier Campground Picnic, Grapevine Springs Access Road, Javelina Loop, Long Gulch, NF-82, NF-88, North Horse Pasture, Orange Peel Day Use Parking, Siphon Road, Teamster C G, Vineyard Day Use Parking, and Windy Hill Bobcat Parking. As part of the 1996 Roosevelt Dam modifications, Reclamation made improvements to A-Cross Road, recreation site roads, the Apache Trail, and State Route 188.

Coinciding with the land ownership within Gila County, most of the roadways serving the permit area are under the jurisdiction of the State of Arizona, Tonto National Forest, and other entities. The only urban roadways under Gila County's jurisdiction are found in communities outside of Tonto Basin. The main transportation issues identified in the Comprehensive Master Plan (Gila County 2003) that apply to the analysis area were adequacy of emergency access, all-weather property accessibility, and lack of alternative transportation mode facilities.

There are currently no all-weather roads that cross Tonto Creek, connecting residents on the east side of Tonto Creek to facilities on the west. As a result, these roads are rendered unusable during storms with high precipitation, when residents on the eastern side are cut off from any services.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

3.5.2.1.1 CONSERVATION SPACE OPERATIONS

Under the Proposed Action, there would be no changes to CS operations and no impacts to transportation are anticipated.

3.5.2.1.2 FLOOD CONTROL SPACE OPERATIONS

Impacts to transportation due to normal FCS operations are the same as those described in the 1996 EA (Reclamation 1996) for the WCM. The roadways located within the FCS and potentially impacted by normal flood control operations are depicted in Appendix I.

3.5.2.1.3 PLANNED DEVIATION

The planned deviation would directly impact roads within the PDS (see Appendix I), as they would not be accessible for public use while water is held within the FCS. Any roads impacted by flood control operations, whether under normal operations or for the planned deviation, would need to be temporarily closed. Under this alternative, road closures would become more frequent and last longer under the planned deviation, which may result in additional maintenance requirements for the roadway, depending on the classification designation (USFS 2018). Surrounding roads would be impacted indirectly through increased traffic pending any closures. No state routes would be affected by the planned deviation, with only collector and local roads being affected.

3.5.2.1.4 CONSERVATION ACTIONS

No effects on transportation are anticipated from implementation of the Gartersnake Conservation Program.

3.5.2.1.5 CONCLUSION

In summary, effects from the Proposed Action on transportation would be temporary and minor, primarily due to the effects of the planned deviation.

3.5.2.2 No Planned Deviation Alternative

Under this alternative, impacts would be similar to those described under the Proposed Action except that the effects attributed to the planned deviation would not occur.

3.5.2.3 No Action Alternative

3.5.2.3.1 CONSERVATION SPACE OPERATIONS

Under the No Action Alternative, managing water levels in the CS to avoid increases in water elevation that would inundate gartersnake habitat until alternative authorization for gartersnake take is achieved would not result in additional impacts to transportation in the analysis area.

3.5.2.3.2 FLOOD CONTROL SPACE OPERATIONS

Effects on transportation from normal flood control operations as described in the 1996 EA (Reclamation 1996) for the WCM would generally not occur under the No Action Alternative, as SRP would endeavor

to avoid rising lake levels at Modified Roosevelt, subject to hydrological inputs, physical limitations for releases, and human health and safety considerations, for this limited period (likely less than 3 years).

3.5.2.3.3 PLANNED DEVIATION

Under the No Action Alternative, the planned deviation would not be implemented and no effects on transportation would occur.

3.5.2.3.4 CONSERVATION ACTIONS

Under this alternative, the Gartersnake Conservation Program would not be implemented and no impacts to transportation would occur.

3.6 WATER RESOURCES

The geographic analysis area for evaluating effects on water resources includes the RHCP addendum permit area (i.e., the Roosevelt Lake CS and FCS [up to 2,175 feet amsl] and lower Tonto Creek from the top of the FCS upstream to the crossing of East del Chi Drive), the downstream segment of the Salt River between Modified Roosevelt Dam and GRDD, and a 1-mile buffer around both areas (Figure 3-2 and Figure 3-3). Likewise, impacts to groundwater are anticipated to be generally localized around Roosevelt Lake and Salt River between Modified Roosevelt and GRDD. The water resources analysis area encompasses the surface waters and underlying groundwater basins that may be directly or indirectly impacted by changes in lake elevations, with impacts tapering off as the distance from Roosevelt Lake increases. Impacts to surface waters or groundwater are not anticipated to occur outside of the analysis area beyond those analyzed in the 2002 RHCP EIS (FWS 2002a).

SRP's current standard operating procedure is to manage surface water to avoid spilling over GRDD in order to minimize losses of water supplies from the Salt River Project system. At GRDD, flows are distributed to users in the Phoenix metropolitan area through the existing system of canals and laterals and their existing interconnections with water treatment plants, points of use, and conveyance systems of contractors. Any flows that are not distributed to users are spilled over GRDD, into the Salt River and outside of SRP's management.

3.6.1 Affected Environment

3.6.1.1 Salt River Federal Reclamation Project

Modified Roosevelt is the largest water supply source in the Salt River Project system, supplying approximately 71% of the total surface water storage in the system. The Salt River Project, operated by SRP,[4] is a major water collection system for the vicinity of the water resources analysis area and plays a vital role in administering and distributing groundwater and surface water for municipal, industrial, and agricultural uses in the Phoenix metropolitan area. The Salt River Project system consists of a series of six storage dams and lakes and one diversion dam along two of Arizona's major rivers (Salt and Verde Rivers), two underground storage facilities (i.e., Granite Reef Underground Storage Project and New River-Agua Fria River Underground Storage Project), a groundwater savings facility, and a system of canals and high-capacity wells that are used to collect and distribute water to users throughout the Phoenix metropolitan area. Along the Salt River, within the water resources analysis area, are Modified Roosevelt Dam and Lake, Horse Mesa Dam at Apache Lake, Mormon Flat Dam at Canyon Lake, Stewart Mountain Dam at Saguaro Lake, and GRDD.

[4] SRP includes both the Salt River Valley Water Users Association (authorized in 1903 under the 1902 Reclamation Act) and the Salt River Project Agricultural Improvement and Power District (formed by SRP in 1937).

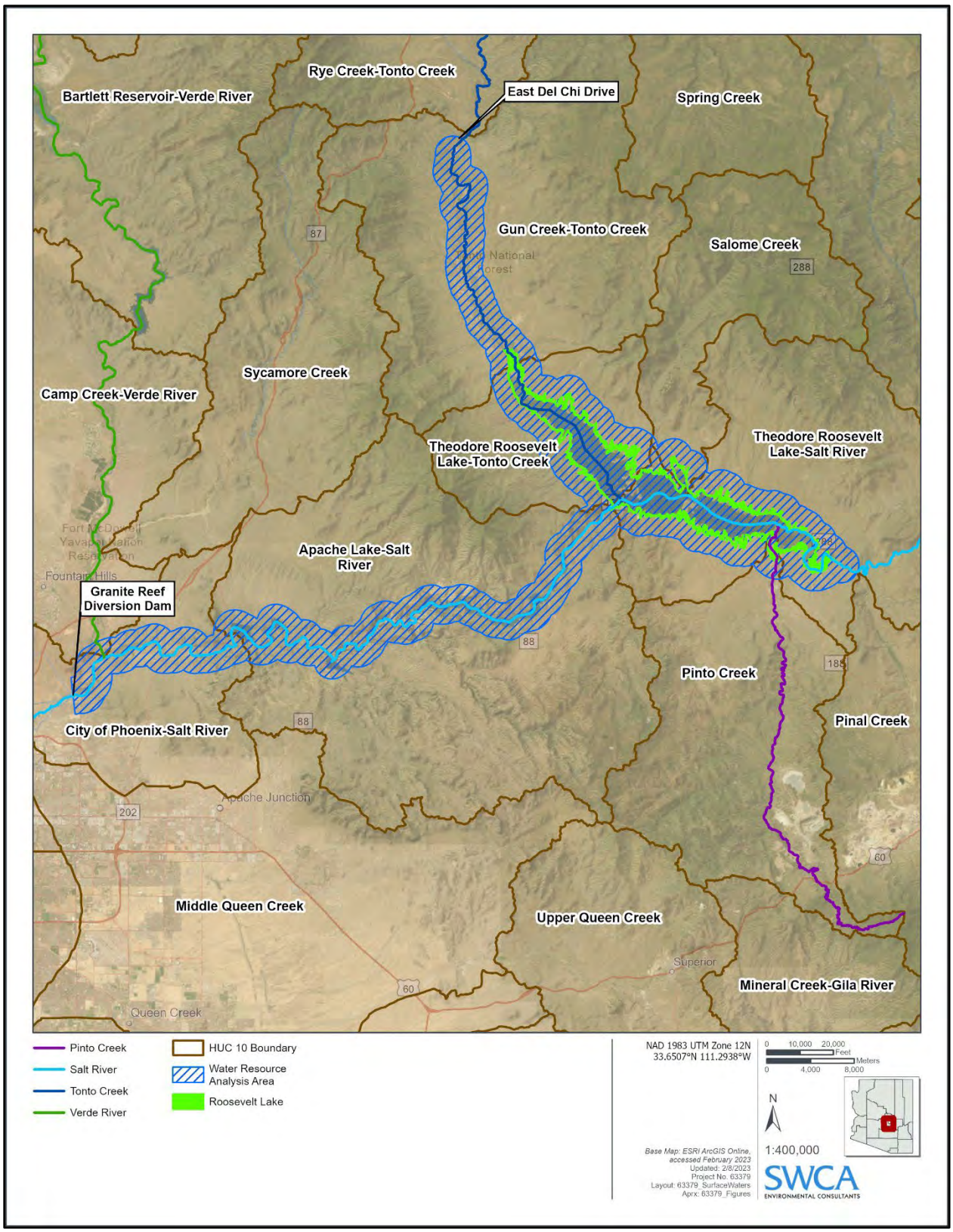

Figure 3-2. Major surface waters and watersheds in the water resources analysis area.

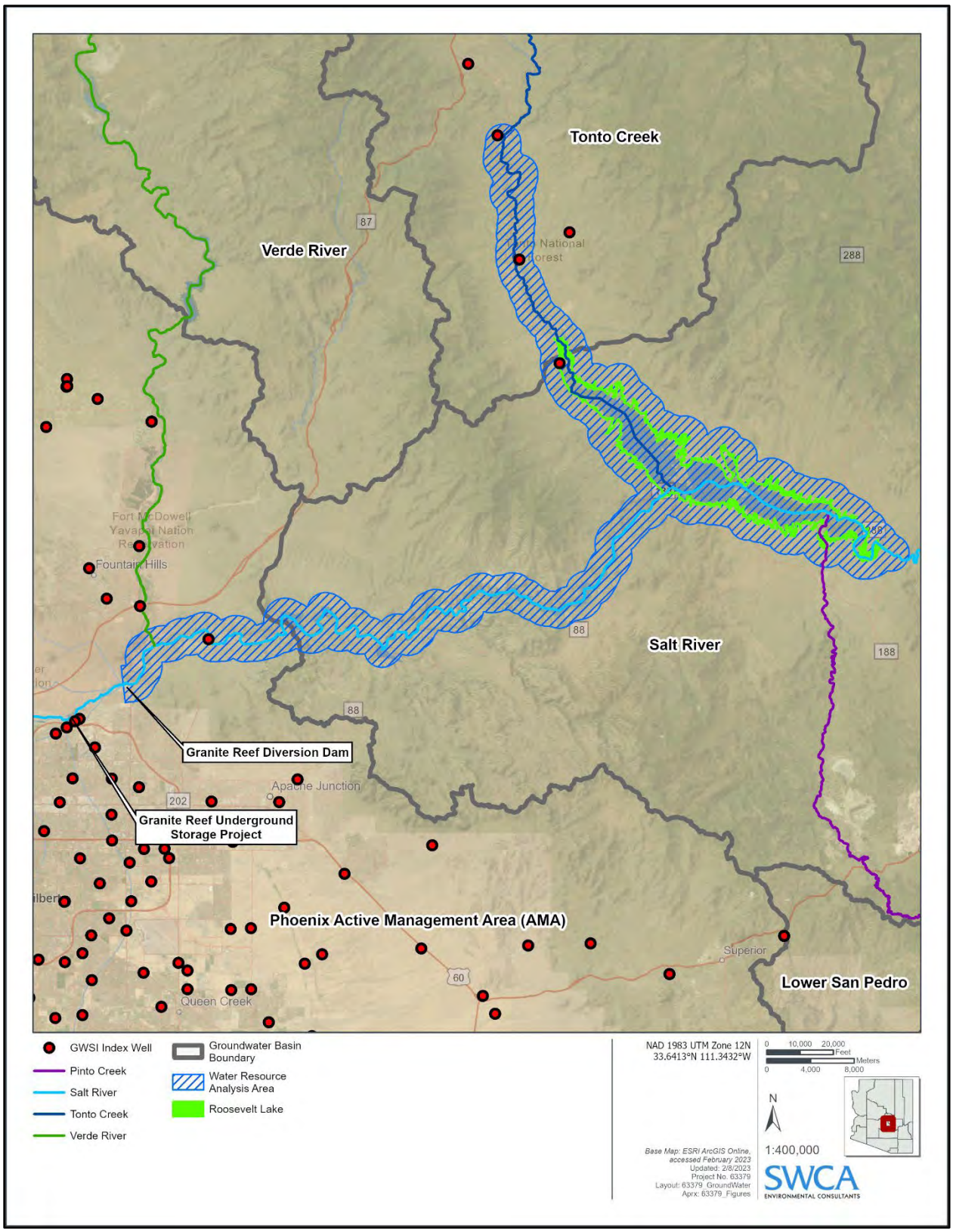

Figure 3-3. Groundwater basins and index wells in the water resources analysis area.

Along the Verde River, outside of the analysis area, are Horseshoe Dam and Reservoir, and Bartlett Dam and Lake. Also beyond the analysis area, the Granite Reef Underground Storage Project and the New River-Agua Fria River Underground Storage Project collect water from Salt and Verde Rivers, Central Arizona Project water, and reclaimed water via pipelines from Mesa, Glendale, and Peoria water reclamation facilities for storage in the underlying aquifer (SRP 2022a).

Theodore Roosevelt Dam was authorized by Reclamation in 1903 to address the limited water supply in the Salt River valley and is used to store water in times of high runoff for later use, reduce downstream flood hazard, and generate hydropower for central Arizona as water is released for downstream uses. Roosevelt Lake is the most upstream reservoir in the 60-mile series of reservoirs, and the only reservoir that has dedicated space for flood storage and attenuation. The ability to use the full capacity of Roosevelt Lake is essential to meeting the water demand in the SRP service area. During prolonged drought conditions, water supply from Roosevelt Lake and the other five lakes in the system decreases, and groundwater is pumped to supplement the water supply. However, groundwater use is being increasingly restricted by the Arizona Groundwater Management Act (Arizona Revised Statutes 45-401 *et seq*.) (Arizona Department of Water Resources [ADWR] 2022a).

SRP provides water from the Salt River Project system to a series of shareholder lands and entities that have water rights from the Salt and Verde Rivers, including the cities of Avondale, Chandler, Gilbert, Glendale, Mesa, Peoria, Phoenix, Scottsdale, Tempe, and Tolleson for delivery to shareholder lands. In addition to providing water to shareholder lands, SRP is obligated by contract to deliver water to cities, irrigation districts, Indian communities, and individual water users having water rights to the Salt and Verde rivers. The cities of Avondale, Chandler, Gilbert, Glendale, Mesa, Peoria, Phoenix, Scottsdale, Tempe, and Tolleson have rights to water stored, developed, and delivered by SRP. In addition, the cities of Chandler, Glendale, Mesa, Phoenix, Scottsdale, and Tempe, and the Salt River Pima-Maricopa Indian Community (SRPMIC) have rights to storage and delivery of water from Modified Roosevelt (Roosevelt Dam modifications were completed in 1996). Water also is delivered from the SRP reservoir system to the SRPMIC, Fort McDowell Yavapai Nation (formerly Fort McDowell Indian Community), Gila River Indian Community, Buckeye Irrigation Company, Roosevelt Water Conservation District, and others in satisfaction of their independent water rights. In addition, exchange agreements with SRP and the cities of Avondale, Chandler, Gilbert, Glendale, Mesa, Peoria, Phoenix, Scottsdale, Tempe, and Tolleson; Tonto National Forest; Reclamation; and other entities are facilitated by water stored in Modified Roosevelt. These entities have water storage, development, and/or delivery rights for irrigation, municipal, industrial, and other uses (FWS 2002a; SRP et al. 1993). The Salt River Project system also generates and supplies power to its customers in the power service area through a combination of hydroelectric, thermal, and nuclear resources.

Surface waters within the analysis area originate from precipitation, snowmelt, and groundwater seepage, with headwaters originating from the Mogollon Rim to the north and the White Mountains to the east. Surface water flows, in turn, are the primary source of groundwater recharge in the underlying groundwater basins in the analysis area. Precipitation in Arizona is largely disproportionate by region, with lower elevations receiving as little as 10 inches per year on average and higher elevations receiving as much as 25 inches per year on average. Precipitation and snowmelt runoff may not reach the lake during periods of low rainfall and slow snowmelt, but heavy rainfall and/or rapid snowmelt almost always results in downstream flooding (Corps 1997). Snow from the White Mountains and Mogollon Rim melts in spring and would be delivered into the Salt River if it were not impounded, stored, and redistributed for use by the SRP reservoir system. Roosevelt Dam was strategically constructed where Tonto Creek and Salt River converge to assist in balancing the needs of water supply and demand for the growing population downstream. This retimes the hydrograph and yields a water supply that is better aligned with the consumptive needs of downstream users far later into the water year.

3.6.1.2 Surface Water

3.6.1.2.1 HYDROLOGY

A variety of surface water features are present within the water resources analysis area, including rivers and streams (perennial, intermittent, and ephemeral); lakes/reservoirs and ponds; human-made canals, ditches, and pipelines; and wetlands. The USGS National Hydrography Dataset catalogs approximately 384 miles of linear surface water features (e.g., streams, rivers, canals, and pipelines) and 23,536 acres of waterbodies (i.e., lakes, ponds, reservoirs, swamps, and marshes) within the analysis area (USGS 2022a). The FWS National Wetlands Inventory identifies approximately 26,549 acres of surface water features within the analysis area, including approximately 4,614 acres of riverine features, 4,440 acres of freshwater wetlands, and 17,495 acres of lakes and ponds (FWS 2022b). Riparian and wetland vegetation areas are discussed further in Section 3.2.1 above.

Surface water features are hydrologically grouped into watersheds, which are grouped within basins and larger regions, as defined by the USGS. Per the USGS Watershed Boundary Dataset (USGS 2022b), the water resources analysis area is located in the Lower Colorado Region (Hydrologic Unit Code [HUC] 15) within the Salt Basin (HUC 150601) and a small downstream portion of the Verde Basin (HUC 150602) where it abuts the Salt Basin. Watersheds within the analysis area include the following (see Figure 3-2):

- *Gun Creek-Tonto Creek watershed (HUC 1506010504)*: Stormwater in this watershed flows toward Tonto Creek, which flows south-southeast until it discharges into Roosevelt Lake. This watershed is upstream of the Theodore Roosevelt Lake-Tonto Creek watershed.
- *Theodore Roosevelt Lake-Tonto Creek watershed (HUC 1506010505)*: Stormwater in this watershed flows toward Tonto Creek or it flows directly into Roosevelt Lake. Tonto Creek flows south-southeast until it discharges into Roosevelt Lake and joins the flows from Salt River.
- *Theodore Roosevelt Lake-Salt River watershed (HUC 1506010309)*: Stormwater in this watershed flows toward Salt River upstream (east) of Roosevelt Lake or it flows directly into Roosevelt Lake. Salt River flows west-northwest through the watershed until it discharges into Roosevelt Lake and joins the flows from Tonto Creek.
- *Salome Creek watershed (HUC 1506010308)*: Stormwater in this watershed flows toward Salome Creek, which flows generally south until it discharges into Roosevelt Lake.
- *Pinto Creek watershed (HUC 1506010307)*: Stormwater in this watershed flows toward Pinto Creek, which flows generally north until it discharges into Roosevelt Lake.
- *Apache Lake-Salt River watershed (HUC 1506010601)*: Stormwater in this watershed drains toward the Salt River and accepts flows in the Salt River released from Modified Roosevelt Dam. Salt River flows southwest toward the City of Phoenix-Salt River watershed and Gila River farther downstream.
- *City of Phoenix-Salt River watershed (HUC 1506010603)*: Stormwater in this watershed drains toward the Salt River, which flows generally southwest toward the Gila River.
- *Camp Creek-Verde River watershed (HUC 1506020307)*: Stormwater in this watershed flows toward Verde River, which flows generally south until it discharges into the Salt River (USGS 2022b).

The Salt River is the largest tributary to the Gila River, which flows generally southwest to the Colorado River near Yuma, Arizona, and drains nearly 13,700 square miles of central and eastern Arizona. The Salt River begins at the confluence of Black River and White River in the White Mountains on the Colorado Plateau. Its major tributaries upstream of Roosevelt Lake are Carrizo Creek, Cibecue Creek, Cherry Creek, Pinal Creek, and Tonto Creek. These creek systems all drain areas greater than 200 square miles

except Tonto Creek, which drains nearly 1,000 square miles and contributes 105,000 acre-feet annually to the reservoir. The greater Salt River Basin drains approximately 6,620 square miles, 5,830 square miles of which is located upstream of Modified Roosevelt Dam (FWS 2002a).

Waters in the Salt and Verde Rivers released through SRP's collection system come together at GRDD near northeast Mesa, Arizona. Here, water is diverted into a complex canal system and delivered to downstream users, primarily for agricultural and municipal purposes. Downstream of this point, the Salt River channel is generally dry and without surface water flow except during large flow events when floodwaters exceed SRP distribution capacity. The channel remains largely dry until its confluence with the Agua Fria and Gila Rivers near Avondale, Arizona, with the exception of Tempe Town Lake. Water is also present in the river channel downstream of GRDD during occasional flood events downstream of the dam (including contributions from tributaries and urban stormwater management facilities), wastewater treatment plant discharges, limited areas of groundwater seepage, and immediately following releases from GRDD.

3.6.1.2.2 QUALITY

The Tonto National Forest protects water quality and watershed and riparian area conditions, including for surface waters in the analysis area, through implementation of standards and guidelines as outlined in the Tonto National Forest Land Management Plan (USFS 2022). Water quality in the water resources analysis area varies. Much of the watershed upstream of Roosevelt Lake is undeveloped National Forest and Indian Reservation lands. However, surface water contamination is present in several upstream tributaries in the analysis area, including Tonto Creek and Pinto Creek, which are identified on the State's Section 303(d) list of impaired waters for mercury and other metals or low dissolved oxygen. Roosevelt Lake and other downstream reservoirs also have a 303(d) designation for mercury found in fish tissue (Arizona Department of Environmental Quality [ADEQ] 2023a, 2023b) (Table 3-10). No Outstanding Arizona Waters, which are afforded special protection, are present within the analysis area (ADEQ 2023a).

The Clean Water Act requires that a total maximum daily load (TMDL) be developed for waterbodies identified on the State's Section 303(d) list of impaired waters. The U.S. Environmental Protection Agency (EPA) completed a copper TMDL for Pinto Creek (from West Fork Pinto Creek to Roosevelt Lake) in 2001. The TMDL identifies a series of active and inactive mines as point sources; non-point sources were identified as natural background, aerial deposition, and other sources (i.e., activities that occur in the watershed that disturb natural vegetative cover and increase weathering and erosion) (ADEQ 2022a, Uhlman et al. 2008). The other impaired waters in the analysis area do not yet have TMDLs established, as indicated in their Category 5 designation (see Table 3-10).

Table 3-10. Section 303(d) List of Impaired Waters within the Water Resources Analysis Area

Waterbody ID	Waterbody Name	303(d) Listed*	Impairment (Date First Listed)	Size within the Analysis Area†	TMDL Priority
AZL15060103-1240	Roosevelt Lake	Category 5, Impaired	Mercury in Fish Tissue (2006/2008)	21,625.08 acres	Low
AZL15060106A-0250	Canyon Lake	Category 5, Impaired	Low Dissolved Oxygen (2004), Mercury in Fish Tissue (2018)	919.53 acres	Low
AZL15060106A-0070	Apache Lake	Category 5, Impaired	Low Dissolved Oxygen (2006/2008), Mercury in Fish Tissue (2016)	2,877.78 acres	Low
AZ15060105-004	Tonto Creek, from Upstream of Greenback Creek to Roosevelt Lake	Category 5, Impaired	Mercury in Fish Tissue (2010)	3.64 miles	Low

Waterbody ID	Waterbody Name	303(d) Listed*	Impairment (Date First Listed)	Size within the Analysis Area†	TMDL Priority
AZ15060105-006	Tonto Creek, from Gun Creek to North of Greenback Creek	Category 5, Impaired	Mercury in Fish Tissue (2010)	15.45 miles	Low
AZ15060103-004	Salt River, from Pinal Creek to Roosevelt Lake	Category 5, Impaired	Arsenic (2022), *Escherichia coli* (2010)	7.12 miles	Low (Arsenic), Medium (*E. coli*)
AZ15060103-018C	Pinto Creek, from West Fork Pinto Creek to Roosevelt Lake	Category 4A/5, Not attaining/ Impaired	Selenium (2004) (Category 5) and Copper (1998) (Category 4A)	3.17 miles	Low (Selenium), Complete (Copper)

Sources: ADEQ (2016, 2018, 2022a, 2022b, 2023a, 2023b).

Note: EPA = U.S. Environmental Protection Agency; TMDL = total maximum daily load

* Category 4A includes waterbodies with TMDLs completed for specific pollutants. Category 5 waterbodies are still in need of a TMDL analysis, which will be completed according to the priority list (ADEQ 2022b).

†ADEQ data on waterbody size may differ from National Hydrography Dataset and National Wetlands Inventory data.

3.6.1.3 Groundwater

The ADWR Water Atlas (ADWR 2009) provides substantial data on groundwater resources across Arizona. The Water Atlas divides the state into seven "planning areas" based on groundwater basins and active management areas. The water resources analysis area for this resource falls within the Central Highlands Planning Area and the Phoenix Active Management Area (AMA) Planning Area, and overlies the Salt River, Tonto Creek, and Phoenix AMA groundwater basins (ADWR 2009, 2010) (see Figure 3-3). These groundwater basins lie below and are directly recharged by the surface waters within the analysis area. Groundwater impacts are not anticipated outside of these three groundwater basins and would be generally localized around Roosevelt Lake and Salt River between Modified Roosevelt and GRDD. Table 3-11 summarizes the estimated storage capacity, major aquifers, recharge rates, water levels, well yields, and groundwater quality in each of the basins (ADWR 2009).

Groundwater quantities in a given aquifer fluctuate with changes in pumping activities, natural and human-led recharge, and precipitation. Recharge occurs when water infiltrates the soils at the surface, moves through the unsaturated zone, and enters the groundwater aquifer. Natural recharge is affected by precipitation, geology, vegetation, and land development (e.g., increases in impermeable areas) and can vary widely even within the same region. Human-led recharge may occur from agricultural and urban irrigation, canal delivery losses, artificial lakes, and various recharge programs and is subject to legal, institutional, and practical constraints as described in Section 3.6.6.3 of the 2002 RCHP EIS (FWS 2002a:96–97). Climate change is also anticipated to have an effect on water resources in the arid West, though the Salt River Basin has been shown to be relatively resilient to changes in annual streamflow as a result of climate change. Snow loss in the basin is offset by winter precipitation inputs to streamflow (Robles et al. 2021).

Groundwater in the Salt River Basin is limited due to low storage capabilities and high runoff rates caused by prevalence of bedrock and steep gradients (ADWR 2016). Most of the groundwater pumping in the Salt River groundwater basin is intended for low-yield domestic and livestock wells, except for pumping in the Globe-Miami-Claypool area for municipal, industrial, and mining purposes. Groundwater is the primary supply for domestic and industrial uses for this small metropolitan area in east-central Arizona. Groundwater levels in the basin range from 8 feet below ground surface (bgs) to 82 feet bgs (ADWR 2009). Groundwater levels downstream of the Salt and Verde River confluence have shown a long-term decline due to pumping rates that exceed recharge rates. Groundwater movement in the Salt River valley has shifted over time from the Salt and Gila Rivers toward five cones of depression associated with groundwater pumping stations for agricultural and municipal use (FWS 2002a).

Groundwater pumping activities are limited within the Tonto Creek basin, as over 97% of this land falls within Tonto National Forest jurisdiction. Any pumping that does occur is limited to low-yield domestic and livestock watering wells. Groundwater generally flows from north to south in this basin, with depths to water ranging from approximately 14 feet bgs near Punkin Center to over 100 feet bgs in other areas in the basin (ADWR 2009).

Groundwater in the Phoenix AMA is primarily used to meet municipal and agricultural needs. Groundwater levels range from 10 feet in the vicinity of Superior to 866 feet in the vicinity of Cave Creek. Pumping has altered groundwater flow and has caused cones of depression in various areas throughout the AMA, including Scottsdale, Mesa, Queen Creek, Tonopah Desert, Centennial Wash, Luke Air Force Base, and Deer Valley (ADWR 2010).

Table 3-11. Potential Sources of Groundwater in the Analysis Area

ADWR Groundwater Basin	Acreage in the Analysis Area	Estimated Storage (acre-feet)	Major Aquifers	Description
Salt River	102,235 (74% of the analysis area)	>8,700,000 (to 1,200 feet)	Recent Stream Alluvium Volcanic Rock: Pinetop-Lakeside Aquifer Sedimentary Rock: Gila Conglomerate and C and R Aquifers	Geology consists of consolidated crystalline and sedimentary rocks. The natural recharge estimate is 178,000 acre-feet/year. Groundwater levels range from 8 feet bgs to 82 feet bgs, both measurements north of the Miami-Globe area. Well yields are recorded between less than 100 gallons per minute (gal/min) to greater than 2,000 gal/min, with a median yield of approximately 170 gal/min. Groundwater in the Salt River Basin is limited due to low storage capabilities and high runoff rates caused by the prevalence of bedrock and steep gradients. Wells in the analysis area have equaled or exceeded drinking water standards for cadmium, fluoride, beryllium, copper, lead, chromium, total dissolved solids, arsenic, nitrate, and radionuclides. The exceedances in the wells closest to Roosevelt Lake included arsenic and radionuclides.
Tonto Creek	19,890 (14% of the analysis area)	2,000,000 to 9,400,000 (to 1,200 feet)	Basin fill Sedimentary Rock: (C and R Aquifers)	Geology consists of consolidated crystalline and sedimentary rocks. The natural recharge estimates range from 17,000 acre-feet/year to 37,000 acre-feet/year. Groundwater levels range from 14 feet bgs near Punkin Center to 106 feet bgs east of Kohls Ranch. Well yields are recorded between less than 100 gal/min to greater than 2,000 gal/min (near State Route 188 north of Punkin Center), with a median yield of approximately 120 gal/min. Wells in the analysis area have equaled or exceeded drinking water standards for arsenic, nitrate, beryllium, radionuclides, and organic compounds.

ADWR Groundwater Basin	Acreage in the Analysis Area	Estimated Storage (acre-feet)	Major Aquifers	Description
Phoenix AMA	15,872 (12% of the analysis area)	Total permitted storage capacity for underground storage facilities is 962,000 acre-feet/year. Total permitted storage capacity for groundwater savings facilities is 517,520 acre-feet/year.	Recent Stream Alluvium Basin fill Basin Fill (Carefree Formation) Basin Fill with interbedded basalt Sedimentary rock (conglomerate)	Geology consists of recent stream alluvium, basin fill, and sedimentary rocks. The natural recharge is estimated at 24,100 acre-feet/year. Groundwater levels range from 10 feet bgs in the vicinity of Superior to 866 feet bgs in the vicinity of Cave Creek. Well yields are recorded between less than 1 gal/min to greater than 6,944 gal/min, with a median yield of approximately 1,280 gal/min. Wells in the analysis area have equaled or exceeded drinking water standards for nitrate, fluoride, arsenic, manganese, organics, cadmium, lead, radionuclides, selenium, beryllium, chromium, total dissolved solids, mercury, and barium.

Sources: ADWR (2009, 2010, 2016)

A search of the ADWR's online database of Groundwater Site Inventory wells (i.e., field-verified by ADWR) showed that there are numerous groundwater wells mapped within the analysis area, primarily along Tonto Creek. Four of the wells are identified as index wells, which have a more robust data set since they are typically checked annually by ADWR to monitor specific hydrologic factors such as water levels across the state. The recorded groundwater level in the index wells is generally deeper (i.e., groundwater is further from the ground surface) with distance from Roosevelt Lake. A review of hydrographs for the four index wells indicates that trends in water levels over time vary by location. The groundwater depths at the three index wells along Tonto Creek (well registry IDs 55-601025, 55-560965, and 55-600998) vary year to year and do not show a clear rise or fall over time. The index well along Salt River downstream of Saguaro Lake (well registry ID 55-600880) shows a general increase in the groundwater depth over time (ADWR 2022b) (Table 3-12).

Table 3-12. Groundwater Site Inventory Index Wells in the Analysis Area

Well Registry ID	Maximum Depth to Water (Date Measured)	Minimum Depth to Water (Date Measured)	Most Recent Depth to Water (Date Measured)	Location Description
55-601025	84.60 feet bgs (March 2017)	61.30 feet bgs (March 2010)	64.80 feet bgs (April 2020)	33° 58' 11.5", 111° 19' 24.3" West of Tonto Creek and State Route 188, north of East del Chi Drive, along the Tonto Creek arm
55-560965	18.23 feet bgs (October 2002)	10.85 feet bgs (April 1978)	13.40 feet bgs (October 2022)	33° 52' 2.2", 111° 18' 5.4" East of Tonto Creek, south of Greenback Valley Road, along the Tonto Creek arm near Punkin Center
55-600998	15.3 feet bgs (October 2015)	3.2 feet bgs (October 2010)	10.03 feet bgs (October 2022)	33° 46' 54.1", 111° 15' 40.4" West of Tonto Creek, east of State Route 188, south of A-Cross Road, upstream of Roosevelt Lake along the Tonto Creek arm
55-600880	63.8 feet bgs (November 2014)	51.6 feet bgs (June 1988)	62.10 feet bgs (December 2022)	33° 33' 10", 111° 36' 24.6" South of Salt River, north of Bush Highway, east of Usery Pass Road, downstream of Saguaro Lake

Source: ADWR (2022c)

The use of septic systems is common in the residential communities within the analysis area, including Roosevelt Lake Gardens East and Roosevelt Lake Estate communities. A study by Leonard Rice Engineers, Inc. (2008), noted that the typical septic tank depth is 4 feet bgs, and ADEQ regulations

(Arizona Administrative Code Title 18, Chapter 9, Section A312) dictate 5 to 10 feet of separation between the bottom of the disposal works system (e.g., the septic tank) and the seasonal high-water table, depending on soil absorption rate and the type of septic tank treatment. Therefore, the minimum depth to groundwater at septic tank locations per the ADEQ regulations is 9 to 14 feet bgs. The 2008 study included an additional safety factor of 6 feet, for a total minimum depth to water in the vicinity of septic tanks of 15 to 20 feet bgs (SRP 2021a).

In 2021, SRP evaluated groundwater levels within wells in the vicinity of the Roosevelt Lake Gardens East and Roosevelt Lake Estate communities. Groundwater levels measured between 1970 and 2019 at the Roosevelt Lake Gardens East community ranged from 26 to 44 feet bgs; no recent water level measurements were available for the Roosevelt Lake Estate community. The corresponding water elevation for these wells during that time period ranged from approximately 2,146 feet to 2,178 feet amsl, with land surface elevations of 2,190 feet to 2,204 feet amsl (SRP 2021b). The groundwater levels measured over the 49-year time period in the vicinity of the communities were deeper than 20 feet bgs and so have historically been deeper than the minimum required depth in the vicinity of the septic tanks.

3.6.1.4 Floodplains

Approximately 5,416 acres within the water resources analysis area are designated by the Federal Emergency Management Agency (FEMA) as 1% annual chance flood (i.e., 100-year floodplain), including areas designated as Zones A, AE, and AO. The remaining areas in the analysis area are either designated as Zone D (undetermined flood hazard) or Zone X (areas with 0.2% annual change flood hazard [i.e., 500-year floodplain]). The 100-year floodplain areas are primarily along Salt River, Tonto Creek, and Roosevelt Lake (FEMA 2022).

3.6.1.5 Flood Control at Modified Roosevelt

Modified Roosevelt Dam is the only dam within the SRP reservoir system with allocated FCS. The modifications to Roosevelt Dam added FCS to aid in the reduction of downstream flooding, and flood surcharge space (Safety of Dams) to protect the dam from overtopping. Reclamation and the Corps co-developed the WCM, which includes a water control plan that identifies how and when releases will be made from Modified Roosevelt Dam during flood conditions. The main goal of the WCM is to minimize downstream flood damage along the Salt and Gila Rivers—including the Salt River reservoir system, the metropolitan Phoenix area, and other downstream communities—while providing operational flexibility to maximize incidental power generation (Corps 1997). This is accomplished by minimizing peak discharge at the Salt/Verde River confluence during major hydrologic events through controlled releases at Modified Roosevelt Dam. The WCM also outlines the maximization of hydropower production during flood release operations. The power plant at Roosevelt Dam is one of eight plants on the Salt River and has a design discharge of 2,400 cfs. Power production is generated through lower-magnitude releases leading up to flooding events and during long-duration, low-peak magnitude inflows. The WCM is also designed to prevent the likelihood of overtopping of the dam during large-magnitude floods up to the probable maximum flood (Corps 1997).

Roosevelt Dam originally provided approximately 1.3 million acre-feet of storage capacity, which increased and decreased over time with spillway modifications and silt accumulation (FWS 2002a). Modified Roosevelt Dam increased total capacity for Roosevelt Lake to approximately 3.4 million acre-feet, including 557,000 acre-feet exclusively for the FCS (Reclamation 1996). The total capacity of the lake remains at 3.4 million acre-feet, but sedimentation over time has adjusted capacities for the various spaces to include 17,026 acre-feet in the dead storage, 1.6 million acre-feet in the CS, 556,206 acre-feet in the FCS, and an additional 1.2 million acre-feet for flood surcharge (Safety of Dams) (see Figure A-1) (Ferrari 2014; SRP 2022a). The FCS (elevation range between 2,151 and 2,175 feet amsl) release

operations under the WCM are outlined in Table A-2 in Appendix A. As water surface elevations increase above the FCS, the rate of discharge increases to ensure outflows exceed inflows.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

The Proposed Action involves a planned deviation from the WCM that would affect the operation of the FCS as described in Section 2.1.2. The Proposed Action would also add FCS operations as a covered activity in the RHCP addendum/ITP amendment, expand the permit area to include the FCS and a 14.1-mile segment of lower Tonto Creek, authorize incidental take of the newly listed gartersnake in the permit area, and address impacts to all protected species and their critical habitat. These aspects of the Proposed Action are not expected to impact water resources. Therefore, the discussion in the following sections focuses on potential impacts from the operation of the FCS with the planned deviation.

3.6.2.1.1 CONSERVATION SPACE OPERATIONS

Under the Proposed Action, SRP would continue current CS operations. The water resources impacts from SRP's continued CS operations under the Proposed Action are similar to those described in Section 4.2.2.2 of the 2002 RCHP EIS (Full Operation Alternative) (FWS 2002a:121) and are incorporated here by reference.

3.6.2.1.2 FLOOD CONTROL SPACE OPERATIONS

Water resource impacts of normal FCS operations are as described in the 1996 EA for the WCM and are incorporated here by reference.

3.6.2.1.3 PLANNED DEVIATION

The planned deviation under the Proposed Action would allow for increased operational flexibility within the FCS as described in Section 2.1.2. The use of the PDS would provide up to an estimated 108,620 acre-feet of additional spill water for beneficial uses,[5] with use of that extra water likely within the same calendar year (see Appendix E, Figure E-2).

Surface Water

Water Supply

During periods of high precipitation and/or rapid snowmelt upstream of the lake, the planned deviation would allow more water to be captured in the lake and less water to be released downstream of Modified Roosevelt (compared with current operations) for up to an additional 100 days in up to 3 out of 5 years. During periods when the PDS is used, the surface area of the lake would increase by up to 799 acres (an increase of approximately 3.7%, from 21,810 acres at the top of the CS to 22,609 acres at the top of the PDS), and the lake could temporarily hold up to 108,620 acre-feet of additional water (an increase of approximately 6.7%) for up to 120 days.

SRP's operations at GRDD would not change as a result of the Proposed Action. Typically, Salt River is largely dry downstream of GRDD until its confluence with the Agua Fria and Gila Rivers, except for Tempe Town Lake, occasional flood events downstream of the dam (including contributions from

[5] "Beneficial use" includes but is not limited to use for domestic, municipal, recreation, wildlife (including fish), agricultural, mining, stock watering, and power purposes (Arizona Revised Statutes 45-181).

tributaries and urban stormwater management facilities), wastewater treatment plant discharges, limited areas of groundwater seepage, and immediately after storm events or upstream flood events that require spill releases from GRDD. SRP diverts waters within the Salt River Federal Project GRDD for distribution throughout the existing SRP canal system to fulfill the downstream users' water rights in the Phoenix metropolitan area. GRDD is the diversion point for all deliveries to the Salt River Project water distribution system. Under current operations, SRP endeavors to avoid spilling floodwaters over GRDD[6] in order to minimize losses of water supplies from the Salt River Project system. An objective of the previous dam modifications and operation schedule in the WCM was to limit the releases at GRDD to a maximum of 180,000 cfs. However, the quantity of spilled water is dependent on the control of floodwaters upstream of the Salt River and the Verde River. The goal of minimizing the spill of water over GRDD would persist under the proposed planned deviation. The ability to hold additional floodwater from the Salt River within Modified Roosevelt would allow SRP to further reduce spills over GRDD, which would be consistent with that goal.

The Reservoir Planning Model was used to model the anticipated spills over GRDD under the current conditions versus the planned deviation under the Proposed Action (Table 3-13). The Reservoir Planning Model showed that the planned deviation under an average spill year would result in a decrease in the number of days with spills over GRDD, a decrease in total acre-feet of water spilled over GRDD, but an increase in the average daily rate of release. The decrease in average duration of spills over GRDD is due to the ability to release spill water deliveries more slowly from Modified Roosevelt, which reduces the volumes of released water that reach GRDD at any given time, reducing the likelihood of a spill over GRDD. However, the average daily flow rate would increase under the proposed planned deviation since even small storm events that occur while the Roosevelt FCS is at the maximum allowable level (2,156 feet) may necessitate shorter-duration but higher spill rates. Spill events that would occur under the planned deviation would (on average) occur in a shorter duration of time, with a lower volume of water, but at a higher daily rate. The spills over GRDD under the planned deviation would vary from current operations, but the changes in releases (i.e., duration, magnitude, and daily flow rate) would be within the historic range of observed variability (SRP 2022a).

Table 3-13. Summary of Modeled GRDD Releases

Operational Condition at GRDD	Average Spill Duration (days)	Average Spill Volume (acre-feet)	Average Daily Flow Rate (cfs)
Current Operations	11	144,281	3,017
Planned Deviation	10	129,467	3,283
Percent Difference	**−11%**	**−10%**	**9%**

Source: Adapted from SRP (2022d)

The planned deviation would allow for more control of release of floodwaters downstream of Modified Roosevelt. Water held in the FCS would not decrease availability of scheduled deliveries to water users in the Salt River Project system. Increased operational flexibility within the FCS would allow for more controlled flow releases and increased beneficial use of floodwaters following high precipitation and/or rapid snowmelt events. The more controlled releases reduce the frequency of flow events that exceed GRDD's capacity and lead to spills. Fewer spills over GRDD means more water is available to SRP water users, particularly spill water users, in the Phoenix metropolitan area. These additional floodwaters in the system would be available for direct use (distribution to downstream water users) or future use

[6] Smaller, unregulated flows from the Verde River and other smaller washes can contribute to stream flows in the Salt River upstream of GRDD, which may lead to minor spill releases at GRDD even in the absence of releases from the Stewart Mountain Dam (upstream of GRDD on Salt River) or Bartlett Dam (on the Verde River upstream of the confluence with Salt River). These smaller contributions would not change under the planned deviation and are not considered in this analysis.

(contributing to recharge of groundwater for recovery during times of drought and surface water shortage).

The reduced frequency of spills over GRDD and increased use of floodwaters for SRP users is beneficial in terms of flood control and supply for water users. Less spill water would be available to the dry areas within Salt River downstream of GRDD, but the differences in spills over GRDD are small (11% or less difference) and are limited within the historic range of observed variability. The reduction in number of spill days and total quantity of water spilled, and the increase in the daily flow release rate that are anticipated to occur under the planned deviation, are all within the existing range of metrics for spills observed in the historic record. Therefore, the current ranges for timing and magnitude of releases, channel metrics, and water quality within and downstream of Modified Roosevelt are not anticipated to change (SRP 2022a).

Evaporation rates in the lake would increase slightly due to the larger surface area of the lake during use of the PDS, especially during the hot summer months. However, the more controlled releases would slightly reduce water loss downstream of Modified Roosevelt from percolation (as it flows over the typically dry river channel) and evapotranspiration (as plants along the dry reaches of the river channel use it), and this would likely offset the water loss from the increased lake evaporation rates.

Overall, the Proposed Action would have moderate beneficial impacts to water supply to Salt River Project system water users, and negligible impacts to surface water availability downstream of GRDD.

Wetlands and Waters of the United States

Waters of the United States, including potential wetland areas, are present within the analysis area and would be affected by the planned deviation through the rising of water levels in the lake and contributing streams upstream of Modified Roosevelt near their discharge points into the lake. However, no Clean Water Act Section 404 permitting would be required as the Proposed Action would not cause a discharge of dredge or fill material within wetlands or other waters of the United States. No reservoir facilities would be modified under this alternative.

The surface area and volume of Roosevelt Lake would increase following large storm and rapid snowmelt events within the PDS. Rising lake levels would submerge up to 44 acres of wetland vegetation along the shoreline (Table 3-14), which would be submerged for up to 120 days instead of up to 20 days. However, the shallow submerged areas may support new obligate wetland vegetation. The perimeter of the shoreline would temporarily increase from approximately 777,058 feet to 902,009 feet (a 16% increase) when the PDS is full. The increased shoreline would provide additional areas for riparian and wetland vegetation to establish. Impacts to wetlands and waters of the U.S. would be beneficial, minor to moderate but temporary and short-term during and following periods of high lake elevation.

Table 3-14. Wetland Areas within the PDS

Wetland Type (Source)	In Horizontal Extent of PDS (acres)	In Horizontal Extent of FCS (acres)
Swamp/Marsh (National Hydrography Dataset)	0	0
Freshwater Emergent Wetland (National Wetlands Inventory)	2	4
Freshwater Forested/Shrub Wetland (National Wetlands Inventory)	42	85

Sources: FWS (2022b); USGS (2022a)

Water Quality

Under the Proposed Action, as a result of the planned deviation, there would be more control over the release of floodwaters downstream of Modified Roosevelt. The Reservoir Planning Model showed that under the planned deviation, spills would (on average) occur for a shorter duration of time, with a lower volume of water, but at a higher daily rate. The lower volumes from Modified Roosevelt may decrease sediment transport downstream through the Salt River but the higher daily rate of flows may increase turbidity levels. However, the spills under both the current operations and the planned deviation are within the historic range of observed variability of flow rates on the Salt River downstream of Stewart Mountain Dam (SRP 2022a).

Releases from the Salt River at Stewart Mountain Dam and from the Verde River at Bartlett Dam, as well as flows from local unregulated sources (e.g., Sycamore Creek between Bartlett Dam and Salt/Verde confluence), contribute to spill waters at GRDD. Turbidity observed in the Salt and Verde Rivers below Stewart Mountain and Bartlett Dams is typically higher under spill conditions as compared to non-spill conditions since there is less time for suspended solids to settle out upstream of GRDD or the reservoirs. However, since spills under the proposed planned deviation are within the historic range of observed variability of spills, levels of turbidity at GRDD would also be expected to be within the historic range. The flows from Sycamore Creek and other unregulated sources upstream of GRDD can be flashy (i.e., rapid increases in flow during or immediately following precipitation events) and can interact with fire-damaged soils, which leads to higher turbidity levels measured near GRDD. The sediments and other water quality constituents from Sycamore Creek are often the primary source of impacts to water quality at GRDD, but the planned deviation would not affect flows from Sycamore Creek or other unregulated sources (SRP 2022a). It is unlikely that the planned deviation would cause an exceedance of water quality standards upstream or downstream of GRDD.

Raising the water level in Roosevelt Lake (impaired for mercury in fish tissue) would temporarily dilute contaminants in the water and improve water quality in the lake. Conversely, the reduced releases downstream of Modified Roosevelt would result in a temporary concentration of contaminants in surface waters in downstream impaired lakes (i.e., Canyon Lake and Apache Lake) (see Table 3-10).
The decrease in spill quantity over Modified Roosevelt would reduce the potential for erosion and sedimentation downstream, but this would be offset by the increase in the daily rate of release that would increase the risk of erosion and sedimentation downstream. The lower-magnitude flows may benefit water quality by decreasing the suspended sediment load but may also potentially decrease water quality, as the flows would be more concentrated and warmer with lower levels of water. These impacts would be negligible since the changes would be within the historic range of observed variability under current operations.

Changes in Roosevelt Lake's water temperature may occur. The lake would be up to 5 feet deeper and 3,596 acres larger during use of the FCS. The increased depth and surface area would allow for cooler temperatures at the lake bottom and increased temperatures at the surface in any shallow areas along the shoreline. However, given the 120-day duration and the steep slopes of the lake shore, these effects on temperature would be negligible.

Groundwater

The longer use of the FCS made possible by the planned deviation would allow for a longer period of time for groundwater recharge in the vicinity of the reservoir. Allowing the lake level to stay above 2,151 feet amsl for a longer period of time would temporarily decrease the depth to groundwater (i.e., raise the groundwater level). If the lake level elevation increased to 2,156 feet amsl, the groundwater level in the immediate vicinity of the lake—including the nearby communities of Roosevelt Lake Gardens East and Roosevelt Lake Estate—could rise up to 2,156 feet amsl in response to the reservoir rise.

Impacts to groundwater levels would be moderate but temporary and short-term during periods of high lake elevation.

As discussed in Section 3.6.1.3, safety factors related to soil absorption and septic tanks dictate that the minimum depth to water in the vicinity of septic tanks should be 15 to 20 feet bgs (SRP 2021a). The groundwater level at 2,156 feet amsl would be below the 20-foot elevation safety buffer in the vicinity of these communities. Therefore, impacts to local groundwater wells and septic systems (such as intrusion of groundwater into septic systems, causing leaching of contaminants) is not anticipated.

Flood Control

Reclamation's Dam Safety Advisory Team identified a risk-neutral finding for the proposed planned deviation at Modified Roosevelt and to downstream communities—a critical finding in support of safely managing flood events.

As noted above, increased operational flexibility within the FCS made possible by the planned deviation would allow for more controlled flow releases from Modified Roosevelt following high precipitation and/or rapid snowmelt events. There would be greater flexibility in holding back water in response to downstream flooding (e.g., in the Verde River). Although the Salt River Project system has the ability to release excess floodwaters through—and downstream of—the reservoir system to prevent local flooding, the controlled releases allowed under the planned deviation would reduce the risk of emergency spills that can cause greater levels of erosion and sediment downstream.

Impacts to flood control would be beneficial, short- and long-term, temporary, and moderate.

3.6.2.1.4 CONSERVATION ACTIONS

No effects on water resources are anticipated from implementation of the Gartersnake Conservation Program.

3.6.2.1.5 CONCLUSION

In summary, compared to the current Modified Roosevelt operations, the Proposed Action would result in moderate beneficial impacts to water supply and flood control due to the additional control of floodwater releases from Modified Roosevelt. The Proposed Action would have temporary and short-term, minor to moderate beneficial impacts to wetlands and waters of the United States during and following periods of high lake elevation, as well as moderate but temporary and short-term impacts to groundwater levels from the temporary increases in lake levels. Impacts to surface water availability downstream of GRDD and to water quality would be negligible.

3.6.2.2 No Planned Deviation

Under this alternative, impacts would be similar to those described under the Proposed Action Alternative, except that the impacts of the planned deviation would not occur. The water resources impacts of SRP's continued CS operations are similar to those described in Section 4.2.2.2 of the 2002 RCHP EIS (Full Operation Alternative) (FWS 2002a:121). The water resource impacts of normal FCS operations are the same as those described in the 1996 EA for the WCM. No additional impacts to surface waters or groundwater in the analysis area would occur beyond the cumulative impacts from existing and future trends and actions identified in Appendix F.

3.6.2.3 No Action Alternative

3.6.2.3.1 CONSERVATION SPACE OPERATIONS

Under the No Action Alternative, SRP would hold lake levels at or below the elevation as of June 2023 (i.e., when SRP's Section 10(a)(1)(A) Recovery Permit for the Northern Mexican Gartersnake expires) to prevent take of gartersnake. Impacts to surface and groundwater resources—including water supply, wetlands, quality, groundwater, and flood control—due to CS operations would be similar to those described in Section 4.2.2.1 of the 2002 RHCP EIS (No Permit Alternative) (FWS 2002a:117–120). However, holding Roosevelt Lake managing reservoir levels in the CS to avoid inundation of existing gartersnake habitat under the No Action Alternative may result in changes to spill water availability, water deliveries, and water storage capacity. Conservation storage at Modified Roosevelt might be reduced if SRP is unable to store new inflow in excess of delivery. Storage credits may be lost or unable to accrue. Reduced storage might impact planning (such as groundwater pumping and overall system operations). Virtual spill[7] could become physical spill from the Salt River system resulting in additional amounts of spill, which might not otherwise occur, as well as the loss of storage credits and/or the loss of SRP shareholder vested water rights (SRP 2023a). These moderate adverse impacts to water users would be temporary and may be subject to additional operational and environmental analyses due to future ESA compliance actions.

The lower lake levels may also impact water quality. Contaminants would be more concentrated at lower lake levels, and the presence of algal blooms may increase. The impacts to water quality may be negligible to moderate depending on the drop in lake level and duration of the lower level, but impacts would be temporary until SRP and the FWS develop and implement a long-term ESA compliance solution that allows for lake levels to rise.

3.6.2.3.2 FLOOD CONTROL SPACE OPERATIONS

Under the No Action Alternative, because SRP would manage reservoir levels in the CS to avoid inundation of existing gartersnake habitat, water would not be anticipated to enter the FCS, but would flow through Modified Roosevelt and be released downstream. Consistent with the WCM, due to physical constraints of the reservoir system and to protect the health and safety of the public, SRP must limit spills over GRDD to no more than 180,000 cfs. In the event of rare, large storm events, this health and safety limitation could cause a rise in Roosevelt Lake if short-term storage is necessary to keep the spill over GRDD at or below 180,000 cfs. But as soon as feasible, SRP would return Roosevelt Lake to the elevation before the rise occurred. Spill releases during the 1- to 3-year time frame could cause more frequent adverse impacts to other downstream users and the public, such as temporary traffic impacts at low-water crossings in the Salt River. Although the frequency of potential downstream impacts might slightly (and temporarily) increase, as noted below, the magnitude and duration of spill and associated impacts would remain within the long-term variability of the system.

Under the No Action Alternative, the circumstances and characteristics of spills may differ from current operations but the absolute timing, frequency, volume, and rate of spill under the No Action Alternative

[7] This occurs when no physical spill is occurring over GRDD, but Roosevelt Lake is increasing within the New Conservation Space (NCS) zone of eligibility and "NCS credits" are being accrued. For instance, if Verde River spill is not occurring and Verde inflows decrease below demand, release from the Verde system will match inflows to maximize and maintain storage on the Verde River (but not spill water) while the remaining deliveries to meet demand will occur from the Salt River. If inflows are exceeding the release from the Salt River, and Roosevelt Lake is increasing within NCS (but not physically spilling from FCS), then virtual spill is declared. In this instance, water that would have been physically spilling from GRDD prior to the 1996 modification of Roosevelt Dam is instead being stored in the NCS. SRP shareholders have rights to use this "virtual" spill water. During virtual spill events, only SRP shareholders are eligible to receive the excess free water, which is delivered through SRP's canal system.

would remain within the overall range of variability observed in the past and estimated by the Reservoir Planning Model (SRP 2023a). Therefore, impacts under the No Action Alternative would be negligible.

3.6.2.3.3 PLANNED DEVIATION

Under this alternative, there would be no planned deviation and therefore no changes to surface water or groundwater resources. Impacts to water resources would be as described for normal FCS operations.

3.6.2.3.4 CONSERVATION ACTIONS

While the Gartersnake Conservation Program would not be implemented under this alternative, nonnative fish suppression efforts would be conducted. These actions are not anticipated to impact water resources.

3.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The socioeconomic and environmental justice analysis area for Modified Roosevelt includes the permit area, the Phoenix metropolitan area, three Indian reservations (Fort McDowell Yavapai Nation, Salt River Pima-Maricopa Indian Community, and Gila River Indian Community), and the agricultural region of Maricopa County located along the Gila and Salt Rivers. These areas contain about 60% of Arizona's total population (U.S. Census Bureau 2021).

3.7.1 Affected Environment

Maricopa County is the most populous county in Arizona and the nation's fourth largest county in terms of population. It is also the nation's fastest growing county, with more than 81,000 people added between July 2017 and 2018 (Maricopa County 2022). Table 3-15 shows the population breakdown for the analysis area. Populations for the reservations within the analysis area per the 2015–2019 American Community Survey population estimates are 1,053 residents for the Fort McDowell Yavapai Nation, 7,729 residents for the Salt River Pima-Maricopa Indian Community, and 10,879 residents for the Gila River Indian Community (U.S. Census Bureau 2019).

Table 3-15. Current Population Estimates

Area	Total Population	Percentage of State Population
Gila County*	53,597	1%
Maricopa County*	3,817,117	60%
Fort McDowell Yavapai Nation†	1,053	<1%
Salt River Pima-Maricopa Indian Community†	7,729	<1%
Gila River Indian Community†	10,879	<1%
Arizona*	6,392,017	

* Estimates are from 2020 (U.S. Census Bureau 2021).

† Estimates are from 2019 (U.S. Census Bureau 2019).

The top three employment sectors in Maricopa and Gila Counties are healthcare and social assistance, retail trade, and government. Agriculture makes up 0.2% of employment in Maricopa County and 0.9% in Gila County. Unemployment in Maricopa and Gila Counties for 2020 was 7.4% and 7.7%, respectively, compared with 7.9% for the State (Headwaters Economics 2022a, 2022b).

3.7.1.1 Water Use and Hydropower Generation

Since completion in 1911, Roosevelt Dam has continuously provided water for irrigation, municipal and industrial uses, and hydroelectric power generation. In 1996, the Roosevelt Dam modification was completed, which raised the height of the dam to 357 feet and expanded the lake storage capacity by 20%—enough to accommodate water supply for 1 million more people. The expansion provided 304,729 new acre-feet of water storage and provided substantial amounts of flood control and safety of dam storage space (SRP 2022a). Raising Roosevelt Dam increased capacity to over 1.5 million acre-feet, which includes a large amount of space for flood storage (ADWR 2020). Additional information regarding water supply in the Salt River Federal Reclamation Project and associated water users is provided in Section 3.6.1.1.

SRP delivers an average of 823,895 million acre-feet of water each year (SRP 2022b) and provides water and power to more than 2 million people in central Arizona. The SRP service area is 375 square miles for water, 13,000 square miles for the watershed, and 2,900 square miles for power. Water deliveries for Fiscal Year 2021 were 484,631 acre-feet and water in storage capacity was at 79% (SRP 2022c). SRP has approximately 280 wells in its water service area, two underground storage facilities, and one groundwater savings facility (SRP 2022d). While SRP provides water for agricultural use, much of the land within SRP's service boundary is highly urbanized and includes development in central Phoenix, south Scottsdale, Tempe, and Mesa (ADWR 2020).

The analysis area is partially within the Phoenix AMA, which has a statutory management goal of safe- yield by the year 2025. Safe-yield is accomplished when there is an annual balance between groundwater withdrawals and annual natural and artificial recharge in the AMA. Surface water is a major source of water supply in the Phoenix AMA, including water provided by SRP. The amount of surface water delivered annually by SRP depends on the annual amount of surface water stored and users' decreed and appropriative water rights. When reservoirs are low, SRP supplements its surface water deliveries with groundwater to meet customer demand (ADWR 2020). Many providers with rights to surface water use underground storage facilities and recovery wells to manage surface water supplies. Appropriable surface water generally must be recovered within the same month it is stored. If stored and recovered in this manner, it is considered a direct use of the supply. Through 2019, approximately 407,537 acre-feet of Salt and Verde River water was used through annual storage and recovery activity (ADWR 2022a).

Water spilled over Modified Roosevelt will flow downstream through three lakes and past the Salt and Verde River confluence until it reaches GRDD. During spill events, excess water may be available for use by customers free of charge. During spills triggered by discrete storm events, the demand for this "free spill water" may be limited due to reduced need during wet seasons or an inability to receive the water at the time of the spill. For longer spills followed by longer-duration snowmelt conditions, customer use of the spill water may increase (e.g., demand may be greater and/or the ability to take the water increased). The use of spill water is still limited by the ability to receive and physically use the water. Since the modification of Roosevelt Dam was completed in 1996, 7 out of 27 years resulted in spill events. Two of these years had spill from the Salt River Federal Reclamation Project system due to water levels at Roosevelt Lake entering the FCS.

The power system operated by SRP includes eight hydroelectric units on the Salt River dams with an installed generating capacity of about 260 megawatts. The Roosevelt power plant contains a 36-megawatt turbine generator with a design discharge of 2,400 cfs. SRP supplies power to more than 700,000 customers from a combination of hydroelectric, thermal, and nuclear resources (SRP 2022a).

3.7.1.2 Environmental Justice

On February 11, 1994, President Clinton issued EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 directs agencies to address environmental and human health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on those populations.

A minority population exists where the percentage of minorities in an affected area either exceeds 50% or is meaningfully greater than in the general population. "Meaningfully greater" is defined as 5 percentage points or more above the statewide average for broad metrics such as the proportion of low-income or Hispanic or Latino residents, and 1 percentage point above the statewide average for more detailed metrics such as the percentage of American Indian and Alaska Native residents. Low-income populations are identified using the U.S. Census Bureau's statistical poverty threshold, which is based on income and family size. The U.S. Census Bureau defines a "poverty area" as a census tract with 20% or more of its residents below the poverty threshold, and an "extreme poverty area" as one with 40% or more below the poverty level (Bishaw 2014). A census tract is a small geographic subdivision of a county and typically contains between 1,200 and 8,000 persons. However, due to the large size of the analysis area, census tracts were not used to determine potential environmental justice (EJ) populations; these were instead determined at the county level.

The state of Arizona was used as the general population reference area and the counties and tribal areas that make up the analysis area were used to identify potential EJ communities (Table 3-16, Table 3-17, Table 3-18, and Table 3-19). EJ communities are present within Gila County and nearby Indian Reservations in areas where minority population groups and poverty levels are meaningfully greater than their statewide average representation.

Table 3-16. Population by Race/Ethnicity in Counties in Analysis Area and Arizona

Area	Total Population	White	Black or African American	American Indian/ Alaskan Native	Asian	Hawaiian/ Pacific Islander	Two or More Races	Hispanic or Latino (of any race)
Gila County	53,597	78.2%	0.8%	18.2%*	0.9%	0.1%	1.7%	18.9%
Maricopa County	3,817,117	82.8%	6.4%	2.8%	4.6%	0.3%	3.1%	31.4%
Arizona	6,392,017	82.6%	5.2%	5.3%	3.7%	0.3%	2.9%	31.7%

* Areas in which minority population groups are meaningfully greater than their statewide average representation.

Table 3-17. Population by Race/Ethnicity in Tribal Areas in Analysis Area

Area	Total Population	White	Black or African American	American Indian/ Alaskan Native	Asian	Hawaiian/ Pacific Islander	Two or More Races	Hispanic or Latino (of any race)
Fort McDowell Yavapai Nation	1,053	8.0%	0.1%	84.2%*	0.6%	0.0%	6.3%	16.6%
Gila River Indian Community	10,879	6.2%	0.7%	87.4%*	0.8%	0.2%	4.0%	9.9%
Salt River Pima-Maricopa Indian Community	7,727	20.4%	0.3%	72.4%*	0.3%	0.4%	4.4%	15.0%
Arizona	6,392,017	82.6%	5.2%	5.3%	3.7%	0.3%	2.9%	31.7%

* Areas in which minority population groups are meaningfully greater than their statewide average representation.

Table 3-18. Economic Indicators of Counties in Analysis Area and Arizona

Area	Total Population	Per Capita Income	Percent All People Below Poverty Level	Median Household Income
Gila County	53,597	$24,251	16.70%	$43,524
Maricopa County	3,817,117	$33,279	11.60%	$64,468
Arizona	6,392,017	$20,694	12.80%	$58,945

Table 3-19. Economic Indicators of Counties in Tribal Areas in Analysis Area

Area	Total Population	Percent All People Below Poverty Level	Median Household Income
Fort McDowell Yavapai Nation	1,053	20.7%	$51,875
Gila River Indian Community	10,879	44.2%	$22,053
Salt River Pima-Maricopa Indian Community	7,727	33.0%	$35,933
Arizona	6,392,017	12.80%	$58,945

Note: No per capita income was available for the tribal areas.

On February 18, 2022, the CEQ released a beta version of the Climate and Economic Justice Screening Tool (CEQ 2022). The beta version of the tool identifies communities that are marginalized, underserved, and overburdened by pollution. These communities are in census tracts that are at or above the thresholds in one or more of eight categories of criteria. According to the Climate and Economic Justice Screening Tool, Gila County, which includes the town of Roosevelt, is identified as "disadvantaged" in five categories: climate change, clean energy and energy efficiency, clean water use and infrastructure, health burdens, and workforce development.

According to the EPA's EJ screening and mapping tool, EJScreen (EPA 2022), the analysis area constitutes an EJ community due to the following factors:

- High demographic index (see Table 3-16, Table 3-17, Table 3-18, and Table 3-19)[8]
- High percentage people of color (see Table 3-16 and Table 3-17)
- High percentage low-income population (see Table 3-18 and Table 3-19)[9]
- High unemployment rate
- High percentage population who have not graduated from high school

These factors were particularly high within the Gila River Indian Community and Salt River Pima-Maricopa Indian Community, which are 40 to 50 miles southwest of Roosevelt Lake, and in small areas throughout the Phoenix metropolitan area. No EJ communities were identified within the permit area or in the immediate vicinity.

[8] Definition: The Demographic Index in EJScreen is a combination of percent low-income and percent minority, the two demographic factors that were explicitly named in EO 12898 on Environmental Justice. For each Census block group, these two numbers are simply averaged together. The formula is as follows: Demographic Index = (% people of color + % low-income) / 2.

[9] Definition: Percentage of individuals whose ratio of household income to poverty level in the past 12 months was less than 2 (as a fraction of individuals for whom ratio was determined).

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

3.7.2.1.1 CONSERVATION SPACE OPERATIONS

Socioeconomic impacts of CS operations under the Proposed Action are as described in Section 4.12.2 (Full Operation Alternative) of the 2002 RHCP EIS (FWS 2002a) and are incorporated here by reference.

3.7.2.1.2 FLOOD CONTROL SPACE OPERATIONS

The socioeconomic impacts from normal FCS operations are as described in the 1996 EA for the WCM and are incorporated here by reference.

3.7.2.1.3 PLANNED DEVIATION

The planned deviation would result in increased hydropower generation at Modified Roosevelt. The planned deviation would also increase operational flexibility within the FCS at Modified Roosevelt Dam, which would allow for increased use of floodwaters, when available, through direct deliveries to spill water users or underground recharge for recovery during times of drought and shortage. Spill water deliveries made possible by the extended-release period in the PDS would be made available to lands identified in Figure A-2 of Appendix A by the entities responsible for making deliveries to those lands, pursuant to existing water delivery agreements with SRP. The increase in hydropower generation and the increased use of floodwaters for delivery to downstream communities would both result in long-term minor beneficial impacts within the analysis area.

Downstream EJ communities within the analysis area may benefit from an increase in hydropower generation and the increase in water supply from the planned deviation. There would be no direct adverse impacts to EJ communities; therefore, there would be no disproportionately high and adverse effects on the identified EJ populations resulting from implementation of the Proposed Action.

3.7.2.1.4 CONSERVATION ACTIONS

No effects on socioeconomics or EJ communities are anticipated from implementation of the Gartersnake Conservation Program.

3.7.2.1.5 CONCLUSION

In summary, the effects on socioeconomics under the Proposed Action would be minor, long-term, and beneficial, primarily due to the planned deviation. There would be no adverse effects to EJ populations.

3.7.2.2 No Planned Deviation Alternative

Under this alternative, there would be no planned deviation and therefore no changes to water supply and hydropower generation. Impacts to downstream communities and EJ communities would be the same as those described under the Proposed Action, except that the impacts of the planned deviation would not occur. The impacts of SRP's continued CS operations are similar to those described for the Full Operation Alternative in Section 4.12.2 of the 2002 RCHP EIS (FWS 2002a). The impacts of normal FCS operations would be the same as those described for normal FCS operations under the Proposed Action. No additional impacts to socioeconomics or EJ communities would occur beyond the cumulative impacts from existing and future trends and actions identified in Appendix F.

3.7.2.3 No Action Alternative

3.7.2.3.1 CONSERVATION SPACE OPERATIONS

Socioeconomic impacts of normal CS operations are described in Section 4.12.2 (Full Operation Alternative) of the 2002 RHCP EIS (FWS 2002a) and are incorporated here by reference. However, holding Roosevelt Lake managing water levels in the CS to avoid increases in water elevation that would inundate gartersnake habitat under the No Action Alternative may result in changes to spill water availability, hydropower generation, water deliveries, and water storage capacity. Impacts from these changes are discussed in Section 3.6.2.3.1. These minor to moderate adverse impacts to communities within the socioeconomics analysis area, including EJ communities, would be temporary and may be subject to additional operational and environmental analyses due to future ESA compliance actions.

3.7.2.3.2 FLOOD CONTROL SPACE OPERATIONS

Under the No Action Alternative, because SRP would manage reservoir levels in the CS to avoid inundation of existing gartersnake habitat, water would not be anticipated to enter the FCS, but would flow through the Tonto Creek channel and be released downstream. Based on SRP's latest streamflow forecast (as of January 15, 2023), Roosevelt Lake is projected to reach 97% of capacity (approximately 2,148 feet elevation) by May 31, 2023. At this high elevation, Roosevelt Lake is more likely to enter FCS and spill within the next 1 to 3 years, regardless of any operational changes to implement the No Action Alternative. If spills from Modified Roosevelt are necessary, they could begin earlier in the year, would be of larger volume and greater peak discharge, and could continue later into the spring. SRP anticipates that most of the spill water would be released from GRDD into the Lower Salt River, as with typical past reservoir spills. Similar to existing operation protocols, SRP would inform and coordinate with SRP's customers and other water users to maximize the use of any spill water. These changes would result in temporary beneficial impacts to downstream users, including EJ communities.

For rare, large storm events, to protect the health and safety of the public, and consistent with the WCM, SRP would operate in a manner that limits spills over GRDD to no more than 180,000 cfs. This health and safety limitation could cause a rise in Roosevelt Lake if short-term storage is necessary to keep the spill over GRDD at or below 180,000 cfs. But as soon as feasible, SRP would return Roosevelt Lake to the elevation before the rise occurred. Spill releases during the 1 to 3–year time frame could cause more frequent adverse impacts to other downstream users and the public, such as temporary traffic impacts at low-water crossings in the Salt River. While the circumstances and characteristics of spills under No Action Alternative may differ from current FCS operations, the absolute timing, frequency, volume, and rate of spill under the No Action Alternative would remain within the overall range of variability observed in the past and estimated by the Reservoir Planning Model; however, the potential impacts on socioeconomics and EJ communities may be subject to additional operational and environmental analyses due to future ESA compliance actions.

3.7.2.3.3 PLANNED DEVIATION

Under this alternative, there would be no planned deviation and therefore no changes to water supply and hydropower generation. Impacts to downstream communities and EJ communities would be the same as those described for normal FCS operations under the Proposed Action.

3.7.2.3.4 CONSERVATION ACTIONS

The Gartersnake Conservation Program would not be implemented under this alternative and no effects on socioeconomics or EJ communities are anticipated.

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APPENDIX A

Operational History and Current Operations for Modified Roosevelt Dam

A.1 MODIFIED ROOSEVELT DAM OPERATIONAL HISTORY

Reclamation, in coordination with SRP, structurally modified Theodore Roosevelt Dam in 1996 (as authorized under Public Laws 95-578 and 90-537) to include: 1) new conservation storage; 2) designation of an FCS to help manage flood releases to reduce downstream flood damage; 3) designation of a flood surcharge space to protect the dam from overtopping (i.e., safety of dams); and 4) new outlet works and spillway configuration. The most recent elevations and storage volumes associated with each of these operational spaces are illustrated in Figure A-1. The storage volumes are based on the Theodore Roosevelt Lake 2013 Sedimentation Survey (Ferrari 2014), adjusted to account for sedimentation and safety of dams requirements in the 1993 operating agreement (SRP et al. 1993).

In the same year (1996) that Theodore Roosevelt Dam modifications were completed, the Corps' Los Angeles District Reservoir Regulation Section, in coordination with Reclamation, prepared the WCM for Modified Roosevelt Dam. The Corps and Reclamation completed an EA and reached a Finding of No Significant Impact (FONSI) in 1996 for the anticipated environmental impacts from WCM implementation. The WCM EA was tiered[10] from Reclamation's 1984 Final EIS and 1984 Record of Decision developed for the Central Arizona Water Control Study, as well as Reclamation's 1990 Final EA and FONSI for the Theodore Roosevelt Dam modifications. The Corps, Reclamation, and SRP entered into a WCA, dated November 5, 1996, under which the parties agreed that SRP—as the entity responsible for the care, operation, and maintenance of Modified Roosevelt—would comply with the WCM's flood control operating criteria. The Corps issued the WCM for Modified Roosevelt Dam in September 1997.

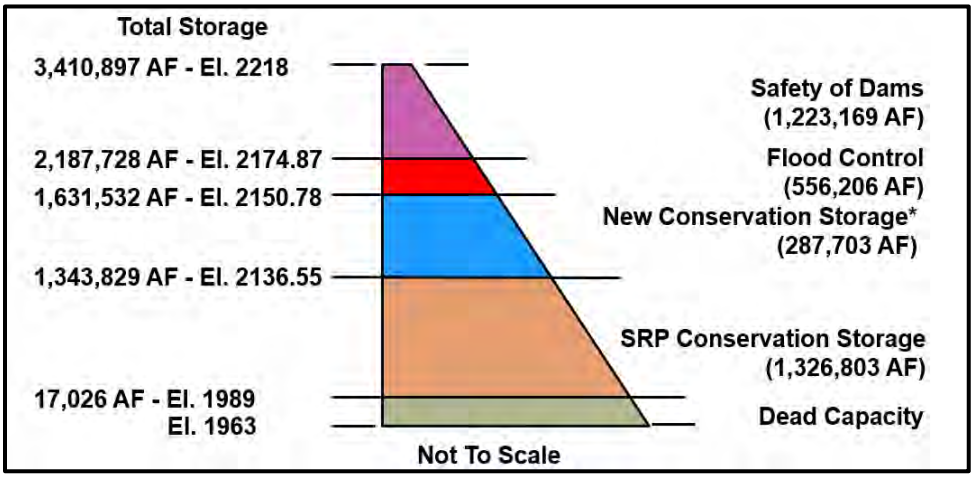

Figure A-1. Delineated storage spaces within the Roosevelt Lake basin by elevation (El.) in feet above mean sea level. Also shown are the storage capacities of each storage area in acre-feet (AF) (SRP 2022a).

Modified Roosevelt's operational objective with respect to flood control, as stated in the WCM, is to minimize downstream flood damage from the Salt and Verde Rivers and the spill of water past GRDD, which is located downstream of the Salt and Verde River confluence. Through the use of controlled releases from Roosevelt Lake, Modified Roosevelt minimizes peak discharges downstream at the Salt and Verde River confluence during large flood events. The WCM identifies operational releases within the lake's FCS to draw down the water level within 20 days of initial inundation, while working to maintain combined flows at the Salt and Verde River confluence below 180,000 cfs.

[10] "Tiering" refers to incorporating by reference the general discussions and/or analysis of specific issues contained in an EIS or EA for a program or policy with subsequent EISs or EAs for an action included within that program or policy (40 CFR 1501.11).

Modified Roosevelt's WCM identifies in Section 7-14(c) when it may be necessary to temporarily deviate from the established flood control plan. There are three categories of deviations identified in the WCM: emergencies, unplanned minor deviations, and planned deviations.

When water physically occupies the FCS, SRP operates the Salt River Project reservoir system under spill conditions as described in the 1993 Modified Roosevelt Dam Operating Agreement. The Modified Roosevelt Dam Operating Agreement aims to minimize the spill of water past GRDD. Spill conditions at Modified Roosevelt occur when: 1) the SRP storage space (below 2,136 feet amsl) is full, and 2) water levels in the new conservation storage are rising as a result of inflows into Roosevelt Lake exceeding SRP deliveries out of Stewart Mountain Dam (Figure A-2), or 3) when water enters the FCS. Prior to the 1996 modifications to Modified Roosevelt, this water would have either been delivered as spill water or would have physically spilled over GRDD. During spill conditions, water may or may not physically spill over GRDD or from spillways on the Salt River dams, depending on whether Verde River flows and if the lower Salt River reservoirs (Saguaro Lake, Canyon Lake, and Apache Lake) exceed available storage and SRP deliveries at GRDD. During these spill conditions, SRP delivers water to certain entities with claims to the use of the spill or floodwaters without those water deliveries counting against their contractual entitlements (Figure A-2). These deliveries have taken place for decades and occur through SRP's existing canal and lateral system and their existing interconnections with water treatment plants, points of use, and conveyance systems of contractors. These deliveries include distribution to lands outside SRP's water service area (see Figure A-2). These deliveries allow users on the system to make use of spill water when available to conserve contractual and other entitlement waters within the SRP reservoir system.

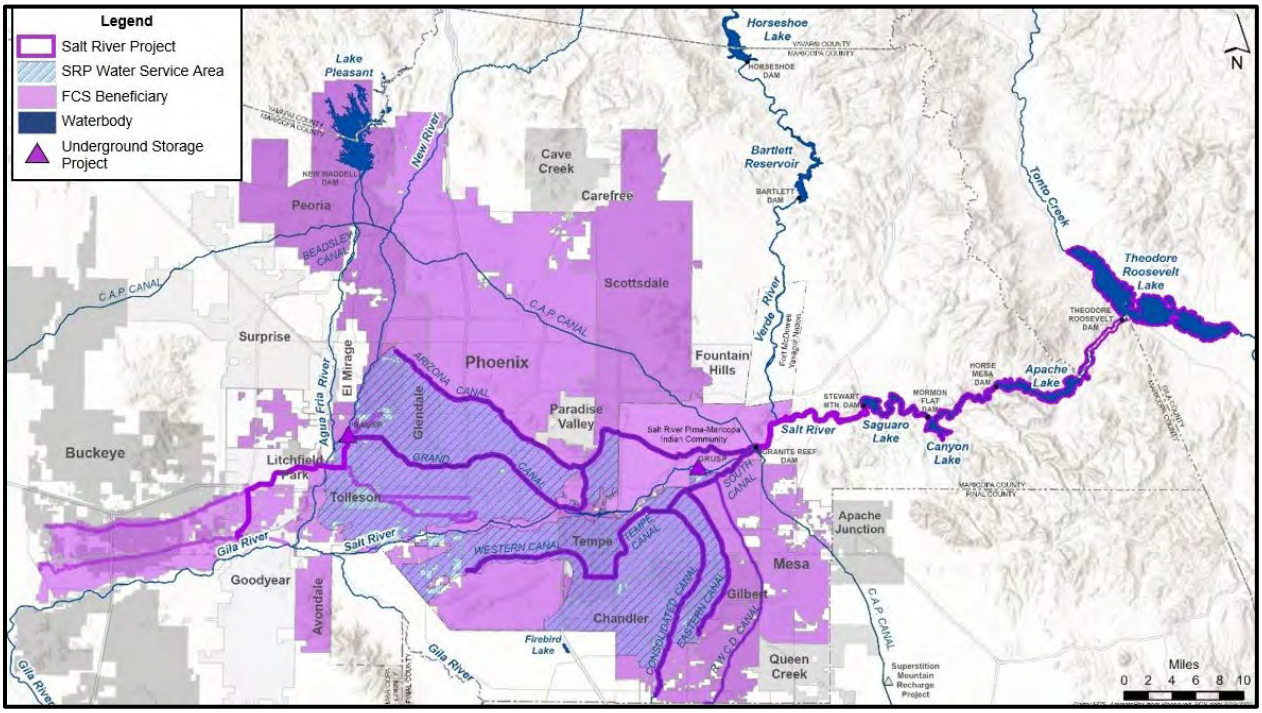

Figure A-2. Lands eligible for use of spill water from the Salt River.

A.2 CURRENT OPERATIONS

A.2.1 Conservation Storage Operations

As described in the 2002 RHCP, SRP implements CS activities in accordance with the Modified Roosevelt Operating Agreement, which specifies the following (in order of priority):

1. Maintain the safety and integrity of the dam.
2. Maintain sufficient SRP storage to meet SRP water delivery obligations.
3. Optimize reservoir storage for SRP use within the SRP reservoir system.
4. Maintain adequate SRP carryover storage for following years in case of low runoff.
5. Conjunctively manage groundwater pumping given reservoir storage and projected runoff and demand.
6. Maximize hydrogeneration.
7. Operate to permit necessary facility maintenance.

SRP's CS activities (including the transition of SRP water deliveries among its reservoir systems), the duration and magnitude of snowmelt and rainfall runoff in the Salt River watershed, and local evaporation rates cause the lake's water elevation to continuously rise and fall throughout the year (Figure A-3) and from year to year (Figure A-4).

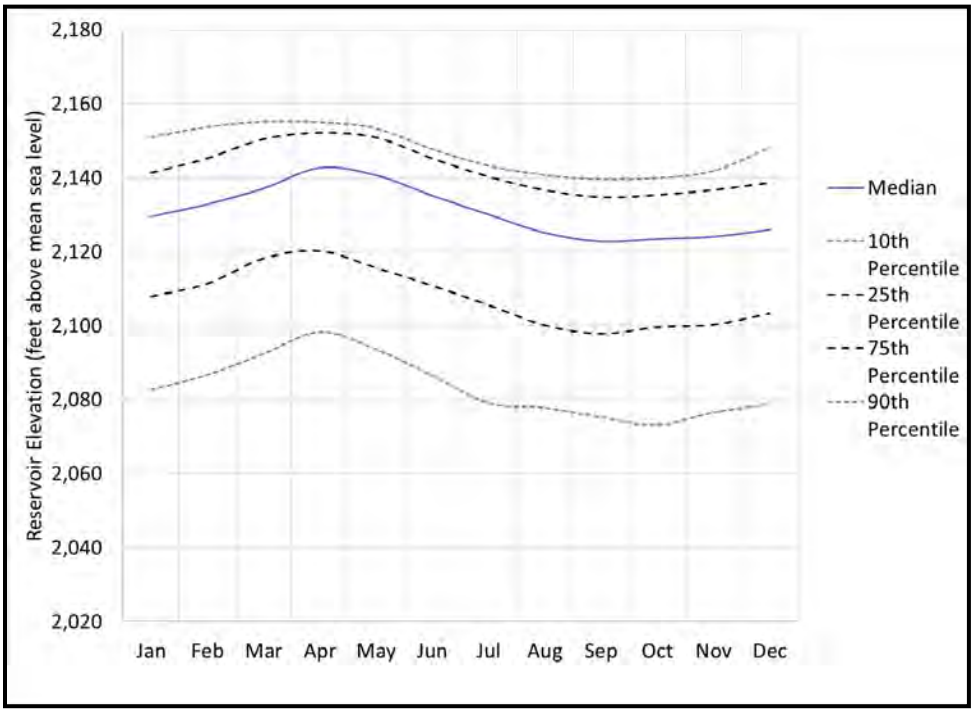

Figure A-3. Range of estimated intra-annual elevation changes at Roosevelt Lake, by month.

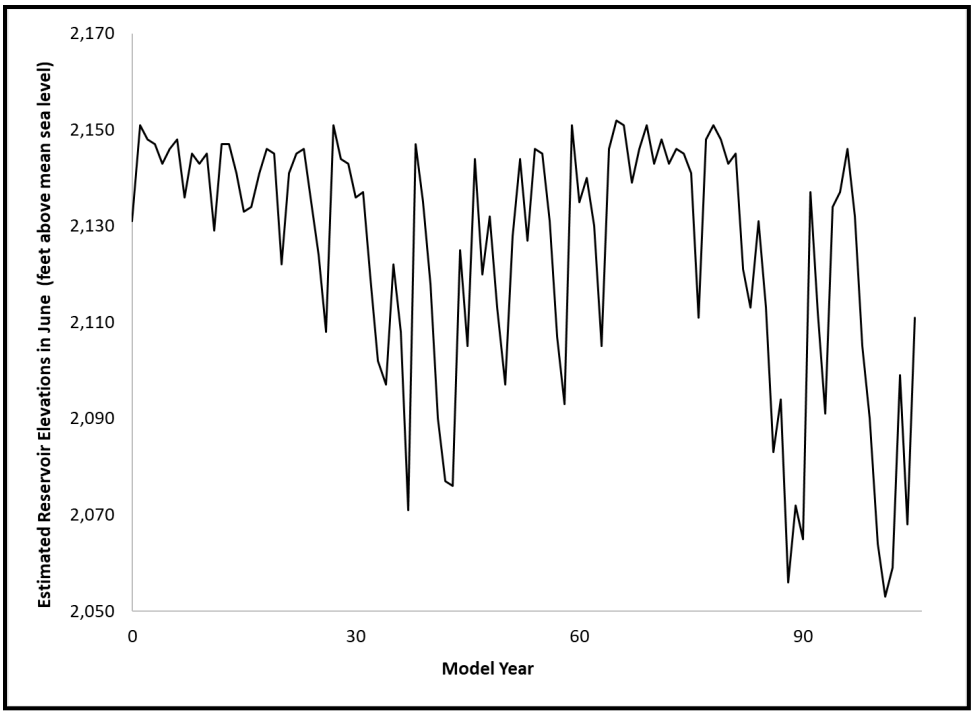

Figure A-4. Year-to-year variation in elevation levels at Roosevelt Lake in each model year.

To estimate the lake elevations for CS and FCS operations under the current WCM and standard SRP conservation operations, SRP used its Reservoir Planning Model (see Appendix A in the RHCP addendum) for the SRP reservoir system,[11] which combines the historic 106-year inflow data from 1914 to 2019 with: 1) operational parameters for storing and releasing water from Modified Roosevelt to the rest of the reservoir system, and 2) adjustments for climate-related changes to regional precipitation and temperature, to create a 106-year scenario of lake elevations that approximate the range of potential future conditions. The Reservoir Planning Model provides a basis for estimating the frequency, magnitude, duration, and timing of changes to the elevation of the lake resulting from SRP's continued operation of Modified Roosevelt.

SRP categorized the estimated variations in lake elevation as typical, atypical, and extreme (Table A-1). These categories convey the frequency of lake elevation changes, based on the Reservoir Planning Model. The lake's typical estimated daily change in elevation is small (0.2 vertical foot per day; 25 horizontal feet per day, or about 1 horizontal foot per hour). Over several months, the estimated lake elevation changes accumulate, resulting in moderate changes of approximately 20 to 30 vertical feet (see Table A-1). The 20 to 30–foot vertical change equates to approximately 3,000 to 4,500 horizontal feet of movement of the lake's shoreline.

[11] In 2016, the Reservoir Planning Model replaced the SRP Simulation (SRPSIM) model as SRP's main operational planning tool for estimating future reservoir conditions. The SRPSIM model was used to assess reservoir elevations in the 2002 RHCP, but the Reservoir Planning Model was used for the analysis in the RHCP addendum. The Reservoir Planning Model uses the same assumptions and methods for modeling the reservoirs as the previous SRPSIM model, but is updated with modern coding/software and user interface.

Table A-1. General Categories of Estimated Lake Elevation Changes Based on Magnitude, Duration, and Frequency of Occurrence

		Rise			Fall		
Frequency of Occurrence		**Common (75th percentile)**	**Occasional (90th percentile)**	**Rare (99th percentile)**	**Common (75th percentile)**	**Occasional (90th percentile)**	**Rare (99th percentile)**
General Categories		**Typical**	**Atypical**	**Extreme**	**Typical**	**Atypical**	**Extreme**
Intraannual	Magnitude (feet)	20	40	80	20	30	40
	Duration (months)	6–7	7	8–9	6	7	9–10
Interannual	Magnitude (feet)	30	50	80	20	30	40
	Duration (years)	1–2	1–2	2–3	1–3	3–4	4–5

Notes:

Intraannual changes reflect the fluctuation in water levels that occur within a given year over the course of a fill and delivery season.

Interannual changes are based on the differences in reservoir elevations from year to year, on December 31 of each model year.

"Duration" refers to the number of consecutive years or months with rising water levels, or consecutive years or months with falling water levels. Note that duration percentile statistics are calculated independently of magnitude percentile statistics; for example, the 99th percentile magnitude of interannual rise (80 feet) does not necessarily occur during the 99th percentile run of back-to-back years with increases in water level (which lasts 4 to 5 years in duration).

Occasionally, the estimated atypical water level changes are of greater magnitude, exceeding 30 vertical feet, or have faster rates of change (see Table A-1). These atypical water elevation changes occur at an estimated frequency of approximately once every 7 to 8 years and generally across several months within 1 year (see Figure A-4 and see Table A-1).

In even rarer instances (i.e., approximately once every 18 to 19 years), the water elevation may undergo an extreme change of more than 40 feet (see Table A-1). These rare, extreme changes are due to major weather events, such as exceptional precipitation. Most of these extreme changes are the result of accumulated changes from major weather events over 4 to 10 months, though large increases can occur in just 1 to 2 months. These events tend to occur when the lake's elevation is either exceptionally low (i.e., less than 2,100 feet amsl) or exceptionally high (i.e., above 2,151 feet amsl). The lake's elevation may reach 2,151 feet amsl gradually through typical year-to-year accumulation, despite the typical rises and falls within a given year (see Figure A-3 and see Figure A-4).

A.2.2 Flood Control Operations

SRP implements WCM prescriptions for minimum releases of water from Modified Roosevelt when the lake's elevation exceeds the CS limits. Flood control operations minimize downstream flood damages by reducing peak discharges that might otherwise occur during large flood events. The WCM specifies a minimum release schedule based on lake elevation and whether it is rising (inflows exceed outflows) or falling (outflows exceed inflows) (Table A-2). The WCM requires SRP to manage releases such that the lake returns to the CS limits within 20 days of first entering the FCS. While the lake is receding, additional minimum releases may be required to meet the 20-day drawdown requirement.

Table A-2. Release Plan under Current WCM Operations

Water Surface Elevation—Rising (feet amsl)	Minimum Release Rate—Rising	Water Surface Elevation—Falling (feet amsl)	Minimum Release Rate—Falling
2,151–2,153	1,900 cfs	2,151–2,152	6,500 cfs
2,153–2,155	2,200 cfs	N/A	N/A
2,155–2,157	6,500 cfs	2,152–2,157	12,200 cfs
2,157–2,162	12,200 cfs	N/A	N/A
2,162–2,172	39,500 cfs	2,157–2,170	39,500 cfs
2,172–2,175	53,100 cfs	2,170–2,175	53,100 cfs

Note: Values are rounded to the nearest whole number.

Projections from the Reservoir Planning Model indicate that more frequent FCS operations will occur compared to historical lake elevations since modification in 1996. The modifications to Theodore Roosevelt Dam were completed just over 25 years ago, during a long period of drought. The anticipated greater frequency in FCS operations is due to the likelihood of entering a wetter period in the next 5 years as well as anticipated regional climate-related precipitation and temperature changes. The Reservoir Planning Model for normal FCS operations indicates that the lake is anticipated to enter the FCS in 37 of 106 years (35% of years) and require normal FCS operations during 143 of the total 1,272 months (11% of months) (Table A-3). The Salt River hydrology can result in multiple FCS operations in the same year, extending the number of months in which the lake may be present within the FCS in a given year.

In years with anticipated flood control operations, runoff volume and storm event frequency are likely to be sufficient to create multiple FCS operational events in a given year, resulting in water entering the FCS in an average of 3.8 months, with a range of 1 to 8 months. The WCM requires water evacuation from the FCS within 20 days, so results showing multi-month durations of FCS operations under the existing WCM are the result of: 1) the occurrence of frequent runoff events (storms or snowmelt) initiating multiple 20-day FCS operations, and/or 2) a single 20-day event occurring at the end of a month and lasting into the start of the next month.

The Reservoir Planning Model indicates that FCS operations could occur any time of the year, but primarily occur between December and May. Approximately 45% of the predicted FCS operations occur in April or May, and 41% in January, February, or March (see Table A-3).

The lake's elevation during FCS operations can vary quickly. In months with FCS operations, SRP estimates the peak monthly lake elevation will average 2,154 feet amsl (see Table A-3). Most monthly lake elevation peaks (93% of months with predicted FCS operations) are within the FCS's first 10 vertical feet (up to the 2,161-foot elevation contour) (see Table A-3). Rates of fill in the FCS reach about 0.5 vertical foot per day (about 3 horizontal feet per hour movement) under atypical conditions (90th percentile) and, reaching 4 vertical feet per day (about 25 horizontal feet per hour movement) with extreme events (99th percentile).

Table A-3. Duration, Timing, and Magnitude of Estimated FCS Operations by Model Year.

Model Year*	Number of Months with FCS Operations	Range of Months with FCS Operations	Range of Peak Monthly Lake Elevations (feet amsl)	Range of Peak Monthly Lake Rise into FCS (feet)
2	5	February–June	2,151–2,156	<1–5
3	5	January–May	2,151–2,174	<1–23
4	5	January–May	2,153–2,155	2–4

Model Year*	Number of Months with FCS Operations	Range of Months with FCS Operations	Range of Peak Monthly Lake Elevations (feet amsl)	Range of Peak Monthly Lake Rise into FCS (feet)
6	4	April–August	2,152–2,153	1–2
7	8	October–May	2,151–2,165	<1–14
9	4	February–May	2,151–2,155	<1–4
11	5	December–April	2,151–2,156	<1–5
13	1	May	2,152	1
14	4	February–May	2,152–2,155	1–4
19	4	January–April	2,151–2,162	<1–11
23	2	April–May	2,152–2,153	1–2
24	4	February–May	2,151–2,157	<1–6
28	5	February–June	2,151–2,166	<1–15
29	5	January–May	2,151–2,152	<1–1
30	2	April–May	2,151	<1–1
39	2	April–May	2,154–2,155	4
47	1	April	2,151	<1
53	6	December–May	2,151–2,155	<1–4
55	3	March–May	2,151–2,154	<1–3
56	1	April	2,152	2
60	4	March–June	2,151–2,157	1–7
65	3	March–May	2,151–2,155	<1–4
66	7	December–June	2,152–2,163	1–12
67	6	January–June	2,151–2,165	<1–14
69	2	April–May	2,151	<1
70	6	January–June	2,151–2,157	<1–6
71	7	October–April	2,151–2,153	<1–2
72	6	December–May	2,154–2,157	3–6
73	2	March–April	2,154–2,155	3–4
74	3	March–May	2,151–2,154	<1–3
75	2	April–May	2,153	2
78	2	April–May	2,152	1
79	5	February–June	2,151–2,155	<1–4
80	6	December–May	2,153–2,169	2–18
81	1	April	2,151	<1
82	3	February–April	2,152–2,157	1–6
97	2	April–May	2,154	3

* Based on water year (October–September).

APPENDIX B

U.S. Fish and Wildlife Service Bald Eagle Local Area Population Analysis

U. S. FISH AND WILDLIFE SERVICE

APPENDIX TO DRAFT ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED AMENDMENT OF AN ENDANGERED SPECIES ACT INCIDENTAL TAKE PERMIT FOR TAKE OF BALD EAGLES FOR SALT RIVER PROJECT AT ROOSEVELT DAM

SOUTHWEST REGION

April 2023

In February 2003, the U.S. Fish and Wildlife Service (FWS) issued an incidental take permit (ITP) for the take of bald eagles (*Haliaeetus leucocephalus*) associated with the operation by Salt River Project (SRP) of Modified Roosevelt Dam and Lake (Roosevelt) pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973 (ESA; 16 United States Code [U.S.C.] §§ 1531-1544, 87 Stat. 884), as amended. Bald eagles were removed from the List of Endangered and Threatened Wildlife in 2007 due to recovery (USFWS 2007), and although bald eagles nesting in the Sonoran Desert area of central Arizona were temporarily afforded regulatory protections under the ESA as a distinct population segment, the Sonoran Desert eagles were removed from the list in 2011 (USFWS 2011). Bald eagle ITPs are now implemented under the Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 U.S.C. §§ 668-668d, 54 Stat. 250 as amended) and its governing regulations under Title 50 in the Code of Federal Regulations (C.F.R.) § 22.80.

SRP is in full compliance with the terms and conditions of its 2003 ITP issued under the authority of Section 10(a)(1)(B) of the ESA and the bald eagle remains a covered species under the ITP in the event the bald eagle is listed as threatened or endangered in the future. Consequently, the 2003 ITP constitutes a valid permit under BGEPA permit regulations for the take of bald eagles, and the provisions of 50 C.F.R. Part 17 that originally applied will apply for purposes of the BGEPA authorization as long as the activity is compatible with the preservation of bald eagles (50 C.F.R. 22.10(a)). SRP is seeking to amend its 2003 ITP under ESA for the bald eagle to clarify the metrics used to quantify take due to Roosevelt operations in the event the bald eagle is listed as threatened or endangered in the future. The bald eagle will be included in our intra-Service biological opinion for SRP's proposed amended ITP. This draft Environmental Assessment (EA) appendix was prepared to assist the FWS in making a determination as to whether any "significant" impacts could result from the amendment of the ITP and whether authorized take is compatible with the preservation of the bald eagle for compliance with the BGEPA.

As described in more detail in the *Programmatic Environmental Impact Statement for the Eagle Rule Revision*, December 2016 (PEIS; USFWS 2016a; https://www.fws.gov/media/final-programmatic-environmental-impact-statement-eagle-rule-revision), the FWS has set a preservation standard under the BGEPA. The preservation standard requires the FWS to manage eagle take at two geographic scales, the regional eagle management unit (EMU) and the local area population (LAP), to maintain stable or increasing breeding populations in the EMUs and the persistence of local populations. To achieve this standard, the FWS established take thresholds for bald eagles and golden eagles at the EMU scale and the LAP scale. Eagle fatalities caused by activities in place prior to September 11, 2009, are accounted for in the baseline conditions that were analyzed in the PEIS and used to set EMU thresholds. Therefore, authorized take prior to September 11, 2009, is considered part of the biological baseline level of take and is not subject to EMU take limits (USFWS 2009, 2016a). The baseline conditions do not apply to LAP thresholds. To ensure persistence of local populations to meet the preservation standard, the

LAP cumulative effects analysis was incorporated into the regulations to provide protection at local scales. Cumulative authorized take must not exceed 5% of the LAP, unless the FWS can demonstrate why take above this limit is still compatible with the preservation of eagles.

The FWS prepared an Environmental Impact Statement (EIS) to analyze the environmental consequences of issuing an ITP for the take of bald eagles from SRP's operation of Roosevelt up to the maximum conservation storage space elevation of 2,151 feet above mean sea level (amsl) (i.e., the permit area) (USFWS 2002) when it issued the 2003 ITP. The resulting Record of Decision documents the FWS's decision to issue the ITP following the determination that all means to avoid or minimize environmental harm had been adopted (USFWS 2003a). The SRP 2003 ITP authorizes take from continued operation of the dam and conservation storage space up to an elevation of 2,151 feet.

SRP is requesting to amend the 2003 ITP to include operation of Roosevelt's flood control space above the elevation of 2,151 feet. SRP's normal flood control operations extend to an elevation of 2,175 feet. SRP has also requested the U.S. Army Corps of Engineers (Corps) authorize a planned deviation to the Water Control Manual up to an elevation of 2,156 feet, extending the maximum release period for water from 20 days to 120 days (in 3 out of 5 years). The potential effects to eagles from these two uses of the flood control space were not previously a part of SRP's 2002 Roosevelt Habitat Conservation Plan (RHCP).

SRP, FWS, and the Corps re-evaluated the bald eagle's status at Roosevelt and whether the 2002 RHCP (SRP 2002) and 2003 ITP still adequately address the changes in eagle distribution and abundance with nests placed in the conservation space and breeding pairs relying on the lake's conservation space for food. Since 2002, the number of breeding bald eagle pairs using Roosevelt Lake for food has increased from six to seven. Three previous territories no longer exist, and bald eagles established new territories in closer proximity to the lake. We can anticipate the number of territories, distribution, and productivity relying (or partially relying) on Roosevelt Lake to change through time. The number of bald eagle tree nests and territories located in Roosevelt Lake's conservation and flood control space incrementally increased since 2002. We can anticipate nest locations and territories in the conservation and flood control space to continue to change over time.

This EA appendix evaluates the effects of the proposed action and previous authorizations to examine whether impacts differ from those analyzed for the 2002 EIS (USFWS 2002) and require modification of the terms and conditions of the 2003 ITP in order to ensure the preservation of the bald eagle.

Authorization and Potential Impacts

The original 2003 ITP authorized incidental take associated with harm to bald eagles using nest or perch trees within the permit area due to inundating trees, nests, and eggs or nestlings, and incidental take of up to 18 fledgling bald eagles due to reduced productivity of bald eagles relying on the permit area for food during periods of declining water levels. The 2002 EIS (USFWS 2002), RHCP (SRP 2002), and Biological Opinion (BO) (USFWS 2003b) analyzed the effects of loss of nest trees, nests, and nest contents (eaglets/eggs) from inundation/desiccation in the conservation space (2,151 feet amsl and below), and interspecific competition and effects to nesting eagle foraging areas, prey resources, and productivity resulting from exceptionally low lake levels (USFWS 2002, SRP 2002, USFWS 2003b), and the analyses are incorporated by reference here.

SRP, FWS, and the Corps examined whether the analysis from the 2002 RHCP EIS, BO, and 2003 ITP is still accurate, and the anticipated effects from proposed normal flood control space activities and the planned deviation. Included in this review was whether we adequately characterized anticipated changes to Roosevelt Lake bald eagle distribution and abundance.

We found that our original 2003 ITP did not explicitly establish a clear exceedance level for the abundance or frequency of bald eagle nests, supporting nest trees/snags, eggs, and nestlings affected from rising and falling water levels, nor was there an ability to detect 18 fewer fledgling eagles from reduced food availability due to reduced lake levels. As a result, we are improving our incidental take metrics for ongoing conservation space operations, accounting for the anticipated changes in bald eagle distribution and abundance, and overall establishing better thresholds for authorized incidental take for all Modified Roosevelt Dam operations (including the planned deviation and normal flood control space operations included in the proposed amended RHCP).

Nesting Bald Eagles Using Tree/Snag Nests in the Conservation and Flood Control Space

Currently, lake levels from SRP's Modified Roosevelt Dam operations (conservation and normal flood control operations, and the proposed planned deviation) can adversely affect three eagle territories (Tonto, Pinto, and Bachelor Cove breeding areas) using nests in trees/snags within or adjacent to the conservation and flood control space. A fourth bald eagle territory (Campaign Bay breeding area) occurs within the conservation space, but its nest and nest tree are absent, and the territory has been unoccupied for nine consecutive years. We expect to remove Campaign Bay from the list of existing territories and relegate it to historical status after the 2023 breeding season. The Bachelor Cove breeding eagles currently nest in trees just outside of the flood control space, but could build a nest nearby within the flood control or conservation space. Therefore, three existing bald eagle territories (Tonto, Pinto, and Bachelor Cove breeding areas) within or just outside of the flood control and conservation space are the most at risk (depending on nest site selection) to reduced reproduction from lake levels adversely affecting nests, supporting nest trees/snags, nest contents (eggs/nestlings), and reproduction (and fledglings drowning - see below).

We anticipate over the remaining 30 years of the 2003 ITP, as many as four (occurring at the same time) eagle territories with tree/snag nests in the conservation and flood control space are at risk from adverse effects due to water levels caused by all Modified Roosevelt Dam operations (conservation storage, normal flood control, and proposed planned deviation). We expect, based upon the bald eagle's nesting history at Roosevelt (and across Arizona), the amount of bald eagle territories, their nest locations, and nesting activity will be dynamic from year to year. For example, throughout Tonto (established in 1990) and Pinto's (established in 1986) long breeding area history, bald eagles have placed nearly 20 nests in different trees within the conservation and flood control space. The Bachelor Cove eagle tree nests are not presently at risk from water levels, but depending on a short shift in nest site selection, that risk could quickly increase. The actual number of tree/snag nests and nesting eagles within the Roosevelt Lake conservation or flood control space affected in any single year will depend on the number of territories, occupancy, nesting activity, nest tree/snag location, tree status and species, nest height, and timing (and duration) of precipitation/runoff and lake elevation.

Roosevelt Lake's rising and lowering lake levels in the conservation and flood control space can adversely affect bald eagle nests, supporting nest trees/snags, nest contents (eggs/eaglets), and nest success/reproduction, and also influence the future development and persistence of nest trees. Inundation (from higher lake levels), desiccation (from extended drought), or day-to-day water storage can destroy, kill, or reduce the longevity of trees/snags holding bald eagle nests. Lake levels can adversely affect eagle reproduction by inundating, destroying, or preventing use of an active (with eggs/nestlings), occupied, or alternate nest. Prior to egg laying early in the breeding season, inundation (or partial inundation) of nests can prevent or delay reproduction, or reduce success. Water may reach close to the nest without actually destroying or covering the nest causing eagles to abandon an active nest and initiate emergency rescue operations of eggs/nestlings due to anticipated imminent failure. Lake levels may also inundate an active nest with eggs/nestlings without emergency rescue operations when either inundation occurs too quickly or biologists can't climb into or reach a nest safely. SRP estimates that lake elevations reaching a height that can effect eagles nesting in trees/snags would occur no more than 10 times over the remaining 30-

year ITP duration. We do not anticipate effects to the survivorship of any breeding eagles because of their mobility. Dynamic lake elevation movement, especially moderate events mimicking the timing of the natural hydrograph in the flood control space, can benefit existing nest trees vigor (water) and help create replacement trees (germination and growth). In the conservation space, we expect fewer cottonwood trees over time, because the timing of water storage, delivery, and periodic inundation does not align with or promote seeding, germination, growth, and persistence.

Nesting Bald Eagles Relying on Roosevelt Lake for Food

Nesting bald eagles located at and surrounding Roosevelt Lake rely on the fish and waterfowl the lake supports for food (Hunt et al. 1992), and we can expect the number of territories to fluctuate over the remaining 30-year ITP duration In the late 1970s, we knew of a single bald eagle territory relying on Roosevelt Lake (Pinal breeding area), and in the mid-1980s, that grew to two bald eagle territories (Pinal and Pinto breeding areas) (Hunt et al. 1992). Now there are eight bald eagle territories on the active list relying (or partially relying) on Roosevelt Lake for food (Pinal, Pinto, Tonto, Bachelor Cove, Armer Gulch, Two Bar, Sheep, and Campaign Bay breeding areas) (McCarty et al. 2022). Roosevelt Lake, of all Arizona lakes, supports the most bald eagle territories in the State (McCarty et al. 2022). We expect to remove Campaign Bay from the list of current territories after the 2023 breeding season, after being unoccupied for 10 consecutive years. In addition to current bald eagles nesting in trees/snags within or adjacent to the conservation and flood control space (Tonto, Pinto, Bachelor Cove, and Campaign Bay breeding areas), other current eagle territories (Pinal, Armer Gulch, Two Bar, and Sheep breeding areas) nest on nearby cliffs and trees/snags farther from the conservation and flood control space. Bald eagles established the Rock Creek and Dupont breeding areas (located in the Sierra Ancha and Four Peaks Wilderness Areas) in the 1990s, and we eventually relegated them to historical status after 10 consecutive years of unoccupancy. Yet, bald eagles established new territories (Armer Gulch and Two Bar breeding areas) closer to Roosevelt Lake in the 2000s. Over time, we can anticipate the overall number of breeding bald eagle territories relying (or partially relying) on Roosevelt Lake for food will fluctuate (increase and decrease) and possibly move locations.

We anticipate that SRP's Roosevelt Dam conservation storage operations can periodically affect bald eagle reproduction for pairs at and surrounding Roosevelt Lake relying on its food resources when the lake is exceptionally low for longer durations. Across Arizona and at Roosevelt Lake, where multiple breeding bald eagle pairs rely on dynamic lakes for food, the surface area can drop (likely to elongated drought) affecting eagle territory size, food availability and acquisition, and competition (USFWS 2003b). These changes can adversely affect bald eagle nesting attempts, eggs laid and hatched, and eaglets fledged (USFWS 2003b). We initially (USFWS 2003b) identified (and continue to identify) a lake elevation at 2,100 feet amsl or below where it is reasonable to attribute adverse effects to bald eagle productivity from a reduced lake size. SRP estimates that over the remaining ITP duration, there would be no more than four breeding seasons where the lake could reach 2,100 feet amsl or below for a substantial portion of the breeding season. We anticipate that the number of bald eagle pairs relying on Roosevelt Lake for food during these seasons will fluctuate, making it impossible to predict precisely the number of affected pairs. We can also expect that not all bald eagle pairs may be affected, and changes to lake size may not affect some pairs and possibly benefit others. There are also various reasons why eagles may not reproduce other than food, including a new bird in the pair, nest parasites, weather, etc.

Eaglets in Tree/Snag Nests Fledging Over Water

Dam operations (including the proposed planned deviation) surrounding bald eagle nest trees/snags with water in the conservation and flood control space at the end of the breeding season increases the risk of newly fledged eagles landing in water and drowning. Young eagles taking their first flights are often unstable and awkward because of their inexperience and limited strength. Leaving the nest without ground to land on or a nearby shoreline to reach by flight (or possibly swimming), increases their risk of

landing in water and drowning. SRP's Reservoir Planning Model estimates an increased future use of the flood control space compared to the past, which can cause the lake to be higher in both the conservation and flood control space more frequently. Similarly, the goal of the proposed planned deviation is to extend water into the flood control space for 100 days longer, causing the lake to be higher and persist longer in the conservation and flood control space. The frequency of risk to eagles is unpredictable because of variables such as nesting location and timing, water occurrence, and fledgling behavior. We anticipate that eagles fledgling from nests in the conservation space could be slightly more at risk, because water occurs more regularly in the conservation space and nests are likely farther from shore. Overall, we anticipate the occurrence of fledglings drowning will be rare because we have not commonly detected drowning in the past, and through time, we expect fewer large nesting trees in the conservation space.

Proposed Amended Authorization and Ongoing Conservation Measures

To account for future changes in bald eagle distribution and abundance and establish clearer thresholds to determine effects from Roosevelt operations, the RHCP amendment restates and clarifies the amount of eagle take to be authorized for the remaining 30-year ITP duration. Bald eagle incidental take from SRP covered RHCP activities (conservation storage, normal flood control, and proposed planned deviation) for the remaining 30-year ITP duration, as proposed in the RHCP amendment, includes a maximum of 3 drowned fledglings, 40 destroyed nests, and 4 reduced lake level events where the lake is reduced to a level that would affect reproduction. The number of destroyed nests was based on the anticipated maximum number of territories using nest trees/snags in the conservation and flood control space (4) and frequency of events (10) that could cause adverse effects to nesting attempts, nest success, and eggs/nestlings and the destruction of nests or nest trees/snags over the next 30 years. Based upon SRP's Reservoir Planning Model, they determined that over the remaining 30-year ITP duration, there would be no more than four events when the lake could get low enough to adversely affect bald eagle productivity. Bald eagles fledgling from trees/snags placed in the conservation and flood control space and drowning during their initial flights has a reasonable likelihood of occurring, but we expect this will be rare based on the lack of previous detections and the lake's anticipated elevation during fledging. In contrast to the original RHCP, we are including these instances based upon SRP's anticipated increased use of the flood control space for normal operations and the proposed planned deviation. With exception to fledglings drowning, we anticipated the same effects in the original RHCP, EIS, and BO. This authorization considers a range of outcomes and establishes reasonable limits to account for changes in breeding bald eagle distribution and abundance, though we expect to not reach incidental take exceedance levels.

To meet the requirements of a Section 10(a)(1)(B) ITP, SRP developed and is implementing the RHCP, which specifies measures to minimize and mitigate incidental take of bald eagles to ensure that incidental take will not appreciably reduce the likelihood of survival and recovery (SRP 2002). Mitigation, minimization, and monitoring measures required by the 2003 ITP include funding long-term annual breeding bald eagle monitoring at Roosevelt by breeding season eagle nestwatchers and a year-round Forest Protection Officer, statewide nest search and monitoring helicopter flights with Arizona Game and Fish Department (AGFD), and riparian habitat protection and rehabilitation. AGFD detects and monitors the distribution and abundance of breeding bald eagles at Roosevelt Lake from SRP helicopters. Nestwatchers and the Forest Protection Officer monitoring the daily status of the Roosevelt eagle nests allows for potential rescue of eagles, eagle eggs, or nestlings in danger at Roosevelt, and provides education to the public to minimize disturbance. The habitat enhancement and management measures mitigate potential impacts to bald eagles from the continued Roosevelt operations.

Cumulative Effects

Under the USFWS BGEPA implementing regulations, we must determine whether the direct and indirect effects of the take and required mitigation, together with the cumulative effects of other permitted take

and additional factors affecting the eagle populations within the EMU and the LAP are compatible with the preservation of bald eagles (50 C.F.R. § 22.80(f)(1)). Thus, we are assessing cumulative effects here pursuant to our obligations under the BGEPA.

Direct effects of take due to water levels from SRP's Roosevelt operations may entail the loss or decrease in productivity for eagle pairs nesting in trees/snags within the conservation and flood control space or using Roosevelt Lake for food. Indirect effects of this authorization may result in temporary or long-term displacement of breeding pairs. As lake elevations reaching a height or getting low enough to adversely affect eagles would not occur every year, direct and indirect effects to the eagles are expected to be temporary.

Take of eagles has the potential to affect the larger eagle population. Accordingly, the 2016 PEIS (USFWS 2016a), incorporated herein by reference, analyzed the cumulative effects of permitting take of bald eagles in combination with ongoing unauthorized sources of human-caused eagle mortality and other present or foreseeable future actions affecting bald eagle populations. As part of the analysis, the FWS determined sustainable limits to permitted take within each EMU. The FWS uses productivity calculations specific to the EMU to determine the amount to debit from eagle take limits each year for take resulting from loss of productivity for nesting eagles. In the Pacific Flyway South EMU, the FWS quantifies loss of productivity of one bald eagle pair by debiting EMU and LAP take thresholds by 0.95 eagles per year of the ITP (USFWS 2016b).

At Roosevelt, three existing bald eagle territories within or just outside the conservation and flood control space are most at risk from adverse effects due to water levels caused by operations, and we anticipate as many as four eagle territories with tree/snag nests in the conservation and flood control space may be impacted by water levels from Roosevelt operations. We anticipate the occurrence of fledglings drowning will be rare, but if it were to occur, it would occur at a nest in the conservation or flood control space. We also anticipate that the number of eagle pairs relying on Roosevelt Lake for food will fluctuate and that not all pairs may be affected by reduced lake level events, making it impossible to predict the number of affected pairs. The effect of fledglings drowning, reduced food, and destroyed nests is the same for an individual breeding pair in terms of annual debits to EMU take limits and LAP take thresholds; it is an effect on productivity. Therefore, for the cumulative effects analysis we determined take could occur at 0-4 territories annually due to reduced or loss of productivity. Because we anticipate as many as 4 eagle territories are at risk from adverse effects, lost reproduction for 4 territories was used in the analysis as this is the highest annual estimate of take that we can predict could occur in one year. This is different from how take is proposed to be authorized for the remaining 30-year ITP duration, but 0.95 eagles per territory per year for loss of breeding productivity is used under the PEIS to quantify cumulative local population level effects (USFWS 2016a). Here we used the maximum amount of take that could occur in one year as a conservative approach to examine cumulative effects of authorized take.

Although take authorized by this ITP is part of the baseline conditions and not subject to EMU take limits, the take that is authorized by this ITP does not exceed the Pacific Flyway South EMU take limit so will not significantly impact the EMU eagle population. The mitigation, minimization, and monitoring measures that are required under the ITP further ensure that the permit is compatible with the preservation of the bald eagle at the regional EMU population scale.

Additionally, to ensure that eagle populations at the local scale are not depleted by cumulative take in the local area, the FWS analyzed in the PEIS (USFWS 2016a) the amount of take that can be authorized while still maintaining the LAP of eagles. In order to issue an ITP, cumulative authorized take must not exceed 5% of a LAP, nor can cumulative unauthorized take exceed 10% of a LAP, unless the FWS can demonstrate why allowing take to exceed that limit is still compatible with the preservation of eagles.

We, therefore, considered cumulative effects to the LAP surrounding Roosevelt to evaluate whether the take authorized under this ITP, together with other sources of permitted take and unpermitted eagle mortality, may be incompatible with the persistence of the Roosevelt LAP. We used data on other eagle take authorized and permitted by the FWS and other reliably documented unauthorized eagle mortalities to estimate cumulative impacts to the LAP. The scale of our analysis is a 143-km (89-mile) radius around the Roosevelt site. We conducted our cumulative effects analysis as described in the FWS's Eagle Conservation Plan Guidance (ECPG; Appendix F in USFWS 2013).

Authorized Take

The Roosevelt LAP is estimated to be approximately 34 bald eagles (USFWS Cumulative Effects Tool, run 14 April 2023). Using this estimate, the 5% annual take threshold for the Roosevelt LAP is 1.7 bald eagles. As of April 2023, there is one project that overlaps with the Roosevelt LAP that is permitted to take bald eagles. The potential take at Roosevelt combined with the authorized take from the overlapping project could result in a total annual take of 4.4 bald eagles, representing 13.1% of the LAP. Although the authorized take at Roosevelt is considered part of the biological baseline level of take and is therefore not subject to EMU take limits (USFWS 2009, 2016a), the EMU take limit will not be exceeded.

Cumulative authorized take could potentially exceed our 5% benchmark and hence resulted in the FWS taking a harder look as required by the BGEPA regulations (USFWS 2016c). In this case our harder look demonstrates that despite a potential LAP take rate of 13.1%, bald eagle populations at the LAP scale are robust enough to withstand the authorized take above the 5% level. Analyses conducted by the FWS in 2016 showed that over most of the United States, bald eagle populations are growing at an average rate of approximately 5% per year (USFWS 2016b), and the FWS's recent assessment indicated that bald eagle populations in the western U.S. continue to experience robust population growth (USFWS 2020). Since the SRP ITP was issued in 2003, the breeding bald eagle population in Arizona has increased 81.0% (AGFD data provided by Kenneth Jacobson 18 April 2022, annual reports available at: https://swbemc.org/yearlyReports.html; hereafter cited as AGFD Data). The Arizona breeding population has increased 49.0% (AGFD Data), or 4.1% per year, since 2009, which is the population level that is used to estimate the 5% annual take threshold, and which is the management objective specified in the 2016 PEIS (USFWS 2016a). The population growth in excess of the 2009 population provides considerable additional capacity for take above the LAP benchmark. This indicates that a take rate of 9.1% (the 5% take rate that is compatible with the persistence of local populations plus the 4.1% rate of annual population growth in excess of 2009 population) would likely be sustainable. In addition, abundance of Arizona bald eagles increases during winter months due to arrival of migrants from northern breeding populations. The FWS recently estimated that the population in the EMU to the north, the Pacific Flyway North EMU, was 42,068 bald eagles, which is 2.8 times more eagles than in 2009 (USFWS 2020; population numbers for the Pacific Flyway South EMU that contains Arizona were not updated in the FWS's 2020 assessment). Thus, in general, size of bald eagle populations within and around the region from which take under the ITP could occur are increasing substantially.

The RHCP amendment proposes to authorize take of up to 3 drowned fledglings, 40 destroyed nests, and 4 reduced lake level events over the remaining 30-year ITP duration from reduced productivity due to alterations of lake levels. However, the LAP cumulative effects analysis considered here and the LAP take limit are annual metrics that use EMU-specific productivity (mean number of young fledged per occupied nesting territory) per year to estimate productivity potentially lost as a result of the permitted activity. Take thresholds are debited by 0.95 per territory per year in the Pacific Flyway South EMU; therefore, in this analysis we used a total annual estimate of 3.8 bald eagles for loss of productivity in the 4 eagle territories at risk from adverse effects. We believe this level of annual take is unlikely based on the monitoring data from Roosevelt territories since the ITP was issued in 2003.

As noted in USFWS 2016a, for permitted activity to have a population-level effect, it has to result in a loss of potential productivity. This ITP has been in effect for 20 years, and there is no evidence that permitted activity has had a population-level effect on the local population of eagles. The eagle territories that were within the conservation and flood control spaces when permitted activity began in 2003 still remain (Tonto and Pinto breeding areas), and the number of eagle territories that use Roosevelt for prey resources has increased (4 breeding areas in 2003 and 8 breeding areas in 2021; AGFD Data). Comparing reproductive rates in Roosevelt territories with all other territories statewide during the 2003-2021 period of permitted activity, mean nest success (number of successful breeding attempts/number of occupied nesting territories) for territories that use Roosevelt was 0.62 ± 0.29 SD (0.63 ± 0.30 SD for territories within the inundation zone) and was 0.59 ± 0.06 SD statewide (AGFD Data). There was not a significant difference in nest success between the statewide population and the population using Roosevelt ($t_{36} = 0.6$, $p = 0.57$) or within the inundation zone ($t_{36} = 0.7$, $p = 0.51$). During the 2003-2021 period of permitted activity, mean productivity for territories that use Roosevelt was 1.19 ± 0.64 SD (1.18 ± 0.64 SD for territories within the inundation zone) and was 0.92 ± 0.12 SD statewide (AGFD Data). Productivity did not differ significantly between the statewide population and the population using Roosevelt ($t_{36} = 1.8$, $p = 0.09$) or within the inundation zone ($t_{36} = 1.7$, $p = 0.09$). Examining mean nest success and productivity during the pre- and post-permit periods, reproductive rates increased in Roosevelt territories after 2003, which was also observed statewide (Table 1). The differences in nest success ($t_{31} = 1.3$, $p = 0.19$) and productivity ($t_{31} = 1.7$, $p = 0.09$) in Roosevelt territories pre- and post-permitted activity were not significant.

Table 1. Nest success and productivity in bald eagle territories using Roosevelt and all other territories statewide during the periods before and after the ITP was issued in 2003 (AGFD Data), reported as mean ± SD. Two-sample t-tests showed no significant difference between reproductive rates of Roosevelt territories and territories statewide or between Roosevelt territories before and after the ITP was issued.

	Nest Success		**Productivity**	
	Roosevelt	Statewide	Roosevelt	Statewide
pre-ITP 1989-2002	0.46 ± 0.40	0.47 ± 0.08	0.76 ± 0.76	0.71 ± 0.11
post-ITP 2003-2021	0.62 ± 0.29	0.59 ± 0.06	1.19 ± 0.64	0.92 ± 0.12

In addition, required mitigation, minimization, and monitoring measures in the form of annual nestwatchers and a Forest Protection Officer on the landscape has provided a direct conservation benefit. Funded by SRP, the Forest Protection Officer establishes and patrols seasonal closure areas around bald eagle breeding areas to minimize recreation impacts, patrols and protects riparian habitat, and helps detect and monitor eagles. Also funded by SRP, nestwatchers monitor bald eagle breeding areas on a 10-days-on/4-days-off schedule with days on spanning weekends when recreation is highest. Information from breeding area monitoring guides management of the breeding area through assessing need for closures, effectiveness of existing management, and identifying new emerging issues (e.g., public use of drones). Monitoring sites vary by year depending on nesting locations and vulnerability to human activities. There are typically 1-2 nestwatch teams monitoring the bald eagles nesting at Roosevelt Lake. In addition to collecting biological information and behavioral responses to human activities, nestwatchers alert AGFD when eagles are in life-threatening situations (e.g., rising lake levels near tree nests), which allows for the threat to be eliminated or reduced or injured eagles to be rescued and rehabilitated (McCarty et al. 2021). Nestwatchers have notified AGFD when natural events have occurred that would likely have caused reduced productivity or nest failure, such has young eagles falling out of nests or being attacked by

intruding adults, resulting in the ability to return young eagles to nests or have them be fostered into other territories.

Thus, although the LAP threshold is potentially exceeded, based on long-term population monitoring statewide and at Roosevelt, we do not have evidence of cumulative impacts over time to the breeding site or to occupancy, nest success, and productivity of the eagles potentially affected by the permitted activity. The authorized take from the local area is consistent with the management objective established in the PEIS (USFWS 2016a) and codified in regulation, and the effects to bald eagle populations at both the LAP and EMU scales are therefore not significant.

Unauthorized Take

An important caveat with the FWS's eagle mortality database is that it primarily includes records of eagle mortalities that are incidentally discovered and reported. Therefore, they represent the minimum number of unpermitted eagle mortalities, and there are likely more mortalities that were not discovered and/or reported. Additionally, some industries have self-reported incidental eagle mortalities at a higher rate than others, and some types of eagle mortalities (e.g., from vehicle collision) lend themselves better to incidental discovery and reporting while mortalities that typically occur in remote locations are unlikely to be discovered. Thus, some causes of mortality (e.g., poisoning) may be under-represented in the FWS's database. Hence, there are many types of bias associated with these records since they are not from a systematic mortality survey effort. However, the information presented below is the best information available to us regarding eagle mortalities within and around the LAP.

Based on records in the FWS's eagle mortality database, 31 unauthorized anthropogenic bald eagle mortalities were reported in the area from 2014 to 2023, for an average of 3.1 per year. Of the known anthropogenic causes of mortality for bald eagles in this time period, 8 (25.8%) were due to electrocution, 8 (25.8%) were due to lead and 1 (3.2%) other poisoning, 2 (6.5%) were due to collision with a vehicle, 1 (3.2%) was shot, and 1 (3.2%) was due to trauma. Ten (32.3%) mortalities were due to an unknown cause. On an annual basis, 3.1 unpermitted anthropogenic bald eagle mortalities near Roosevelt is approximately 9.1% of the total estimated bald eagle population in the LAP associated with Roosevelt. This amount of unauthorized take is below the 10% unauthorized take threshold for Roosevelt's LAP.

Conclusion

The authorized take of bald eagles at Roosevelt has not significantly impacted local area bald eagle populations and has been determined to be consistent with the FWS's management objective. In our review of known unauthorized bald eagle take in the area, we did not identify evidence to conclude local sources of eagle take differ from those discussed in the PEIS (USFWS 2016a). Further, the take authorized by the 2003 ITP does not exceed the EMU take limit, so would not significantly impact the EMU eagle population. The mitigation, minimization, and monitoring measures required under the ITP ensure that the ITP is compatible with the preservation of bald eagles at the local and regional EMU population scale.

List of Acronyms and Abbreviations

AGFD	Arizona Game and Fish Department
AGFD Data	Arizona Game and Fish Department data provided by Kenneth Jacobson 18 April 2022, annual reports available at: https://swbemc.org/yearlyReports.html
amsl	above mean sea level
BO	Biological Opinion
BGEPA	Bald and Golden Eagle Protection Act
C.F.R.	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
EA	Environmental Assessment
ECPG	Eagle Conservation Plan Guidance
EIS	Environmental Impact Statement
EMU	Eagle Management Unit
ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
ITP	Incidental Take Permit
LAP	Local Area Population
PEIS	Programmatic Environmental Impact Statement for the Eagle Rule Revision, December 2016
Permit	Incidental Take Permit
Permit area	Roosevelt Dam's conservation space up to an elevation of 2,151 feet
RHCP	Roosevelt Habitat Conservation Plan
Roosevelt	Modified Roosevelt Dam and Lake
SD	Standard Deviation
SRP	Salt River Project
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service

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APPENDIX C

Compliance with Environmental Regulations

C.1 INTRODUCTION

This section provides a brief summary of the laws, regulations, EOs, and other guidelines that are relevant to the proposed project activities and alternatives. Included in this summary is a discussion of the consistency of the Proposed Action with each of the laws, policies, and regulations listed below.

C.1.1 National Environmental Policy Act

This EA was prepared to evaluate impacts associated with the Proposed Action in accordance with NEPA. Based on the analysis in Chapter 3 of this EA, preparation of an EIS is not required.

C.1.2 National Historic Preservation Act of 1966, as amended

The Proposed Action is in compliance. Pursuant to Section 106 of the NHPA, the FWS determined that historic properties would not be adversely affected by the Proposed Action. Coordination with the State Historic Preservation Officer is ongoing (see Appendix G).

C.1.3 Fish and Wildlife Coordination Act, as amended

The Proposed Action is in compliance. Numerous meetings have occurred between the FWS, Corps, Reclamation, AGFD, and other resource agencies concerning the project. Discussions included potential impacts to, mitigation for, and minimization and avoidance measures for federally listed species and birds covered under the Migratory Bird Treaty Act and the BGEPA. Specific issues related to the Proposed Action were coordinated with the resource agencies. Furthermore, the draft EA was posted for public notice, which allowed FWS, the Corps, Reclamation, and other resource agencies further review.

C.1.4 Bald and Golden Eagle Protection Act, as amended

The Proposed Action is in compliance. The BGEPA of 1940 protects bald and golden eagles by prohibiting the taking, possession, and commerce of such birds and establishes civil penalties for violation of this Act. Take of bald and golden eagles is defined as follows: “disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior’’ (*Federal Register* 72:31132; 50 CFR 22.3). On November 10, 2009, the FWS implemented new rules (*Federal Register* 74:46835) governing the “take” of golden and bald eagles. The new rules were released under the existing BGEPA which has been the primary regulation protecting unlisted eagle populations since 1940. All activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity must be permitted by the FWS under this Act. The definition of “disturb “(*Federal Register* 72:31132) includes interfering with normal breeding, feeding, or sheltering behavior to the degree that it causes or is likely to cause decreased productivity or nest abandonment. Conservation measures developed as part of the 2002 RHCP and evaluated in this EA have been formulated to reduce impacts on eagles. See Appendix B for the bald eagle LAP analysis.

C.1.5 Endangered Species Act, as amended

The ESA and subsequent amendments provide guidance for the conservation of endangered and threatened species and the ecosystems upon which they depend. Section 7 requires federal agencies, in consultation with, and with the assistance of the Secretary of the Interior or the Secretary of Commerce, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse

modification of critical habitat for these species. Section 10 of the ESA specifically directs the FWS to issue ITPs to non-federal entities when the applicant satisfies the criteria in Section 10(a)(2)(B). Once the FWS receives an application for an ITP, it reviews the application to determine if it meets issuance criteria. The FWS also ensures that ITP issuance and Habitat Conservation Plan (HCP) implementation complies with other applicable federal laws and regulations.

Potential effects of the Proposed Action on federally listed species, and on designated critical habitat, including the effects of incidental take, are being addressed in formal consultation with the FWS pursuant to Section 7 and Section 10 of the ESA. A project-specific HCP pursuant to ESA Section 10, which includes conservation measures to offset the take, was prepared and is available for public review. Pursuant to ESA Section 7, a biological assessment has been prepared and is available for public review. The FWS will issue a biological opinion to confirm that the Proposed Action will not jeopardize the continued existence of federally listed species. All terms and conditions and conservation measures resulting from this consultation shall be implemented to minimize the take of listed species and avoid jeopardizing the species. The Proposed Action is in compliance.

C.1.6 Migratory Bird Treaty Act

The Proposed Action is in compliance. The Migratory Bird Treaty Act of 1918 (16 USC 703–712) prohibits the take (including killing, capturing, selling, trading, transport, etc.) of any migratory bird listed in 50 CFR Part 10.13. Take is defined as possession or destruction of migratory birds, their nests, or eggs. Birds protected under the Migratory Bird Treaty Act include essentially all native birds in a given region. Mitigation measures developed as part of the 1990 Final EA for the Theodore Roosevelt Dam modifications (Reclamation 1990) and the 2002 RHCP were formulated and implemented to reduce impacts on migratory birds.

C.1.7 Clean Air Act, as amended

The Proposed Action is in compliance. Under Section 176(c) of the Clean Air Act Amendments of 1990, federal action agencies are required to determine whether the proposed project "conforms" with the State Implementation Plan (SIP). Conformity is defined in Section 176(c) of the Clean Air Act Amendments as compliance with the SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of such standards. However, if the total direct and indirect emissions from the Proposed Action are below the General Conformity Rule applicability rates, the Proposed Action would be exempt from performing a comprehensive Air Quality Conformity Analysis and would be in conformity with the SIP. No emissions would be generated under the Proposed Action; therefore, the Proposed Action would not equal or exceed the General Conformity applicability rates.

C.1.8 Clean Water Act, as amended

The Proposed Action is in compliance with the guidelines in 40 CFR 230.10(c), promulgated by the EPA under Section 404(b)(1) of the Clean Water Act. The Proposed Action would affect waters of the U.S., including potential wetland areas, through the rising of water levels in the lake and contributing streams upstream of Modified Roosevelt near their discharge points into the lake. However, no Clean Water Act Section 404 permitting would be required as the Proposed Action would not cause a discharge of dredge or fill material within wetlands or other waters of the U.S. No reservoir facilities would be modified under this alternative.

C.1.9 Executive Order 11988, Floodplain Management

Under this EO, the Corps must take action to avoid development in the base floodplain (100-year) unless it is the only practicable alternative to reduce hazards and risks associated with floods; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial value of the base floodplain. The Proposed Action would not involve development in the flood basin, but would improve operational flexibility of the FCS. The Proposed Action is in compliance.

C.1.10 Executive Order 11990, Protection of Wetlands

EO 11990 states that projects are to "…avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative…" The Proposed Action would affect potential wetland areas through the rising of water levels in the lake and contributing streams upstream of Modified Roosevelt near their discharge points into the lake. However, the Proposed Action would not cause a discharge of dredge or fill material within wetlands or other waters of the U.S. The Proposed Action is in compliance.

C.1.11 Executive Order 12898, Environmental Justice

EO 12898 requires the EPA and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue as part of the NEPA process. The agencies are required to identify and address, as appropriate, any disproportionately high and adverse human health or environmental impacts of their programs, policies, and activities on minority and low-income populations. The order makes clear that its provisions apply fully to programs involving Native Americans. The CEQ has oversight responsibility for the federal government's compliance with EO 12898 and NEPA. The CEQ, in consultation with the EPA and other agencies, has developed guidance to assist federal agencies with their NEPA procedures so that EJ concerns are effectively identified and addressed. According to the CEQ's *Environmental Justice Guidance Under the National Environmental Policy Act* (published December 10, 1997), agencies should consider the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the Proposed Action, and if so whether there may be disproportionately high and adverse human health or environmental impacts. The project area includes minority population and low-income populations. As discussed in the analysis in Section 3.7 of this EA, the Proposed Action would not result in disproportionately high and adverse impacts on minority or low-income populations. The EA complies with the directives and objectives of EO 12898.

APPENDIX D

Scoping Announcement Letter and Response

United States Department of the Interior
Fish and Wildlife Service
Arizona Ecological Services Office
9828 North 31st Avenue, C3
Phoenix, Arizona 85051
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
AESO/SE
2022-0048502-NEPA-001

May 31, 2022

Re: Public Scoping Notice—Roosevelt Habitat Conservation Plan Amendment and Planned Deviation from Modified Theodore Roosevelt Dam's Water Control Manual

Dear Interested Parties:

The Salt River Project Agricultural Improvement and Power District (SRP) notified the U.S. Fish and Wildlife Service (FWS) that they will request an amendment for their existing 2002 Roosevelt Habitat Conservation Plan (RHCP), as well as an application for an amended Incidental Take Permit (ITP). SRP is developing the RHCP addendum with the FWS. A Habitat Conservation Plan (HCP) is a required part of an ITP application under Section 10(a)(1)(B) of the Endangered Species Act (ESA) for non-federal entities undertaking activities that adversely affect threatened or endangered species. FWS is the lead federal agency for National Environmental Policy Act (NEPA) compliance for the RHCP addendum and is seeking public input through this scoping notice.

The 2002 RHCP and ITP addressed the incidental take of four birds (three federally listed and one candidate) associated with SRP's operation of the conservation space (CS) within Modified Theodore Roosevelt Dam (Modified Roosevelt Dam). As outlined in the Proposed Action Section below, the RHCP amendment would authorize incidental take of newly listed species, add SRP's operation of Modified Roosevelt Dam in the flood control space (FCS) under the U.S. Army Corps of Engineers (the Corps) 1997 Water Control Manual (WCM) as a "covered activity," and enlarge the permit area to include the FCS and a 15-mile segment of Tonto Creek upstream of the CS.

Additionally, SRP has requested a planned deviation from the normal operating criteria identified in the Corps' WCM[1] for Modified Roosevelt Dam, in coordination with the Bureau of Reclamation (Reclamation), as the owner of Modified Roosevelt Dam. The RHCP addendum will address impacts to covered species from the planned deviation within the FCS. The proposed amended ITP, associated RHCP addendum, and the planned deviation are subject to federal approvals and, therefore, require NEPA compliance.

[1] The WCM provides an operational plan to regulate Modified Roosevelt Dam for flood control purposes pursuant to the Flood Control Act of 1944 (Section 4.5.8, 58 Stat. 887).

FWS, as the lead agency, in coordination with its cooperators, the Corps, Reclamation, and Tonto National Forest, determined that an Environmental Assessment (EA) is the appropriate level of review under NEPA.

Agency decisions by FWS and the Corps that will stem from the analysis of the planned deviation in the EA are related. FWS and the Corps will work to ensure the two agencies' requirements are addressed through all aspects of the NEPA process and development of the EA. For these reasons, the agencies are analyzing these related actions within one EA. The EA will evaluate (1) FWS's proposed review of an ITP amendment for covered activities under the RHCP, and (2) the Corps' proposed review of the planned deviation, including the impacts of the proposed actions on the quality of the human environment and reasonable alternatives.

FWS is requesting public input to help identify issues and concerns associated with the proposed RHCP addendum and amended ITP, and the planned deviation. As part of NEPA process, resources evaluated in the EA will include, but are not limited to, biology, water, recreation, transportation, utilities, cultural, Indian Trust Assets, socioeconomic, air quality, aesthetic/visual, and environmental justice.

Background

Modified Roosevelt Dam

The United States government owns Modified Roosevelt Dam and impounds water in Roosevelt Lake as part of the Salt River Project. Through a September 6, 1917 contract between the Secretary of the Interior and SRP, Reclamation has delegated to SRP the responsibility for the care, operation, and maintenance of Modified Roosevelt Dam and other facilities of the Salt River Project.

In coordination with SRP, Reclamation structurally modified Theodore Roosevelt Dam in 1996, as authorized under Public Laws 95-578 and 90-537, to include (1) FCS to help manage flood releases to reduce downstream flood damage; (2) flood surcharge space to protect the dam from overtopping (Safety of Dams); (3) additional water conservation space (New Conservation Space); and (4) new outlet works and spillway configuration (Figure 1).

In the same year that Roosevelt Dam modifications were complete, the Corps, in coordination with Reclamation, completed an EA and Finding of No Significant Impact (FONSI), describing the environmental impacts anticipated to result from WCM implementation. The WCM EA was tiered from Reclamation's 1983 Final Environmental Impact Statement (FEIS) and 1984 Record of Decision for the Central Arizona Water Control Study, and Reclamation's 1990 Final EA and FONSI for Theodore Roosevelt Dam Modifications. Reclamation's 1983 FEIS included conceptual plans and estimated impacts on recreation sites at the Modified Roosevelt Dam. Reclamation's 1990 EA also considered impacts to recreation up to the reservoir's water surface (RWS) elevation of 2,174.87 above mean sea level (amsl) and included a Recreation Enhancement Plan for facilities on Tonto National Forest Lands at Roosevelt Lake.

In September 1997, the Corps issued the WCM for Modified Roosevelt Dam. The Corps, Reclamation, and SRP entered into a Water Control Agreement, dated November 5, 1996, under which the parties agreed that SRP, as the entity responsible for the care, operation and

maintenance of Modified Roosevelt Dam, would comply with the WCM's flood control operating criteria.

Modified Roosevelt Dam's WCM operational objective is to minimize downstream flood damage along the Salt and Gila Rivers. Modified Roosevelt Dam minimizes, through controlled releases, peak discharges at the Salt-Verde River confluence during large flood events. The WCM identifies operational releases within the FCS to drawdown Roosevelt Reservoir within 20 days of initial inundation while working to maintain combined flows at the Salt and Verde River confluence below 180,000 cubic feet per second.

Modified Roosevelt Dam's WCM identifies in Section 7-14(c) when it may be necessary to temporarily deviate from the established flood control plan. Planned deviations are one of three categories of deviations identified in the WCM. Section 7 of the 1944 Flood Control Act, the Corps' Engineer Regulation 1110-2-240, and the South Pacific Division's Regulation 10-1-04, as well as the existing Modified Roosevelt Dam WCM and Water Control Agreement, establish the process and requirements for approval of a planned WCM deviation.

2002 Roosevelt Habitat Conservation Plan

SRP's 2002 RHCP addresses the impacts to and take of four bird species (yellow-billed cuckoo [*Coccyzus americanus*; hereafter cuckoo], southwestern willow flycatcher [*Empidonax traillii extimus*; hereafter flycatcher], Yuma Ridgway's rail [*Rallus obsoletus yumanensis*; hereafter rail], and bald eagle [*Haliaeetus leucocephalus*]) resulting from SRP's conservation storage operations within Modified Roosevelt Dam. The 2002 RHCP and 2003 ITP permit area covers Roosevelt Lake's CS which extends to the reservoir's water surface (RWS) elevation of 2,150.78 feet amsl. In February 2003, FWS signed its RHCP Record of Decision on the Environmental Impact Statement under NEPA, completed a Section 7 ESA Biological Opinion on the issuance of the ITP, and issued a Section 10(a)(1)(B) ITP to SRP.

FWS will consider SRP's proposed amendment to the RHCP and ITP under the following requirements identified in Section 10(a)(2)(A) of the ESA; implementing regulations at 50 Code of Federal Regulations (CFR) 17.22(b) (endangered species) and 17.32(b) (threatened species); the issuance criteria for HCPs at 50 CFR 17.22(b)(2) and 50 CFR 17.32(b)(2); and, 50 CFR 222.25, 222.27, and 222.31. SRP does not expect the proposed amendment to change the ITP related to federally listed birds (cuckoo, flycatcher and rail) within the Roosevelt Lake CS and anticipates re-evaluating the bald eagle's status and incidental take under the Bald and Golden Eagle Protection Act (Eagle Act).

Since 2003, FWS listed as threatened two species that occupy portions of the CS and FCS: the cuckoo (previously a candidate species) and northern Mexican gartersnake (*Thamnophis eques megalops*; hereafter gartersnake). Additionally, FWS designated critical habitat in portions of the FCS for the flycatcher, cuckoo, gartersnake, and the endangered spikedace (*Meda fulgida*). Reclamation's 1995 Biological Assessment (and FWS's subsequent 1996 Biological Opinion) did not address effects of FCS operations on these species and designated critical habitat. FWS also defined the word "disturb" under the Eagle Act (71 Federal Register [FR] 8265), delisted the bald eagle (72 FR 37345, 73 FR 23966, 77 FR 25792), and established regulations to permit take under the Eagle Act where the take is associated with otherwise lawful activities (73 FR 29075).

Authorities

FWS is the federal agency delegated the authority by the Secretary of the Interior to approve Section 10 permits (including amendments) in accordance with the ESA. FWS must determine whether the RHCP addendum meets the issuance criteria specified in the ESA, Section 10. FWS will issue the amended ITP if they determine the proposed RHCP addendum meets issuance criteria and the covered activities, including implementation of appropriate minimization and mitigation measures, will not jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. Among other requirements, SRP's RHCP addendum must specify the impacts that are likely to result from the taking, the measures they will undertake to minimize and mitigate such impacts, and the funding that will be available to implement such measures. Section 10(a)(2)(B) of the ESA sets forth the statutory criteria that must be satisfied before the RHCP addendum can be approved and an amended ITP can be issued.

The Corps is responsible for providing flood control operating criteria for use of capacity allocated for flood control at all reservoirs constructed wholly or in part with federal funds. The Corps has final approval authority over issuance of WCM deviations, in accordance with Section 7 of the Flood Control Act of 1944. The WCM and Water Control Agreement provide that the Corps must determine whether to approve proposed non-emergency deviations from the Water Control Plan and instruct that SRP shall make any requests for deviation to the Corps, after consultation with Reclamation.

Proposed Action

FWS's proposed action is the approval of SRP's application to amend the ITP, as outlined below. SRP is not proposing any changes to Modified Roosevelt CS operations but developed the amended RHCP to address CS operation impacts to gartersnakes. SRP anticipates gartersnake impacts to occur within the Tonto Creek arm CS of Roosevelt Lake and along lower Tonto Creek. Therefore, SRP is expanding its permit area to address effects on gartersnakes from CS activities that contribute to the movement of predatory nonnative fish into lower Tonto Creek. The RHCP addendum permit area includes 1) the Roosevelt Lake CS, 2) the Roosevelt Lake FCS, and 3) lower Tonto Creek from the top of the FCS upstream to the crossing of East del Chi Drive (Figure 2). The proposed ITP amendment and RHCP addendum would authorize:

1) Incidental take of the gartersnake associated with SRP's operations in Roosevelt Lake's CS below RWS elevation 2,150.78 feet amsl.
2) Incidental take of the gartersnake associated with SRP's normal operations in the FCS (RWS elevation 2,150.78 to 2,174.87 feet amsl) under the current WCM.
3) Incidental take of the gartersnake, flycatcher, and cuckoo associated with SRP's operations in the FCS under the proposed planned deviation from the existing WCM, conditioned on Corps approval. SRP anticipates no incidental take of the rail.
4) Incidental take of the gartersnake within a 14.1-mile segment of Tonto Creek upstream of Roosevelt Lake (see Figure 2), associated with SRP's Modified Roosevelt Dam operations in the CS below RWS elevation 2,150.78 feet amsl.

In addition, the proposed RHCP addendum evaluates the effects of SRP's operation of the FCS under the 1997 WCM and the planned deviation on designated critical habitat for gartersnake,

flycatcher, cuckoo, and spikedace. SRP's proposed RHCP addendum also evaluates the impacts of ongoing CS and FCS operations under the Eagle Act.

The Corps' proposed action is the approval of a planned deviation from the WCM, as requested by SRP. SRP's proposed WCM deviation request would extend the maximum acceptable release period for water held within the first 5 feet of the FCS (RWS elevations 2,150.78 to 2,155.78 feet amsl) from 20 days to 120 days, with authority to exercise in up to 3 years in a 5-year period immediately following approval of the deviation. Since the Corps finalized Modified Roosevelt Dam's WCM in 1997, central Arizona's surface water use has extended outside of SRP's water service area, primarily from Colorado River water provided by the Central Arizona Project canal. Growth in central Arizona water use, combined with likelihood of reductions in Colorado River water availability, requires careful management of water supplies, including Salt River spill waters created by flood events. Spill conditions at Modified Roosevelt Dam occur when 1) the SRP CS is full, and 2) water levels in the CS are rising as inflows into Modified Roosevelt Dam exceed SRP deliveries out of Stewart Mountain Dam, or 3) when water enters the FCS. Spill water from the Salt River is water that, prior to the modifications to Modified Roosevelt Dam, SRP would have either delivered as spill water to existing agreement holders or would have physically spilled over Granite Reef Dam. SRP's planned deviation could improve water supply flexibility within the FCS by allowing for increased use of spill water. When available, spill water users can benefit through direct use or through underground recharge of the spill water for recovery during times of drought or water shortage.

As part of the proposed action, SRP would implement a gartersnake conservation program for impacts associated with CS and normal FCS activities and the planned deviation to achieve a level of conservation benefit that fully offsets the impacts of the anticipated incidental take. SRP would implement the following measures to address impacts to gartersnake associated with CS and normal FCS activities: 1) suppression of nonnative predatory fish by electrofishing in two separate lower Tonto Creek reaches; 2) stocking of native fishes in two separate lower Tonto Creek reaches and the FCS; 3) stocking of lowland leopard frog (*Rana yavapaiensis*) in the Gisela reach of lower Tonto Creek and possibly the FCS; and 4) potential funding of a lowland leopard frog breeding facility. To offset impacts of gartersnake take associated with the planned deviation, SRP would conduct native fish stocking in the FCS. SRP would monitor and adaptively manage implementation of gartersnake conservation measures to achieve effective and efficient conservation.

The proposed action described above, as well as reasonable alternatives, may be further developed during the NEPA process.

How to Comment

As part of this EA development process, FWS is seeking your participation to identify potential issues or concerns with the proposed agency actions and resources these actions may affect. You should submit comments to SRP RHCP Amendment Project, Attn: SWCA Environmental Consultants, 20 East Thomas Road, Suite 1700, Phoenix, AZ 85012 or via email to RHCPcomments@swca.com, no later than 30 days from the date of this notice.

Please be aware that by law, your name, address, and other personal identifying information may be made publicly available at any time. Individuals may request that their personal identifying information be withheld from public review by stating so prominently at the beginning of your comment. We cannot guarantee that we will be able to do so; however, we will honor your

request to the extent allowable by law. All comments from organizations or businesses will be available for public inspection in their entirety.

For additional information regarding this notice, please contact Mr. Greg Beatty, Arizona Ecological Services Office via email greg_beatty@fws.gov.

Sincerely,

HEATHER WHITLAW Digitally signed by HEATHER WHITLAW Date: 2022.05.31 14:11:43 -07'00'

Heather Whitlaw
Field Supervisor

7

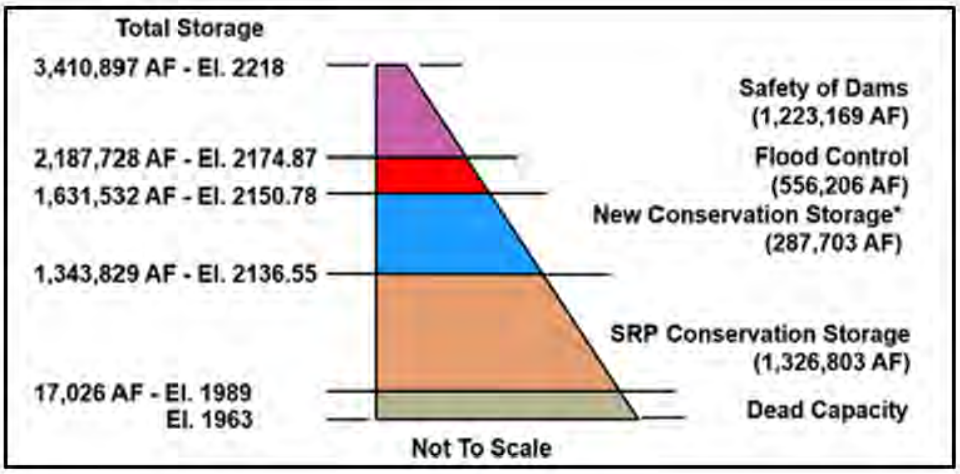

Figure 1. Delineated Storage Space within Modified Theodore Roosevelt Dam by Elevation

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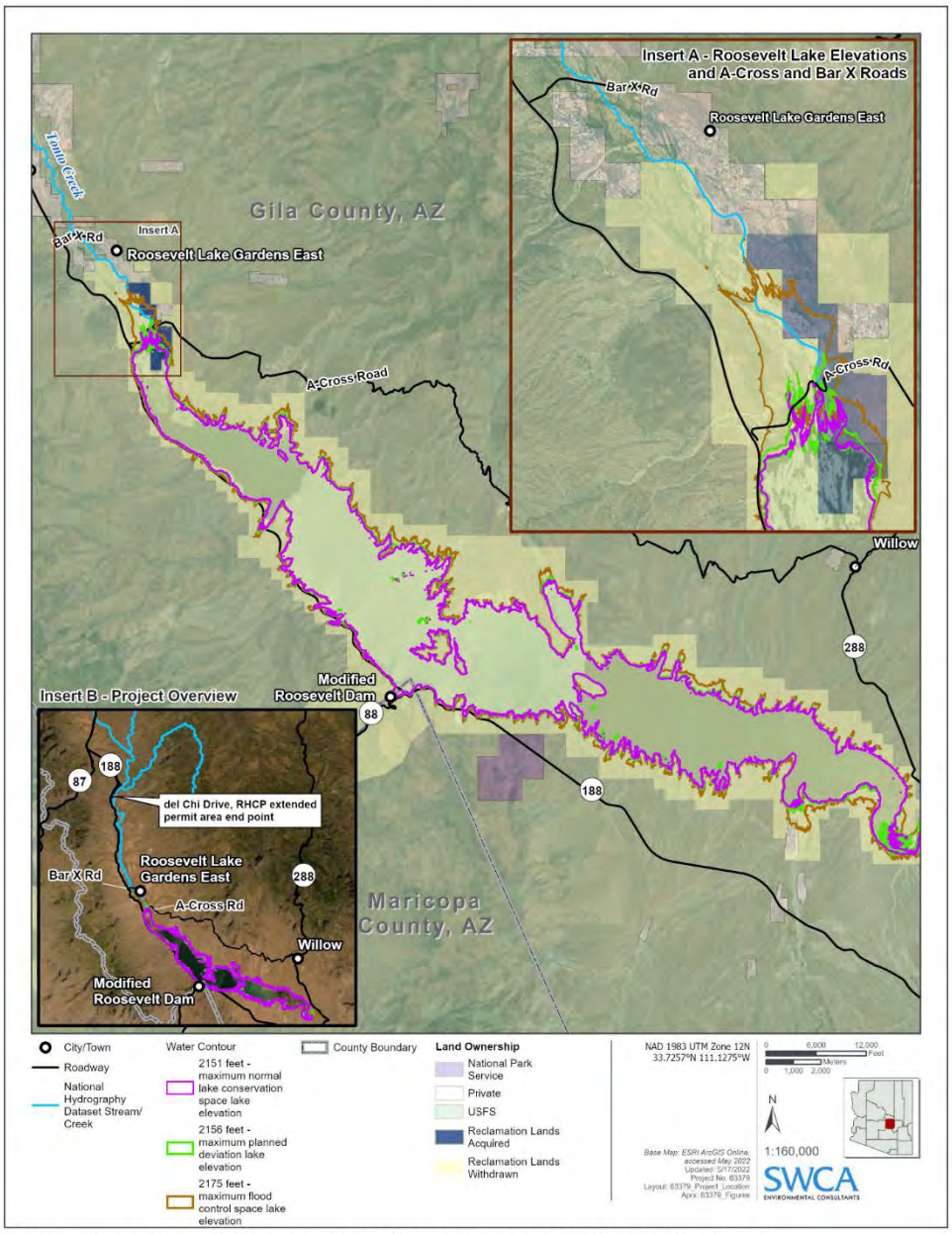

Figure 2. Project Area for the Expanded Permit Area and the Planned Deviation

June 30, 2022

SRP RHCP Amendment Project
Attn: SWCA Environmental Consultants
20 East Thomas Road, Suite 1700
Phoenix, Arizona 85012

Electronically submitted to: RHCPcomments@swca.com

RE: Roosevelt Habitat Conservation Plan Amendment and Planned Deviation from Modified Roosevelt Dam's Water Control Manual

Dear Sir/Madam:

The Arizona Game and Fish Department (Department) appreciates the opportunity to provide review and comment on the May 31, 2022 scoping notice on the Salt River Project's (SRP) request for an amendment and planned deviation from the modified Theodore Roosevelt Dam's Water Control Manual, Roosevelt Habitat Conservation Plan (RHCP) as well as the U.S. Fish and Wildlife Service's (FWS) issuance of an amended Incidental Take Permit (ITP). The Department understands that SRP is requesting to amend their RHCP and ITP to authorize incidental take of newly listed species (Northern Mexican Gartersnake) and to enlarge the ITP area to include the inundation of land within the flood control storage space (FCS), which includes a 15 mile segment of lower Tonto Creek upstream of the existing coverage for the conservation space (CS) impounded by Roosevelt Dam.

Under Title 17 of the Arizona Revised Statutes, the Department, by and through the Arizona Game and Fish Commission (Commission), has jurisdictional authority and public trust responsibilities to conserve and protect the state fish and wildlife resources. In addition, the Department manages threatened and endangered species through authorities of Section 6 of the Endangered Species Act and the Department's 10(a)1(A) permit. It is the mission of the Department to conserve and protect Arizona's diverse fish and wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations. For your consideration, the Department provides the following comments based on the agency's statutory authorities, public trust responsibilities, and special expertise related to wildlife resources and recreation.

Fish and Wildlife Coordination Act

It is the Department's understanding that SRP has requested to deviate from the normal operating criteria identified in the U.S. Army Corps of Engineers' Water Control Manual for Modified Roosevelt Dam, in coordination with the Bureau of Reclamation (Reclamation) as the owner of Modified Roosevelt Dam. The proposed action will modify operations of Roosevelt Dam identified in the 1996 EIS and Record of Decision and affect the reservoir and 15 miles of Tonto

azgfd.gov | 602.942.3000
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Creek. The proposed action falls within the authorization of the Fish and Wildlife Coordination Act (FWCA) Section 2 and the Department requests that the spirit and intent of the FWCA be met through the NEPA process. Department staff remain available to assist in identifying potential effects to fish and wildlife resources and to assist in identifying appropriate and feasible avoidance and/or minimization measures as may be necessary for the project.

Gartersnake Conservation Program

The Department has included the following comments and recommendations in response to the identified gartersnake conservation program described in the scoping notice as part of the proposed action. The Department, having statutory authority for the management of fish and wildlife, requests inclusion in the review and development of any mitigation measures. Department staff have been involved in previous meetings with SRP, FWS, and SWCA, however no suggested mitigation measures had been identified. Additionally, the Department remains available to work with SRP to develop an agreement and to assist SRP in obtaining appropriate Department permits to implement the mitigation measures below.

Measure 1. *The suppression of non-native predatory fish in two reaches of lower Tonto Creek:*
Based on the information provided, the Department is unclear who will be conducting this work and if it will occur on public and/or private lands. The inclusion of suppression efforts on private inholdings is important to success, particularly on lower Tonto Creek between A Cross Rd and del Chi Drive. This area could have habitats that are supporting non-native fish that could recolonize the sections where suppression has occurred. Additionally, the Department recommends SRP conduct public outreach prior to the beginning of suppression efforts.

Measure 2. *Stocking native fishes into two seperate reaches of lower Tonto Creek and the FCS:*
While the Department understands that stocking native fish into two reaches of lower Tonto Creek may be beneficial for gartersnakes in the short term, the stocking of native fish into the FCS is not likely to provide a real benefit to gartersnake. There are existing resident non-native fish species in the FCS, such as threadfin shad and young of the year species such as sunfish and largemouth bass, that are currently available as prey for Mexican gartersnakes. Stocked native fish in this area would likely feed predatory non-native fish more than they would the gartersnakes. Furthermore the stocking of native fishes from other waters brings with it a host of other concerns (i.e. pathogens, parasites, and AIS transport as non-target organisms with translocated fish). Department staff are available to help address these concerns and help identify a potential source of native fishes for translocation to Tonto Creek should this measure move forward.

Measure 3: *Stocking of lowland leopard frog (Rana yavapaiensis) in the Gisela reach of lower Tonto Creek and possibly the FCS:*
The Department has limited information regarding the Mexican gartersnake population in the vicinity of Gisela; specifically, on an approximately 0.6 mile reach of Tonto Creek between Gisela and "The Box" and is aware of three concerted efforts to sample this area/population. The first two included an effort in July-August 2004, followed by an additional effort in June 2005 by Holycross et al. (2006). These surveys produced one adult snake in 2004 and 15 snakes in 2005 (14 of which were neonates). The third sampling effort occurred in June 2010 and produced one

adult Mexican gartersnake. Based on the limited sample size, information regarding population structure or abundance, but more importantly, information regarding factors that might be limiting the population is lacking. As well, the Department knows there are bullfrogs in this reach of the creek. Holycross et al. (2006) noted bullfrogs were not abundant, and Burger (trip report) said they were numerous in 2010. Bullfrogs are generally considered a threat to Mexican gartersnakes, but they are also a food source, and probably sustain (in part) the gartersnake population near Gisela.

Historically, lowland leopard frogs comprised a significant portion of the diet of Mexican gartersnakes on Tonto Creek. Lowland leopard frogs currently persist in a number of Tonto Creek tributaries and in relatively low densities on the mainstem of Tonto Creek. Current populations are likely much lower than they were historically due to the introduction of chytridiomycosis (Bd) from bullfrogs in the 1970s and 1980s. Within the historical distribution of lowland leopard frogs, bullfrogs have also displaced leopard frogs either through predation, larval competition, or by transmitting Bd. The two species do coexist in some cases, but where they do lowland leopard frogs do not seem to thrive.

The Department has a long history of ranid frog conservation and management, largely through translocation efforts (primarily Chiricahua leopard frog and Tarahumara frog). Although the Department knows that Bd cannot be prevented from affecting introduced populations, it is important to continue to implement translocations to support local populations that will eventually evolve some degree of disease resistance (as have frogs in parts of Australia, and possibly Central America). Even so, the Department always ensures native ranid frogs are not stocked/translocated to sites that harbor bullfrogs.

Lastly, the Department recommends the following information be provided in the Environmental Assessment:

1. Describe the current status and conservation needs of the Mexican gartersnake population near Gisela.

2. Describe prey availability for Mexican gartersnakes and whether or not prey limitation in this reach of Tonto Creek is adversely affecting gartersnake survival.

3. Describe the current status of the bullfrog population near Gisela.

4. Provide any information/evidence that introduced lowland leopard frogs will persist at these sites, relative to the bullfrog population that currently exists.

5. Provide the status of Bd in this reach of Tonto Creek, along with an assessment of leopard frog survival and whether their survival is long enough to supplement the gartersnakes' diet.

6. Provide the status of Mexican gartersnakes on Tonto Creek immediately above the Roosevelt Dam flood control space.

Measure 4: *potential funding of lowland leopard frog breeding facility:*
Any entity involved in the propagation of lowland leopard frogs will need permits from and the approval of the Department. The Department is available to discuss potential breeding facilities and assist SRP and/or FWS with identifying locations suitable for a lowland leopard frog breeding facility. While the Department is not confident that the introduction of lowland leopard frogs to Tonto Creek will result in any tangible benefit to Mexican gartersnakes, a lowland leopard frog breeding facility might contribute to conservation benefits for lowland leopard frogs in other suitable habitats around the watershed where source populations are difficult to identify or are compromised by Bd.

Thank you for the opportunity to provide input on this Public Scoping Notice. The Department is available to assist SRP and FWS with development of supportable and meaningful conservation measures for Mexican gartersnakes. For further coordination, please contact David Weedman, Aquatic Habitat Program Manager, at dweedman@azgfd.gov or 623-236-7607.

Sincerely,

Luke Thompson
Habitat, Evaluation, and Lands Branch Chief

AGFD # M22-06074607

The following are responses to the AGFD Scoping comment letter dated June 30, 2022, prepared collaboratively by the SRP and FWS.

AGFD Comment:

Measure 1. The suppression of non-native predatory fish in two reaches of lower Tonto Creek: Based on the information provided, the Department is unclear who will be conducting this work and if it will occur on public and/or private lands. The inclusion of suppression efforts on private inholdings is important to success, particularly on lower Tonto Creek between A Cross Rd and del Chi Drive. This area could have habitats that are supporting non-native fish that could recolonize the sections where suppression has occurred. Additionally, the Department recommends SRP conduct public outreach prior to the beginning of suppression efforts.

Response:

SRP has not determined who will be conducting fish removal activities. SRP is considering a number of options including hiring consultants, coordinating with AGFD for partnered fish removal activities that AGFD will be conducting under their Section 6 permit, and utilizing SRP staff and contract staff to perform these seasonal activities.

SRP will not be conducting fish removal on private property, only state and federal lands.

Non-native fish removal will be concentrated in the sections of Tonto Creek where waters tend to be more persistent – downstream of Greenback Road. In typical years, residual pools (outside of gravel mining operations) dry up along with any fish that may be present, which decreases the likelihood of those fish distributing downstream during monsoon rains. In wetter than normal years when flows persist for longer and pools are more prevalent between Greenback Road and East del Chi Drive, fish removal will occur in that reach.

The public will have an opportunity to review and provide comment on the proposed conservation program, including fish removal activities, when the RHCP is released for public comment by FWS.

AGFD Comment:

Measure 2. Stocking native fishes into two seperate reaches of lower Tonto Creek and the FCS: While the Department understands that stocking native fish into two reaches of lower Tonto Creek may be beneficial for gartersnakes in the short term, the stocking of native fish into the FCS is not likely to provide a real benefit to gartersnake. There are existing resident non-native fish species in the FCS, such as threadfin shad and young of the year species such as sunfish and largemouth bass, that are currently available as prey for Mexican gartersnakes. Stocked native fish in this area would likely feed predatory non-native fish more than they would the gartersnakes. Furthermore the stocking of native fishes from other waters brings with it a host of other concerns (i.e. pathogens, parasites, and AIS transport as non-target organisms with translocated fish). Department staff are available to help address these concerns and help identify a potential source of native fishes for translocation to Tonto Creek should this measure move forward.

Response:

The goal of SRP's non-native fish removal efforts on lower Tonto Creek is to minimize predatory non-native fish that are large enough to prey upon gartersnakes and remove those prey species such as brown bullhead that have been documented to injure gartersnakes upon ingestion. After fish removal activities have occurred, stocking locations will be determined based the need to augment gartersnake forage and the likelihood of the pool persisting throughout the summer months.

SRP understands that with any fish culture and stocking that pathogens may be problematic. SRP looks forward to discussing species, timing, location, and pathogenic risks for these stocking efforts. SRP has proposed an annual coordination process with FWS and other agencies, including AGFD, to discuss implementation of the RHCP such as identifying potential sources of native fishes for stocking.

AGFD Comment:

Measure 3: Stocking of lowland leopard frog (Rana yavapaiensis) in the Gisela reach of lower Tonto Creek and possibly the FCS: The Department has limited information regarding the Mexican gartersnake population in the vicinity of Gisela; specifically, on an approximately 0.6 mile reach of Tonto Creek between Gisela and "The Box" and is aware of three concerted efforts to sample this area/population. The first two included an effort in July-August 2004, followed by an additional effort in June 2005 by Holycross et al. (2006). These surveys produced one adult snake in 2004 and 15 snakes in 2005 (14 of which were neonates). The third sampling effort occurred in June 2010 and produced one adult Mexican gartersnake. Based on the limited sample size, information regarding population structure or abundance, but more importantly, information regarding factors that might be limiting the population is lacking. As well, the Department knows there are bullfrogs in this reach of the creek. Holycross et al. (2006) noted bullfrogs were not abundant, and Burger (trip report) said they were numerous in 2010. Bullfrogs are generally considered a threat to Mexican gartersnakes, but they are also a food source, and probably sustain (in part) the gartersnake population near Gisela.

Historically, lowland leopard frogs comprised a significant portion of the diet of Mexican gartersnakes on Tonto Creek. Lowland leopard frogs currently persist in a number of Tonto Creek tributaries and in relatively low densities on the mainstem of Tonto Creek. Current populations are likely much lower than they were historically due to the introduction of chytridiomycosis (Bd) from bullfrogs in the 1970s and 1980s. Within the historical distribution of lowland leopard frogs, bullfrogs have also displaced leopard frogs either through predation, larval competition, or by transmitting Bd. The two species do coexist in some cases, but where they do lowland leopard frogs do not seem to thrive.

The Department has a long history of ranid frog conservation and management, largely through translocation efforts (primarily Chiricahua leopard frog and Tarahumara frog). Although the Department knows that Bd cannot be prevented from affecting introduced populations, it is important to continue to implement translocations to support local populations that will eventually evolve some degree of disease resistance (as have frogs in parts of Australia, and possibly Central America). Even so, the Department always ensures native ranid frogs are not stocked/translocated to sites that harbor bullfrogs.

Lastly, the Department recommends the following information be provided in the Environmental Assessment:

1. *Describe the current status and conservation needs of the Mexican gartersnake population near Gisela.*
2. *Describe prey availability for Mexican gartersnakes and whether or not prey limitation in this reach of Tonto Creek is adversely affecting gartersnake survival.*
3. *Describe the current status of the bullfrog population near Gisela.*
4. *Provide any information/evidence that introduced lowland leopard frogs will persist at these sites, relative to the bullfrog population that currently exists.*
5. *Provide the status of Bd in this reach of Tonto Creek, along with an assessment of leopard frog survival and whether their survival is long enough to supplement the gartersnakes' diet.*
6. *Provide the status of Mexican gartersnakes on Tonto Creek immediately above the Roosevelt Dam flood control space.*

Response:

Prior to any treatments or stocking in the Gisela reach of Tonto Creek, SRP will conduct a comprehensive baseline analysis of the Gisela reach to establish; 1) presence and size class distribution of fish species currently present, 2) presences of gartersnakes, life stages and sex ratios, and 3) presence of other herpetofauna including but not limited to bull frogs and lowland leopard frogs. SRP had not considered evaluating Bd in the Gisela reach but will consult with the AGFD regarding the methods do so. This baseline analysis will be used to determine the status and threats to gartersnake in this reach. That baseline will then be used to compare to future evaluations and determine if mitigation activities are producing positive effects to gartersnake habitat.

Items 1 and 6 are addressed in both the Amendment document and the EA. These documents will provide the AGFD with a better understanding of the approach and the goals of the proposed mitigation activities. SRP also has offered to provide to the AGFD a detailed presentation of the mitigation program in terms of scope, scale, triggers and periodicity of the proposed activities.

AGFD Comment:

Measure 4: potential funding of lowland leopard frog breeding facility:
Any entity involved in the propagation of lowland leopard frogs will need permits from and the approval of the Department. The Department is available to discuss potential breeding facilities and assist SRP and/or FWS with identifying locations suitable for a lowland leopard frog breeding facility. While the Department is not confident that the introduction of lowland leopard frogs to Tonto Creek will result in any tangible benefit to Mexican gartersnakes, a lowland leopard frog breeding facility might contribute to conservation benefits for lowland leopard frogs in other suitable habitats around the watershed where source populations are difficult to identify or are compromised by Bd.

Response:

SRP has identified at least two facilities that would be able to accommodate lowland leopard frog breeding. SRP understands that any such facility would need to operate under an AGFD permit. Any frog egg mass stocking efforts would occur in the perennial sections of Tonto Creek near Gisela. Prior to any such effort, SRP and its contractors will conduct a baseline survey to determine if lowland leopard frogs are present, to what degree, and if stocking is warranted. SRP also acknowledges that local population genetics is important to maintain. Through the coordination process built into the RHCP addendum, SRP will work with the AGFD to determine brood stock sources appropriate for the proposed stocking locations.

APPENDIX E

Development of Planned Deviation Alternatives and Alternatives Considered but Eliminated

E.1 INTRODUCTION

NEPA regulations (40 CFR 1502.14(a)) require consideration of "reasonable" alternatives, but those alternatives must be practical or feasible from technical and economic standpoints. The FWS and the Corps considered planned deviation alternatives that SRP developed when formulating its deviation request. SRP identified and reviewed alternatives to the specific formulation of the elements comprising the planned deviation (i.e., elevational range, duration of inundation, and period of applicability). The proposed planned deviation under the Proposed Action includes the optimum operational deviation based on: 1) elevation of FCS, 2) inundation duration of FCS, and 3) probability of occurrence and timing during the deviation period. The overall planned deviation proposal balances the cost and level of effort for review, implementation, and approval, with the potential benefits if large runoff events occur. Balancing the costs of seeking approval with the potential benefits created by the planned deviation is especially important since the planned deviation is temporary, and the accrual of benefits is dependent on highly variable and uncertain precipitation patterns.

E.1.1 Reservoir Planning Model

SRP used the Reservoir Planning Model to simulate reservoir storage and spill using historical hydrologic records of the Salt and Verde Rivers for a period spanning 1914 to 2019, and adjusted the record for expected climate change effects on hydrology in order to develop the elevations, durations, and timing considered for the proposed planned deviation while optimizing beneficial use of spill waters.[12] Using the climate change–adjusted hydrology, the Reservoir Planning Model estimated reservoir inflows, storage levels, elevations, releases, and spills based on existing dam infrastructure and operational rules in place as of 2021 and a current system demand of 750,000 acre-feet per year (Figure E-1).

The Salt River watershed follows a typical long-term oscillation pattern from wet periods (above median runoff) to dry periods (below median runoff) every 20 to 25 years (see Figure E-1). Water entering the FCS is more common during wet periods and less frequent during dry periods. SRP used the modeled reservoir inflows, reservoir releases (for delivery and spill), and water accruals to further develop the proposed planned deviation.

[12] For this work, a climate change–adjusted hydrology was based on changes in temperature, precipitation mean, and precipitation variability derived from Global Climate Model projections. The applied increase in temperature over the 106-year period was around a 4-degree Celsius increase for the Salt River watershed. The applied change in mean precipitation was around a 4.5% decrease on Salt River watershed. The change in precipitation variability was represented with an empirical cumulative distribution function with precipitation in the wettest years (above the 90th percentile) increased by 5% to 10% and precipitation in the driest years (below the 10th percentile) decreased by 20% to 30%.

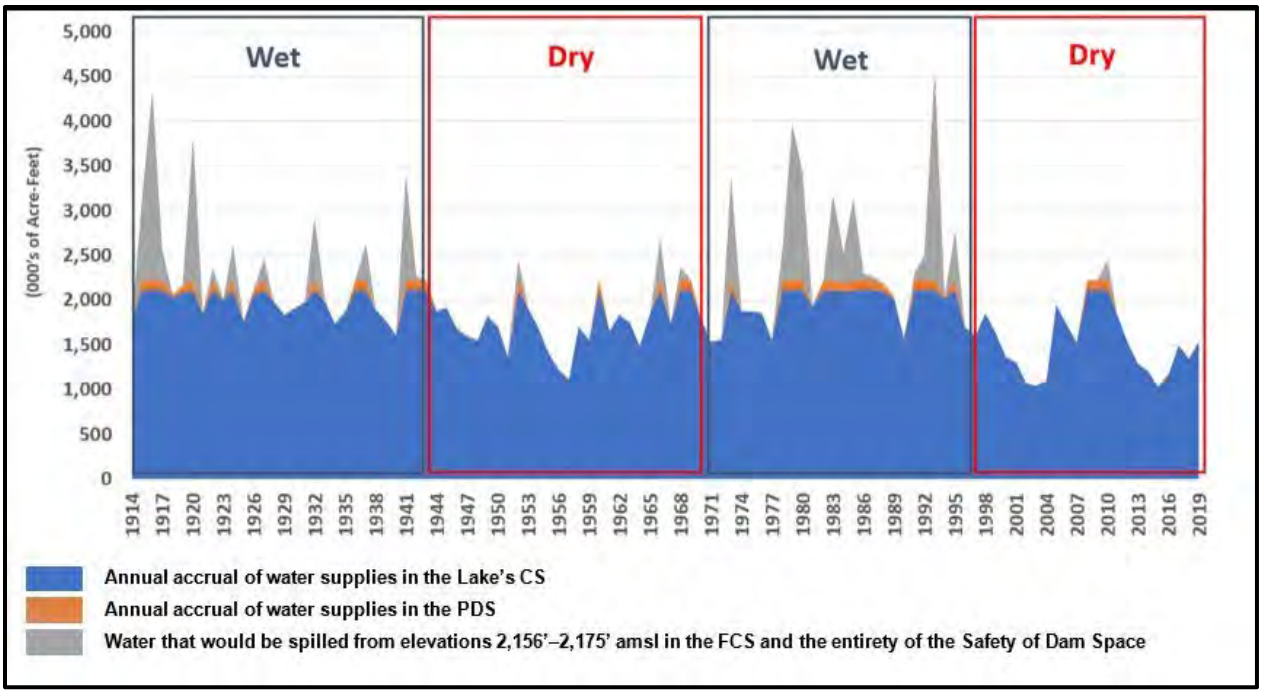

Figure E-1. Modeled reservoir water accruals and spill at Modified Roosevelt.

E.1.2 Elevation Limit for Planned Deviation Space

The total water volume of the FCS contained within the 24 vertical feet of Modified Roosevelt is 556,206 acre-feet (Figure E-2). Through discussions with Reclamation, SRP identified that limiting the planned deviation to the first 5 feet of the FCS would not require a new structural risk assessment and could instead rely on existing information from the dam design and other prior analyses for Modified Roosevelt and the Salt River Basin. Additionally, SRP expects that existing spill water users could also put the proposed extra 108,620 acre-feet of volume generated by using 5 feet of the FCS (see Figure E-2) to beneficial use[13] within the same calendar year.

	Amount into FCS		Roosevelt Elevation	Roosevelt Volume
	feet	acre-feet	feet amsl	acre-feet
	2.5	53,874	2,153.28	1,685,428
Proposed Elevation:	5	108,620	2,155.78	1,740,174
	7.5	164,318	2,158.28	1,795,872
	10	220,828	2,160.78	1,852,382
	15	336,464	2,165.78	1,968,018
	20	455,764	2,170.78	2,087,318
	24.09	556,206	2,174.87	2,187,760

Figure E-2. Lake volume within FCS elevation bands.

In consultation with Reclamation's dam safety specialists on cost and schedule efficiencies, SRP identified an elevation for changing the flood release curve that could rely on existing detailed structural safety analyses, thereby limiting Reclamation's Dam Safety Advisory Team scope of the analysis.

[13] "Beneficial use" includes but is not limited to use for domestic, municipal, recreation, wildlife (including fish), agricultural, mining, stock watering, and power purposes (Arizona Revised Statutes 45-181).

Reclamation's Dam Safety Advisory Team could rely on existing facility and engineering information to assess risks for the first 5 feet within a year. Narrowing the Dam Safety Advisory Team's scope limited the costs and effort to perform the necessary due diligence analyzing risk and safety, maximizing the benefits created by the 5-year planned deviation.

FWS and the Corps considered the FCS elevations between 2,151 feet and 2,175 feet for the planned deviation. However, these elevations would require a new detailed structural safety analysis by Reclamation, resulting in the need for additional resources and time. The additional water volume made possible by higher elevations may be beyond what existing spill water users could expect to put to beneficial use within the same calendar year.

E.1.3 Inundation Duration for the Planned Deviation Space

SRP used the data and results discussed above to identify a desired duration for an extended-release period beyond the current WCM requirement of 20 days. Their analysis used the Reservoir Planning Model and replaced the WCM's existing flood control release curve with only the minimum releases necessary to meet SRP water deliveries during the period. This hypothetical exercise allows for analysis of how long the reservoir would remain within the PDS if flood control operations were not necessary and water conservation operations were prioritized.

Runoff events that create spill conditions and/or necessitate FCS operations typically occur between January 1 and May 31 (winter/spring runoff periods) and are most likely to occur between March 1 and March 31 (with March being a heavy month for snow and rain events). Of the 106-year period analyzed, 47 years had modeled reservoir inflows that could result in water elevations entering the FCS (elevations greater than 2,150.78 feet amsl). SRP used the Reservoir Planning Model to identify how many days it would take to evacuate any water that accrued in the PDS under normal reservoir deliveries[14] for meeting Salt River Project system demand (Figure E-3). Analysis of the evacuation duration data shows that, out of the 106 years,

- 47 years would have sufficient volume in the PDS to require at least 30 days for the reservoir to recede below an elevation of 2,151 feet amsl (back into the conservation pool);
- 45 years would have sufficient volume in the PDS to require at least 60 days for the reservoir to recede below an elevation of 2,151 feet amsl;
- 35 years would have sufficient volume in the PDS to require at least 90 days for the reservoir to recede below an elevation of 2,151 feet amsl;
- 24 years would have sufficient volume in the PDS to require at least 120 days for the reservoir to recede below an elevation of 2,151 feet amsl;
- 5 years would have sufficient volume in the PDS to require at least 150 days for the reservoir to recede below an elevation of 2,151 feet amsl; and
- only 2 years would have sufficient volume in the PDS to require more than 180 days for the reservoir to recede below an elevation of 2,151 feet amsl.

[14] SRP used average historical water delivery distributions for each month from March 1 to August 31 to estimate the minimum releases necessary from Modified Roosevelt Dam to meet water deliveries from SRP's entire reservoir system, including all Salt River and Verde River dams. The historic monthly water delivery distribution from SRP's system is as follows: January–3.9%, February–4.4%, March–6.5%, April–9.5%, May–11.1%, June–13.1%, July–13.5%, August–12.9%, September–8.8%, October–7.3%, November–6.3%, and December–2.9%.

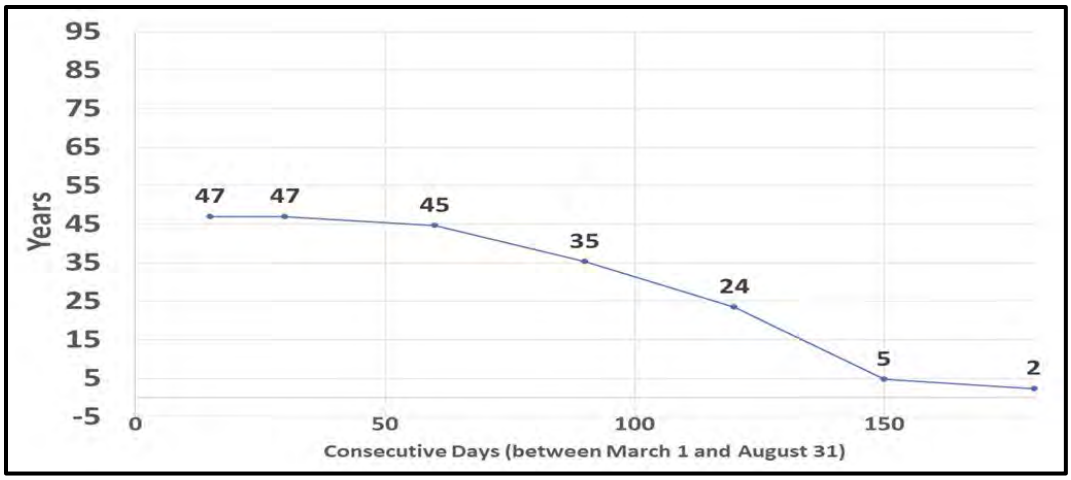

Figure E-3. Consecutive days of inundation at elevation.

Based on the Reservoir Planning Model analysis, SRP identified a natural breaking point of 120 days for the proposed release period extension. The ability to hold water in the FCS would allow for greater flexibility in providing spill water to users. The model showed that in most years (i.e., 24 out of the 47 years that would experience inflows sufficient to enter the PDS), an evacuation period of at least 120 days would result in reservoir inflows sufficient to enter the PDS, which (under the current WCM) would require SRP to physically spill water to meet the evacuation period requirement.

For a period of less than 120 days it is expected that in most years (more than half) where reservoir inflows are sufficient to enter the PDS, water would have to be physically spilled due to the increased reservoir releases required to meet the evacuation period requirement. The increased release rate resulting in physical spill would limit SRP's ability to meet the objective of the planned deviation of increasing beneficial use of spill water (since water physically spilled over GRDD cannot be diverted into the SRP canal system for delivery to spill water users). For an evacuation period greater than 120 days, the probability of inflows being sufficient to require physical spill of water after the end of the first 120 days decreases to close to 10% of years in the record. Therefore, an evacuation period of greater than 120 days would create only limited benefits to the goal of increasing beneficial use of spill water.

E.1.4 Timing of Proposed Planned Deviation

SRP conducted a contingent probability analysis to identify a desired number of years to request allowance for use of the extended evacuation period in the planned deviation. To perform the contingent probability analysis, SRP used the adjusted climate change hydrology to produce 100 subsets of 5 consecutive years randomly selected from the full 106-year data set. SRP incorporated the 100 sampled 5-year streamflow periods into the Reservoir Planning Model to identify the total maximum reservoir fill within the first 5 feet of the FCS (i.e., PDS) for each year.

The planned deviation would only apply in years when reservoir inflows are high enough to inundate the PDS. Predicting[15] reservoir inflows for a future year or period of years with precision or certainty was not possible due to the variability in precipitation and runoff conditions in the Salt River watershed. Therefore, SRP analyzed the probability for inundation of the PDS and subsequent use of the planned deviation. Probabilities for inundation were evaluated for different water year (i.e., October–September) categories (wet, dry, and all years) and minimum number of years up to 5 consecutive years

[15] This analysis should not be viewed as a predictive exercise, but rather informative of the likelihood of using the planned deviation in multiple years within a 5-year period, given different water year categories.

(Figure E-4).[16] A 5-year period was considered to meet the requirements in the WCM that indicate a minimum time frame (up to 5 years) for a deviation to be considered temporary.

The results of the contingent probability analysis showed that a 5-year period with a subset of 3 out of 5 years would maximize the probability for the planned deviation to meet the objective of increasing beneficial use of Salt River spill water (see Figure E-4). Based on SRP's analysis, the probability of zero years of inundation of the PDS is low, even during dry periods. The probability of inundation in 4 or more years out of 5 years is also low for each of the three categories and would limit the potential for furthering the goal of temporarily increasing the operational flexibility within the FCS by increasing beneficial use of spill water. The most probable use of the extended duration period (from 20 to 120 days) occurs between at least 1 and 3 years in the 5-year period. Limiting the planned deviation to only 1 or 2 out of 5 years would still meet the Corps' purpose and need, but it decreases SRP's planned deviation objective to increase beneficial use of spill water and would not meet the objective to increase operational flexibility when compared to the use in 3 out of 5 years. Since it is not possible to predict exactly when precipitation patterns would allow for use of the planned deviation during a temporary period of 5 years, a planned deviation that aims to maximize the probability of use provides the greatest opportunity for meeting SRP's need for increasing beneficial use of floodwater or spill water. Further, the proposed 3 out of 5-year planned deviation maximizes SRP's objective to offset all the financial and in-kind costs of planning, federal agency review, and implementation.

Probability of Inundation (At Least X Out of 5 Years)						
Number of Years Inundating FCS 5 feet	0 Years	At Least 1 Year	At Least 2 Years	At Least 3 Years	At Least 4 Years	At Least 5 Years
All Years	18%	82%	57%	38%	13%	2%
Wet Years (Above Median Run-Off)	0%	100%	96%	72%	24%	4%
Dry Years (Below Median Run-Off)	36%	64%	20%	4%	2%	0%

Figure E-4. Probability of use of planned deviation in number of years of the 5-year period.

E.1.5 Alternatives Considered but Eliminated from Further Analysis

The FWS and the Corps, in consultation with Reclamation, considered multiple reasonable alternatives using various combinations of inundation duration and period of applicability for the planned deviation based on the Reservoir Planning Model. These alternatives included, but were not limited to, the following examples:

- Extend the release period for water held within the first 5 feet of the FCS from 20 days to 120 days for 1 out of 5 years.
- Extend the release period for water held within the first 5 feet of the FCS from 20 days to 120 days for 2 out of 5 years.

[16] This separation into wet and dry periods was completed to account for the long-term oscillation between wet and dry periods that naturally occurs on the Salt River system. Understanding the difference between wet and dry periods is important since 2021 represents around the 25th year of a dry period. As such, it is possible that the Salt River system could be entering a wet period in the next 2 to 5 years.

SRP determined that these alternatives would not meet SRP's intent to temporarily increase the operational flexibility within the FCS and increase the ability to beneficially use spill waters controlled by the Modified Roosevelt Dam, and therefore, would not meet the Corps' purpose and need to address SRP's request for a planned deviation. The FWS and the Corps elected to not move forward with detailed analysis in the EA for these alternatives because they would not result in substantially different impacts to affected resources as compared to the Proposed Action.

APPENDIX F

Cumulative Effects

F.1 INTRODUCTION

Cumulative effects are most likely to arise when a relationship exists between a proposed alternative and other actions that have occurred or are reasonably expected to occur in a similar location or time period, or that involve similar actions (40 CFR 1508.1(g)). Projects in close proximity to the Proposed Action would be expected to have more potential for cumulative effects than those more geographically separated. The 2002 RHCP EIS (Cumulative Effects, Section 4.13) (FWS 2002a) includes a detailed cumulative effect analysis that evaluates cumulative effects both on a project and individual resource basis during the 50-year ITP period and is incorporated here by reference.

F.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ENVIRONMENTAL TRENDS AND PLANNED ACTIONS

Past and present actions in the permit area vicinity include: management of Roosevelt Lake with reservoir operational protocols including water storage, release, and flood control; development and maintenance of recreation facilities at Modified Roosevelt; private development of agricultural, residential, and commercial properties adjacent to Roosevelt and Tonto Creek (e.g., communities of Punkin Center and Gisela); lands that are dependent on water from the Salt River Project system; sand and gravel mining operations on lower Tonto Creek; and land management practices on Tonto National Forest lands bordering Roosevelt, such as grazing and recreation.

Residential communities and small commercial businesses exist on both the Salt and Tonto Arms of Roosevelt Lake and downstream of the dam. A considerable amount of infrastructure exists within or adjacent to the Salt River Valley. Several sewage and/or wastewater treatment plants are located adjacent to the Salt River within the Phoenix metropolitan area. Other public utilities in the area include various sewage, water, power transmission, natural gas, and communication lines, as well as several landfills. Utility maintenance and modification projects would continue as infrastructure ages and requires replacement. Continued population growth in surrounding communities is expected and would add to the demand for additional lands for development purposes, especially infrastructure, and would likely increase recreational visitor use and residential development near Roosevelt Lake.

Except for private inholdings, the lands surrounding Roosevelt Lake are part of the Tonto National Forest and are managed by the USFS for multiple uses, including recreation and livestock grazing. Dispersed camping, boating, and fishing are the primary recreational activities in the Roosevelt Lake vicinity. As part of the recent Tonto National Forest Management Plan revision, Roosevelt Lake is part of the Lakes and Rivers Management Area (USFS 2022). The primary emphasis in this management area includes sustainable recreation. The management requirements in this area would increase motorized access and highly developed recreation, increasing opportunities for fishing but decreasing priority to provide dispersed recreation for other wildlife-related activities.

Aquatic species within Roosevelt Lake are managed under the authority of the AGFD with the objective of providing a diversity of sportfish to anglers. Ongoing and future activities implemented by the AGFD include the continued stocking of sportfish and associated monitoring activities (e.g., electro-fishing surveys) and habitat enhancement activities (AGFD 2019).

The permit area plus the USFS-managed lands surrounding Roosevelt Lake, the Tonto Basin community, the downstream segment of the Salt River between Modified Roosevelt and GRDD, and the Phoenix AMA were used to identify reasonably foreseeable environmental trends and planned actions within the remaining 30-year ITP term. Reasonably foreseeable future actions considered in this analysis include continued urban and rural population growth in the Salt River Valley, increasing demand for water, increasing demand for energy, and increasing demand for recreation opportunities in the permit area

vicinity. As described in Section 1.2.3 and Appendix A of the RHCP addendum, the Reservoir Planning Model, which combines the historic inflow data for Roosevelt Lake with adjustments for climate-related changes to regional precipitation and temperature, was used to create a 106-year scenario of lake elevations that approximate the range of potential future conditions.

Planned future actions considered in this analysis include: 1) fish stocking in Roosevelt Lake from 2021–2031; 2) the construction of Tonto Creek Bridge and subsequent closing of A-Cross Road and Greenback Valley Road; 3) the SRP/Reclamation Pumped Storage Project at Horse Mesa and Mormon Flat Dams; and 4) the SRP-CAP Interconnection Project (near GRDD).

The 10-year proposal to stock fish in Roosevelt Lake from 2021 to 2031 is under the authority of the Dingell-Johnson Sport Fish Restoration Act of 1950 (SFRA), as amended (16 USC 777), which is a federal action. The SFRA directs the FWS to provide federal aid to states for the management and restoration of fish having "material value in connection with sport or recreation in the marine and/or fresh waters of the United States." In accordance with the SFRA and for over 70 years, the FWS's WSFR office has been providing SFRA funds in support of the State's efforts to stock sportfish to maintain, expand, and enhance angling opportunities. As part of this legislation, the WSFR has authorized the funding, in part, of the 10-year stocking program proposed by the AGFD. The AGFD will use these SFRA funds to maintain and enhance public recreational fishing opportunities at 104 locations across Arizona. The AGFD has previously requested and received funds from the WSFR for a prior 10-year stocking program from 2011 to 2021 (FWS 2011b). Hence, the stocking of nonnative fish in Roosevelt Lake is a federal action and for many years the AGFD has obtained federal funds for stocking fish, often into habitats protected for imperiled native species.

The Tonto Creek Bridge Project will include construction of a 1,982-foot, 15-span modified girder bridge and improvements to approximately 4,300 feet of roadway on both sides. Seasonal flooding of Tonto Creek has historically rendered Tonto Creek impassable for an average of 2 to 3 weeks per flood event and for several months during major flood events. This bridge will provide a permanent all-weather crossing of Tonto Creek to provide connectivity for residents, emergency services, and visitors between the east and west sides of Tonto Creek (Arizona Department of Transportation 2011). The first phase of bridge construction began in October 2022 (*Payson Roundup* 2023). This portion of A-Cross Road will be closed once construction of the bridge is complete.

The SRP/Reclamation pumped storage project would enable SRP to further incorporate variable renewable energy resources into its power generation portfolio. Initial investigations have identified that Horse Mesa could support a new 107-megawatt pumped-storage facility and Mormon Flat could support a new 57-megawatt pumped-storage facility. Horse Mesa would use Canyon Lake as the lower reservoir and Apache Lake as the upper reservoir. The Mormon Flat expansion would use Saguaro Lake as the lower reservoir and Canyon Lake as the upper reservoir. Each facility would consist of a new inlet/outlet structure in the upper and lower reservoirs, connected by concrete or steel-lined tunnels around 16 to 20 feet in diameter and around 1,400 feet long. The SRP-CAP Interconnection Project would allow water stored in SRP reservoirs to be pumped into the CAP canal and delivered to customers that have water treatments plants outside of SRP's water service territory.

The potential cumulative effects of past, present, proposed, or alternative actions, and reasonably foreseeable future actions, are evaluated below for each resource.

F.3 BIOLOGICAL RESOURCES

F.3.1 Vegetation

Over the course of the remaining 30 years of the amended ITP period, vegetation in the analysis area will continue to be affected by the existing and future trends and actions identified above. The primary expected effects are the direct loss of vegetation as a result of continued private development, and indirect effects on vegetation from decreased water availability, the introduction or spread of nonnative invasive plants and noxious weeds, and to a lesser degree, from livestock grazing. Effects from private development would be limited since lands in the immediate vicinity of Roosevelt Lake are managed by the USFS and are not available for private development. Some vegetation loss may occur as a result of USFS management decisions that increase motorized access or establish additional developed recreation sites, but the effects on vegetation would be relatively small. Private land and residential development and expansion along lower Tonto Creek and near the Gisela Reach mitigation site are limited by the National Forest lands surrounding these areas.

Should recreational activity and motorized access at Roosevelt Lake increase and should new recreational sites be developed, there would be opportunities for nonnative invasive plants and noxious weeds to be introduced or spread. Invasive plants and noxious weeds would continue to be monitored and treated by the USFS and other landowners in the analysis area. It is difficult to determine how vegetation communities would respond over the remaining 30-year permit period, though a general increase in the distribution and abundance of invasive or nonnative plants and noxious weeds is likely.

Tamarisk leaf beetles were found adjacent to Roosevelt Lake for the first time in 2021, along lower Tonto Creek, and across the greater Tonto Basin in 2022 (RiversEdge West 2022a). Any current tamarisk or future tamarisk persistence following lake recession will likely be affected by the tamarisk leaf beetle. Tamarisk leaf beetles can defoliate 22 to 40 miles of river-corridor tamarisk habitat each year. It is likely that the beetle will rapidly colonize tamarisk stands in Roosevelt Lake's FCS and CS. Repeated tamarisk leaf beetle defoliation can cause 40% of tamarisk to die within 5 years (Jamison and van Riper 2018) and 70%–85% in the long term (RiversEdge West 2022b). While difficult to quantify the potential impact to tamarisk-dominated vegetation communities at Roosevelt Lake over the life of the permit, the spread of the tamarisk leaf beetle at Roosevelt Lake will most likely lead to a substantial reduction in the amount of tamarisk in the permit area. Though native vegetation may eventually recolonize sites where tamarisks have been killed by repeated defoliation, conditions at these sites often favor the establishment of other weedy species. Thus, without management intervention, native vegetation communities are unlikely to replace areas formerly dominated by tamarisk (Nagler et al. 2021). Because shifting lake levels in the CS and FCS and tamarisk leaf beetles can affect tamarisk concurrently, distinguishing effects will be difficult.

While modeling indicates that climate change is unlikely to reduce surface water flows in the Salt River watershed in the near future (Robles et al. 2021), water availability for vegetation in the analysis area could decrease over the next 30 years due to anticipated increases in water demand and associated groundwater and surface water withdrawals that may outpace the rate at which precipitation recharges these water sources. Lower reservoir and groundwater levels and reduced stream flows are possible, which could lead to a shift toward vegetation communities that are more adapted to xeric conditions. Wetland and riparian vegetation are more likely to persist in the CS despite these conditions due to the storage of water within the reservoir, shifting in extent and distribution as reservoir levels fluctuate. Since the planned deviation would not occur in more than 3 years and would only affect vegetation within the bottom 5 feet of the FCS, it would have a relatively small contribution to the cumulative effects on vegetation in the analysis area over the remaining 30-year permit period.

F.3.2 General Wildlife

Over the course of the remaining 30 years of the amended ITP period, general wildlife in the analysis area would continue to be affected by the existing and future trends and actions identified above. These include the continued reduction in the quantity and quality of habitat for general wildlife within the analysis area due to changes in vegetation from reduced water availability, the introduction and spread of nonnative invasive plants and noxious weeds, and to a lesser extent, private development. Climate change is unlikely to reduce water availability for wildlife in the analysis area in the near future (Robles et al. 2021), but the increasing demand for water may result in reduced water availability that could directly impact wildlife species that depend on these water sources. Some species may have to adjust their behavior (e.g., shifting the dates of migration) or their range to compensate for these effects of rising temperatures and changes in water availability. Those species unable to adapt to the changing conditions or that are unable to shift their range could experience population declines from these effects.

The continued operation of Modified Roosevelt will minimize the impacts to wildlife from reduced water availability since water will continue to be present in the reservoir over the remaining 30 years of the ITP period. As surface water availability declines in the region, Roosevelt Lake and the Salt River system in general may become increasingly important to wildlife in the region. Lands in the immediate vicinity of Roosevelt Lake are primarily managed by the USFS, and little development would be expected beyond that associated with new recreation sites. The USFS would continue to evaluate and minimize the impacts to general wildlife when making management decisions, which would limit the impacts to wildlife from increased recreational use. Continued stocking of sportfish by AGFD at Roosevelt Lake and other waterbodies in the analysis area would perpetuate the impacts to general wildlife that result from this activity, which include increased predation and competition for resources and the recreational use associated with sportfish. These effects are discussed in detail below for covered species, and the effects on general wildlife would be similar to those for covered species.

Although some of these effects would overlap with those of the action alternatives, neither action alternative is expected to result in notable impacts to general wildlife, and thus, would have a relatively small contribution to the cumulative effects on general wildlife in the analysis area over the remaining 30- year permit period.

F.3.3 Covered Species

Northern Mexican Gartersnake

Over time, the cumulative effect of individual gartersnake's responses to the impacts of the covered activities may manifest in changes to the population. Population-level changes can appear as changes in the abundance, distribution, sex or age structure, or genetic makeup of a population. In this case, there is insufficient information to predict with any specificity what changes, if any, may occur to the gartersnake population structure or genetic makeup as a consequence of the covered activities.

Over the remaining 30 years of the permit period, gartersnakes in the analysis area would continue to be impacted by the existing and future trends identified above. Since gartersnakes within the analysis area are limited to a few, relatively small sites that meet its habitat requirements, the potential for the effects of the action alternatives to overlap with the effects of many of these existing and future actions is low. Further, since the gartersnake is a listed species under the ESA and critical habitat exists within the analysis area, it would continue to receive protection from activities that may jeopardize its future existence. The gartersnake and its habitat primarily occurs in the analysis area on federal land, and managing agencies would be required to consult with the FWS regarding the potential impacts to the gartersnake from their actions and decisions in the future. Private land is present along portions of Tonto Creek within the lower Tonto Creek permit area, but the potential for substantial development to

occur in this area in the future is low. The Tonto National Forest would continue to manage lands in the vicinity of Roosevelt Lake for sustainable recreation, and the gartersnake could face some impacts if motorized access, developed recreation sites, and recreation use increase in the area. However, these projects would be subject to FWS consultation and environmental review, likely minimizing the potential effects. Construction of the Tonto Creek bridge and subsequent closure of A-Cross road would reduce impacts to gartersnakes in lower Tonto Creek from vehicle travel in the floodplain. AGFD would continue to stock nonnative predatory sportfish at Roosevelt Lake and other locations that may provide habitat for gartersnakes, which would perpetuate the negative effects on gartersnakes and their habitat. AGFD and FWS have prepared an EA (AGFD and FWS 2021) to assess the effects of continuing this stocking for the next 10 years (2021–2031), and additional environmental review will be required for this program to continue in the future.

Potential future climate change trends and the increasing demand for water may impact gartersnakes, but the effects are less likely to be reduced or minimized through future FWS consultation and environmental review, since they are not directly related to federal actions within the analysis area. The potential effects of climate change and reduced water availability on wildlife and their habitats are described above. Since gartersnake activity is related to temperature and they depend on riparian and aquatic edge habitat, they may be particularly susceptible to warmer temperatures and any changes in riparian vegetation. These effects could further reduce or shift gartersnake habitat quality and quantity in the analysis area. These effects are less likely to occur within the Salt River watershed (Robles et al. 2021), and at Roosevelt Lake in particular, where ongoing Modified Roosevelt operations create dynamic gartersnake habitat in the CS and FCS. At the same time, habitat along Tonto Creek may be more susceptible to reduced flows, drying, and decreased habitat quality. Thus, habitat for gartersnakes in the CS and FCS could become more important for ensuring the persistence of the local population in Tonto Creek and the Tonto Arm. SRP's implementation of the Gartersnake Conservation Program would enhance the quality of habitat for gartersnakes in the permit area, increasing the likelihood that gartersnakes will continue to persist in the area despite these changing conditions. If climate conditions or increased water withdrawals lead to the loss of suitable gartersnake habitat (i.e., persistent pools) in lower Tonto Creek and the Gisela Reach, SRP and FWS would identify other suitable locations to implement conservation measures for the gartersnake (see Section 2.1.2.4).

Given the extended time frame and the complicated relationships among the many effects that could occur, it is difficult to determine future habitat conditions and the overall response of gartersnakes in the analysis area with any certainty. However, implementation of adaptive management and monitoring of gartersnake habitat would contribute to a broader understanding of gartersnakes in the analysis area. The effects of SRP's covered activities would overlap with the effects of the existing and future trends. SRP's contribution to cumulative effects on the gartersnake are greatest in the CS where the fluctuating lake levels lead to cyclical changes in the availability and quality of gartersnake habitat. However, SRP would implement the Gartersnake Conservation Program to offset the negative impacts associated with this take (as well as the take that results from other covered activities), which would minimize its contribution to the overall effects on gartersnakes and their habitat. The planned deviation accounts for approximately 0.2% of the overall take expected to occur in the CS and FCS. Thus, both action alternatives would have a similar contribution to the overall impact on gartersnakes in the analysis area.

Southwestern Willow Flycatcher

Following the original RHCP's approval in 2002, the FWS published a Flycatcher Recovery Plan (FWS 2002b) and 5-year status reviews in 2014 and 2017 (FWS 2014c, 2017). The 5-year reviews identified the introduction and spread of the tamarisk leaf beetle as a new threat. Because tamarisk is an important vegetative component in many flycatcher territories, tamarisk leaf beetle defoliation can reduce the quantity and quality of flycatcher habitat. As described in Section 3.2.2, the tamarisk leaf beetle was documented at Roosevelt Lake for the first time in 2021 and affected tamarisk in the surrounding area in

2022. In the immediate future, flycatcher nesting habitat will be defoliated in the spring/summer across much (if not all) of the Roosevelt Lake permit area (including Tonto Creek and Salt River) and some plants will begin to die (likely the least vigorous plants). After approximately 5 to 6 years of defoliation, some proportion of tamarisk will persist (the most vigorous), but a larger proportion will likely die. However, SRP's ongoing flood control operations create conditions that can favor tamarisk establishment and regeneration, potentially minimizing the impacts of tamarisk lost from repeated defoliation by the tamarisk leaf beetle. The tamarisk leaf beetle at Roosevelt Lake adds an additional stressor to flycatcher habitat persistence and quality that, in the immediate future, will likely reduce flycatcher nesting habitat, territories, reproduction, and success.

Over the remaining 30 years of the permit period, flycatchers in the analysis area will continue to be affected by the existing and future trends and actions identified above in Section F.2. Flycatcher breeding habitat at Roosevelt Lake primarily occurs on Tonto National Forest lands that are managed by the USFS for multiple uses. The Tonto National Forest lands in the vicinity of Roosevelt Lake fall within the Lakes and Rivers Management Area, which includes sustainable recreation as the primary emphasis for management (USFS 2022). Over the remaining 30-year permit period, development is unlikely to occur in close proximity to known flycatcher breeding areas, and the USFS would continue to evaluate and minimize potential effects on the flycatcher when making management decisions. Since flycatcher breeding habitat at Roosevelt Lake is on federally managed land, additional impacts from rural and urban development are unlikely to occur.

Western Yellow-billed Cuckoo

Over the remaining 30 years of the permit period, cuckoos in the analysis area would continue to be affected by the existing and future trends and actions identified above in Section F.2. Since cuckoo breeding habitat in the analysis area is very similar to the flycatcher breeding habitat, the cumulative effects to the cuckoo would be the same as those described above for the flycatcher.

Yuma Ridgway's Rail

Since effects on the rail are primarily related to changes in the availability of marsh habitat at Roosevelt Lake, most of the existing and future trends in the analysis area (see Section F.2) would have little to no effect on rails at Roosevelt Lake. Since marsh habitat for rails is no longer present at Roosevelt Lake, there is no potential for existing or future trends to reduce the quantity or quality of habitat for rails at Roosevelt Lake, and none of the activities described in Section F.2 would be expected to create new marsh habitat at Roosevelt Lake. As with Roosevelt Lake, most habitat for rails in the lower Salt River portion of the analysis area has already been lost or degraded due to impoundments, water diversion, and intensive recreational use, and the species has not been recorded in this area since the 1970s. Therefore, additional impacts to the rail and its habitat in the lower Salt River portion of the analysis area are unlikely.

Bald Eagle

Over the remaining 30 years of the permit period, bald eagles in the analysis area would continue to be affected by the existing and future trends identified in Section F.2. However, bald eagles at Roosevelt Lake are closely monitored and nesting occurs primarily on federally managed land where substantial protections for eagle breeding areas are implemented. These protections include seasonal recreation closures to prevent disturbance of nesting eagles, which would minimize any potential impacts from future increases in recreation and developed recreation sites. As with other species, bald eagle habitat at Roosevelt Lake is likely to persist despite climate change, though future changes in Tonto Creek flows could impact eagle use and productivity in this area.

F.3.4 Other Protected Species

Other Threatened and Endangered Species

SPIKEDACE

As a result of past actions and existing trends such as water impoundments and diversions and nonnative fish stocking, spikedace no longer inhabit the analysis area and there would be no additional effects from the future trends and actions described in Section F.2. Existing and future trends are likely to continue to degrade the quantity and quality of spikedace habitat in the analysis area over the remaining 30 years of the permit period by perpetuating the presence of nonnative predatory sportfish and by maintaining the diversions and impoundments that have degraded the hydrologic conditions necessary to support spikedace. Spikedace critical habitat in the analysis area falls primarily within lands managed by the Tonto National Forest and could be impacted by USFS management decisions. However, since the primary management prescription for lands within the analysis area is to promote sustainable recreation, and because the USFS would continue to evaluate and minimize the impacts of its management decisions on the spikedace and its habitat, additional impacts are likely to be minimized. Continued development and the increasing demand for water could impact spikedace habitat in or near the Gisela Reach mitigation site if those actions further degrade water quality or impact the hydrologic regime of Tonto Creek. Implementing the Gartersnake Conservation Program under the RHCP addendum would reduce some of the ongoing effects of nonnative predatory fish in spikedace critical habitat.

NARROW-HEADED GARTERSNAKE

As a result of past actions and existing trends such as water impoundments and diversions and nonnative fish stocking, narrow-headed gartersnakes no longer inhabit the analysis area. Because narrow-headed gartersnakes require cooler water and typically occur at higher elevations than northern Mexican gartersnakes, it is unlikely that narrow-headed gartersnakes ever occurred in large numbers in lower Tonto Creek, Roosevelt Lake, or the lower Salt River. These areas continue to be unsuitable for narrow-headed gartersnakes, and there would be no additional impacts from the existing and future trends and actions described above in Section F.2. Narrow-headed gartersnake habitat is present at the Gisela Reach mitigation site, though it has been degraded by the past and present trends and actions described in Section F.2, and the species has not been recorded in this area since 2005. Continued rural development and increasing water demand in the vicinity of Gisela could further degrade habitat for the narrow-headed gartersnake in this area if it results in reduced water quality or further alters the hydrologic regime in Tonto Creek. However, implementing the Gartersnake Conservation Program under the RHCP addendum would likely improve habitat conditions at the Gisela Reach mitigation site.

Migratory Birds

Over the course of the remaining 30-year permit period, migratory birds in the analysis area would continue to be affected by the existing and future trends and actions identified in Section F.2. Some of these trends and actions, such as continued private development, increasing demand for water, and increased recreational use, could negatively impact the quantity or quality of migratory bird habitat in the analysis area. However, these impacts are unlikely to overlap the impact with the effects from SRP's operations of Modified Roosevelt since most of the lands in the vicinity of Roosevelt Lake fall within the Tonto National Forest and are managed for sustainable recreation by the USFS. While there may be minor impacts to migratory birds from an increase in motorized access and developed recreation sites, the USFS would continue to evaluate and minimize the impacts of its management decisions on migratory birds.

Species of Greatest Conservation Need and USFS-Sensitive Species

Over the course of the remaining 30-year permit period, special-status species in the analysis area would continue to be affected by the existing and future trends and actions identified in Section F.2. The effects on special-status species would be similar to those described for general wildlife, though the magnitude of impacts is likely to be greater for special-status species due to their vulnerability. Most of the land immediately surrounding Roosevelt Lake falls within the Tonto National Forest, and the USFS would continue to evaluate and minimize impacts to their designated special-status species when making management decisions. Should these species continue to decline over the remaining 30 years of the permit period, some species could become federally listed before the amended ITP expires. Should this occur, additional consultation and further amendments to the RHCP could be necessary. Since the effects of SRP's covered activities are primarily limited to the CS and FCS at Roosevelt Lake and the immediate vicinity, there is low potential for those effects to overlap with many of the actions described in Section F.2 above. Where effects do overlap, the potential impacts to special-status would be relatively low due to USFS management.

F.4 CULTURAL RESOURCES

In the vicinity of the analysis area, past and present projects which have or may have affected cultural resources include the operation of Modified Roosevelt and the development of areas adjacent to Roosevelt Lake and Tonto Creek. Because the adverse impacts to cultural resources located within the 2,151 to 2,156–foot amsl level of the FCS have previously been mitigated through data recovery as part of the Modified Roosevelt Dam project, no additional incremental adverse impacts are expected from the Proposed Action or alternatives; therefore, the Proposed Action would not contribute to cumulative effects to cultural resources in the Tonto Basin.

F.5 RECREATION

Roosevelt Lake provides a popular recreation area that is likely to continue to see an increase in visitor use in the future from the growing population in central Arizona. Recreation improvements installed with construction of Modified Roosevelt in 1996 have increased the capacity and quality of the facilities. The No Action Alternative Action may have temporary cumulative adverse effects on regional recreational opportunities by holding the lake at a constant (lower) level and reducing ease of access. This may add to the recreational demand at other recreation sites in the region. The Proposed Action would continue to provide recreational opportunities subject to fluctuating reservoir levels at Roosevelt Lake and would likely be able to meet future recreation demand in the region. No cumulative effects on recreation from the Gartersnake Conservation Program (i.e., nonnative fish removal and native fish shocking) are expected as stocking of sportfish by AGFD at Roosevelt Lake and other waterbodies in the analysis area will continue to occur.

F.6 TRANSPORTATION

Normal FCS operations or the planned deviation under the Proposed Action could adversely impact roads found within the FCS in the Tonto Basin community and cumulatively impact transportation due to more frequent and increased duration of inundation from the planned deviation and a general increase in flood events as predicted by the Reservoir Planning Model.

Hazards from high water conditions and the lack of all-weather access roads across Tonto Creek have led to the death of eight people since 1995. As a result of high water, the current roads crossing Tonto Creek are closed an average of 25 days per year, with no suitable detours available without driving an approximately 70 additional miles. The cumulative impact of a growing population and increased

residential development in the overall analysis area could lead to more traffic on roads found within the Tonto Basin community and the vicinity of Roosevelt Lake. Some of these roads may be prone to flooding issues under normal operations of the FCS or the planned deviation. The construction of the Tonto Creek Bridge will provide an all-weather crossing of Tonto Creek, thereby reducing adverse impacts from flood-prone creek crossings within the analysis area. This portion of A-Cross Road will be closed once construction of the bridge is complete; therefore, there would be no remaining effects on this road from the planned deviation or normal FCS operations.

Downstream of GRDD is a series of commonly used bridges and road crossings, some of which are rated for flows below the maximum release limit at GRDD of 180,000 cfs. When flows exceed a structure's flow rating, floodwaters will overtop the structure, which leads to road closures and increases the risk of structural damage and human safety concerns. However, the occurrence of large spill events (up to 180,000 cfs) into the Salt River are primarily the result of rare, extreme hydrological conditions and storm events, which would occur within the same variability as predicted by the Reservoir Planning Model, regardless of the alterative selected.

F.7 WATER RESOURCES

The demand for water supplies is expected to increase with future population growth and development in the Phoenix metropolitan area. The anticipated increase in groundwater and surface water withdrawals needed to support the growing population downstream may outpace the rate at which precipitation and direct or indirect recharge replenishes the local water sources. Lower reservoir and groundwater levels and reduced stream flows are possible. Wetlands and other waters of the U.S. may decrease as a result of reduced stream flows and lake levels.

There is potential for climate change to impact surface and groundwater resources in the analysis areas and beyond. However, the Salt River Basin—and likely similar basins with relatively warm winter temperatures, substantial winter streamflow generation, shallow and intermittent snowpacks, and large winter meteorological events—has been shown to be relatively resilient to changes in annual streamflow as a result of climate change. Snow loss in the basin is offset by winter precipitation inputs to streamflow (Robles et al. 2021).

The effects of the planned deviation (Proposed Action) would overlap with the effects of the existing and future trends in water use and supply. The increased operational flexibility within the FCS would allow for more controlled flow releases, reduced spills over GRDD, and increased beneficial use of floodwaters following high precipitation and/or rapid snowmelt events. Fewer spills over GRDD means more water available to spill water users in the Phoenix metropolitan area that would be available for direct use (distribution to downstream water users) or future use (contributing to recharge of groundwater for recovery during times of drought and surface water shortage). Under the No Planned Deviation and No Action Alternatives, the anticipated increase in water demand would not be moderated by increased beneficial use of floodwaters.

The Granite Reef Underground Storage Project (GRUSP)—managed by SRP in partnership with the Cities of Chandler, Mesa, Phoenix, Scottsdale, Tempe, the Town of Gilbert, and the Salt River Pima-Maricopa Indian Community—collects SRP water from the Salt and Verde Rivers, CAP water, and effluent, for storage in the underlying aquifer (Arizona Water Banking Authority 2023; SRP 2021c, 2023b). GRUSP is located in the bed of the Salt River just downstream of GRDD and upstream of Gilbert Road (approximately 5 miles downstream of the water resources analysis area). The recharge facility is one of Arizona's largest and is co-owned by SRP and the Cities of Chandler, Mesa, Phoenix, Scottsdale, and Tempe and the Town of Gilbert (SRP 2022a). Reduced releases downstream of GRDD would result in less water at the GRUSP for groundwater recharge, but that difference in groundwater recharge at GRUSP is within the historic range of observed variability and is expected to be largely offset

by the increase in natural recharge at the lake. Additionally, spill water users can also choose to direct their allocated percentage of spill water to GRUSP.

Floodwaters have the potential to cause costly damage to downstream infrastructure and increase risks to public health and safety. Several commonly used bridges and road crossings are located downstream of GRDD, a few of which are rated for flows below the maximum release limit at GRDD of 180,000 cfs (e.g., the culverts at northbound Gilbert Road are rated to approximately 5,000 cfs). When flows exceed a structure's flow rating during periods of high flow and/or following large dam releases, floodwaters will overtop the structure. Risks to structures and human safety are currently managed by closely monitoring flows and closing roads to traffic as needed during flows that exceed the maximum structure rating. Flow monitoring and road closures would continue as needed under the Proposed Action. Average daily flows under the Proposed Action are estimated to be higher compared to current operations, but flows under both scenarios are well below 5,000 cfs (see Table 3-13). When flows above 5,000 cfs spill over GRDD, SRP would breach the GRUSP delivery channel to allow for spill water to pass over the GRUSP to prevent significant damage to the GRUSP culverts and delivery channel infrastructure; the GRUSP owners would then reconstruct the channel to allow for continued recharge operations (SRP 2022a). Tempe Town Lake is also located downstream of GRDD and is typically not affected by floodwaters since the lake's water levels are managed by raising or lowering of the lake's dam gates. Other activities downstream, including gravel mining operations and wetland restoration areas, would also benefit from the reduction in large, destructive flood events downstream of GRDD under this alternative.

F.8 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Future population growth and development is expected to continue in the Phoenix metropolitan area, as is the need for providing municipal and commercial water supplies. The increased flexibility to allow the use of floodwaters under the Proposed Action could result in beneficial impacts to downstream communities due to a decreased cost to consumers for water and the indirect effects on the local and regional economy, including EJ communities. The Proposed Action could also increase the hydropower generation from Roosevelt Dam and would have a beneficial cumulative impact on the local and regional energy supply. The No Action Alternative could result in both adverse and beneficial cumulative effects to downstream communities due to temporary changes in hydropower generation and spill water delivery.

APPENDIX G

Agency Consultation and List of Preparers

G.1 SECTION 106 AND TRIBAL CONSULTATION

The Corps and the FWS have initiated Section 106 consultation with the Arizona SHPO and tribes. The following tribes were notified of the project and were asked to provide input on the project:

- Ak-Chin Indian Community
- Fort McDowell Yavapai Nation
- Gila River Indian Community
- Hopi Tribe
- Mescalero Apache Tribe
- Navajo Nation
- Pueblo of Zuni
- Salt River Pima-Maricopa Indian Community
- San Carlos Apache Tribe
- Tohono O'odham
- Tonto Apache
- White Mountain Apache Tribe
- Yavapai-Apache Nation
- Yavapai-Prescott Indian Tribe

Section 106 and tribal consultations are ongoing.

G.1.1 Indian Trust Assets

Tribes with water rights associated with the Salt River include Fort McDowell Yavapai Nation, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, White Mountain Apache Tribe, and Gila River Indian Community (GRIC) (University of Colorado Law School 2022). The SRPMIC reservation is located approximately 40 miles west-southwest of Roosevelt Lake.

The SRPMIC has a claim to spill water from the SRP system and Verde River and currently gets delivery of spill water from SRP which would not be adversely impacted by the planned deviation (as a participating entity, their use of spill water is enhanced). SRPMIC's claim for its right to use spill water is described in Paragraph 14 of the SRPMIC Water Rights Settlement Agreement dated February 12, 1988, wherein the parties to that agreement include SRP and SRPMIC (United States of America et al. 1988). SRPMIC is one of the non-federal partners in the planned deviation and is supportive of the proposal. They have signed the cost share agreement referenced in paragraph 5 of the request letter from SRP to the Corps for the planned deviation.

While the GRIC has no right to spill water, a portion of GRIC's water right is, however, tied to SRP stored water (U.S. Department of Justice 2015). SRP maintains two separate water accounts (the Current Account and Carryover Account) for GRIC's SRP Stored Water entitlement. GRIC's carryover account is subject to "spill" (as defined in 12.3.2 of their water settlement agreement). Spill, in this instance, occurs when credits in the Carryover Account are subject to being reduced once SRP's reservoir space (as defined in the settlement agreement) is full and the amount of water in the Salt River System is increasing. In the case of Modified Roosevelt, SRP's reservoir space is full once the original conservation space (2,136 feet and below) is reached yet water continues to accumulate in the new conservation space

(2,136–2,151 feet). During these spill events, GRIC's stored water credits in the Carryover Account are reduced by 1 acre-foot for each acre-foot that is spilled until the credit balance is reduced to zero. With this in mind, GRIC's credits that are subject to spill would not be impacted by the planned deviation. GRIC credits that are eligible to be spilled are spilled when SRP's original conservation space is filled and prior to entering the FCS (elevation 2,151–2,175 feet). At the start of any flood control operations under the WCM, planned deviation or otherwise, any spill-eligible credits available to GRIC on the Salt River reservoir system would have already spilled.

SRP will continue to uphold existing agreements with Tribes under each of the alternatives. The No Action alternative could temporarily result in less water being made available, but would not affect the underlying entitlement to water of any Tribe.

G.2 OTHER AGENCIES CONSULTED

In addition to the cooperating agencies described in Section 1.3 that were directly involved in the preparation of this EA, the AGFD and Arizona Department of Transportation were consulted due to their specific jurisdiction or expertise.

G.3 LIST OF PREPARERS

Table G-1 provides a list of agency and consultant staff involved in the preparation of this EA.

Table G-1. List of Preparers

Agency or Entity	Name	Role
FWS	Greg Beatty	Project Lead
Corps	Emily Lester	Project Lead
Reclamation	Nichole Olsker	Cooperating Agency Lead
SWCA	Jana Sterling	Project Manager
SWCA	Coleman Burnett	Senior NEPA Writer
SWCA	Adrian Hogel	NEPA Writer
SWCA	Vicki Casteel	NEPA Writer
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APPENDIX H

Assessment of Impacts to General Wildlife and Other Protected Species

H.1 GENERAL WILDLIFE

H.1.1 Affected Environment

The 2002 RHCP EIS (FWS 2002a) describes wildlife at Roosevelt Lake and is summarized below as appropriate. Conditions within the Roosevelt Lake permit area have changed since the publication of the 2002 RHCP EIS, and the wildlife analysis area has been expanded to reflect the additions to the permit area and new mitigation sites. Therefore, the description of existing vegetation has been updated and expanded based on species occurrence records from AGFD's Heritage Data Management System (AGFD 2022).

Wildlife in the Roosevelt Lake region is characteristic of the Sonoran Desert Scrub community as described by Turner and Brown (1982). Desert scrub vegetation surrounding the reservoir and riparian habitats on the Salt and Tonto Arms support a variety of mammals. Big-game species such as mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and javelina (*Tayassu tajacu*) are sometimes found at the lake but are more prevalent in the surrounding uplands. Predators, including coyote (*Canis latrans*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), mountain lion (*Puma concolor*), and to a lesser extent, black bear (*Ursus americanus*), are present. Non-game mammals such as beaver (*Castor canadensis*) and raccoon (*Procyon lotor*) can also be found in riparian habitats at Roosevelt Lake (FWS 2002a). A variety of rodents, such as Merriam's kangaroo rat (*Dipodomys merriami*), western white-throated woodrat (*Neotoma albigula*), Arizona pocket mouse (*Perognathus amplus*), and cactus mouse (*Peromyscus eremicus*) are also present at Roosevelt Lake (AGFD 2022).

Numerous bird species use riparian and open water habitat at Roosevelt Lake, as well as the surrounding upland habitats. Common species include great blue heron (*Ardea herodias*), green-winged teal (*Anas crecca*), northern flicker (*Colaptes auratus*), and red-tailed hawk (*Buteo jamaicensis*). Gambel's quail (*Callipepla gambelii*) and dove (*Zenaida* spp.) are frequently hunted in the area (FWS 2002a). Migratory birds are discussed further below.

Reptiles common in the vicinity of Roosevelt Lake include desert spiny lizard (*Sceloporus magister*), ornate tree lizard (*Urosaurus ornatus*), common side-blotched lizard (*Uta stansburiana*), western diamond-backed rattlesnake (*Crotalus atrox*), black-necked gartersnake (*Thamnophis cyrtopsis*), and eastern kingsnake (*Lampropeltis getula*), among others. Amphibians are less diverse but are represented in the vicinity of Roosevelt Lake by species such as lowland leopard frog, Woodhouse's toad (*Anaxyrus woodhousii*), and the invasive American bullfrog (*Lithobates catesbeianus*) (AGFD 2022).

Roosevelt Lake supports one of the largest warmwater fisheries in the West and has been stocked with nonnative sportfish species since as far back as 1930. Today there are 20 species of nonnative fish in Roosevelt Lake; native Sonora sucker (*Catostomus insignis*) occurs primarily in lower Tonto Creek but has been recorded in the FCS at Roosevelt Lake near the Tonto Creek inlet (Table H-1) (ERO-GEI 2022b). Twelve of the nonnative fish species present at Roosevelt Lake were stocked by AGFD, including rainbow trout (*Oncorhynchus mykiss*). Additional details on the AGFD stocking program are provided in in the RHCP addendum Subchapter 1.F.

Table H-1. Fish Species with Potential to Be Present in Permit Area

Common Name (Scientific Name)	Stocked?	Areas Where Species May Be Present		
		Roosevelt Lake	Lower Tonto Creek	Gisela Reach
Largemouth bass (*Micropterus salmoides*)	Y	X	X	
Smallmouth bass (*Micropterus dolomieu*)	Y	X	X	X
Yellow bass (*Morone mississippiensis*)	Y	X	X	
Black crappie (*Pomoxis nigromaculatus*)	Y	X	X	
Bluegill (*Lepomis macrochirus*)	Y	X	X	
Green sunfish (*Lepomis cyanellus*)	Y	X	X	X
Redear sunfish (*Lepomis microlophus*)	Y	X	X	
Channel catfish (*Ictalurus punctatus*)	Y	X	X	X
Flathead catfish (*Pylodictis olivaris*)	Y	X	X	
Yellow bullhead (*Ameiurus natalis*)	Y	X	X	X
Black bullhead (*Ameiurus melas*)	Y	X	X	
Threadfin shad (*Dorosoma petenense*)	N	X	X	
American gizzard shad (*Dorosoma cepedianum*)	N	X	X	
Bigmouth buffalo (*Ictiobus cyprinellus*)	N	X	X	
Smallmouth buffalo (*Ictiobus bubalus*)	N	X	X	
Black buffalo (*Ictiobus niger*)	N	X	X	
Common carp (*Cyprinus carpio*)	N	X	X	X
Fathead minnow (*Pimephales promelas*)	N	X	X	
Red shiner (*Cyprinella lutrensis*)	N	X	X	X
Rainbow trout (*Oncorhynchus mykiss*)	Y	X	X	
Desert sucker (*Catostomus clarkii*)	N		X	
Sonora sucker (*Catostomus insignis*)	N	X	X	X
Western mosquitofish (*Gambusia affinis*)	N			X

Common Name (Scientific Name)	Stocked?	Areas Where Species May Be Present		
		Roosevelt Lake	Lower Tonto Creek	Gisela Reach
Gila longfin dace (*Agosia chrysogaster chrysogaster*)	N		X	
Roundtail chub (*Gila robusta*)	N		X	X

Wildlife use in the CS is driven by the cyclical fluctuations in the lake level which lead to annual variation in the availability and quality of habitat for wildlife. Habitat for terrestrial wildlife that depend on riparian vegetation and aquatic wildlife that depend on shallow water are more prevalent in the CS than elsewhere in the analysis area. Upland habitats are generally lacking in the CS, but many of the species that inhabit the surrounding uplands rely on the lake for drinking water or foraging opportunities and use the CS periodically. A similar suite of wildlife species can be found in the FCS, lower Tonto Creek permit area, and Gisela Reach mitigation site, though riparian habitats in these areas are much more limited and are generally restricted to the margins of Tonto Creek (and, within the FCS, the Salt River inflow). The influence of the lake on wildlife is also less pronounced outside of the CS, and the lake has no influence on wildlife at the Gisela Reach mitigation site.

H.1.2 Environmental Consequences

Proposed Action Alternative

CONSERVATION SPACE OPERATIONS

The Proposed Action would not modify SRP's operations of Modified Roosevelt Dam within the CS. The effect of continued CS operations on wildlife communities in the CS would be similar to those described for the Full Operation Alternative in the 2002 RHCP EIS (FWS 2002a: Section 4.3.2.2), which `-concluded that existing upland habitats would not be affected and that the availability of riparian habitats would fluctuate over time due to cycles of vegetation inundation and desiccation. Aquatic habitat in the CS would also fluctuate, with shallow-water habitats becoming more prevalent as the lake elevation rises and deep-water habitats becoming more prevalent as the lake recedes.

FLOOD CONTROL SPACE OPERATIONS

SRP's current flood control operations were analyzed in the 1996 EA for the WCM (Reclamation 1996), which concluded that inundation of the FCS would be too brief and infrequent to lead to readily detectable impacts on wildlife and other resources. However, the most recent Reservoir Planning Model anticipates a more frequent and extended presence of water in the FCS. While this could lead to some short-term impacts on vegetation rooted near the bottom of the FCS (see Section 3.2.1.2.1), these effects would be too minor and localized to notably impact most general wildlife. While there may be no long-term reduction in the spatial extent of habitat for wildlife in the FCS, the temporal availability of these habitats would be reduced. During and after inundation events, wildlife could be temporarily displaced from the FCS. Large amounts of similar habitat would remain in the surrounding area to support wildlife species displaced from the FCS, but wildlife displaced from the FCS could experience increased predation or competition for resources. Species that depend on riparian habitat would likely experience greater effects since there is relatively little riparian habitat in the surrounding region for these species to disperse to when the FCS is inundated.

Temporary, shallow-water habitat for fish and other aquatic species would be present in the FCS more often as the frequency of flood control events increases, but inundation would still be too brief and infrequent to create consistent aquatic habitat in the FCS. As lake levels recede, most fish would be

expected to move back to the consistent aquatic habitat in the CS. Some fish may remain in persistent pools left behind as the lake recedes, then die as those pools become desiccated. The Sonora sucker (see Section H.1.1) is the only native fish species that has recently been recorded within the FCS (where it is limited to the Tonto Creek inflow), and thus, most of these effects would be limited to nonnative fish species that are regularly stocked in the lake.

PLANNED DEVIATION

Under the Proposed Action, the planned deviation would increase the potential for impacts to vegetation in the bottom 5 feet of the FCS (see Section 3.2.1.2.1), which, consequently, could impact wildlife species that depend on this habitat. Future vegetation conditions within the FCS are difficult to predict, and it will be difficult to discern effects attributable to SRP's covered activities from effects related to the tamarisk leaf beetle (see Appendix F, Cumulative Effects). Even if a shift in vegetation communities were to occur, the area affected by the planned deviation (740 acres) is a small proportion of the FCS (3,596 acres) and is generally restricted to a narrow band along the perimeter of the lake (see Figure 1-1). These fluctuations in the lake shoreline are similar to those that occur under current Modified Roosevelt operations and would not be expected to notably impact most terrestrial wildlife species. Any changes in vegetation caused by the planned deviation would be unlikely to persist in the long term, since normal flood control operations would resume after the planned deviation period.

Although the Proposed Action would lead to extended (120-day) inundation of the bottom 5 feet of the FCS in the 3 years the planned deviation is implemented, inundation would still be too brief to create consistent aquatic habitat for fish species in the FCS.

CONSERVATION ACTIONS

The Gartersnake Conservation Program would kill and suppress nonnative predatory fish from persistent pools in lower Tonto Creek (including those within the FCS) and at the Gisela Reach mitigation site. Following suppression, treated pools would be stocked (either by SRP or by AGFD) with native fish and (possibly) lowland leopard frogs, which would increase these species populations in the permit area. The Gartersnake Conservation Program is not expected to directly impact other general wildlife species as these activities would be brief and infrequent and would be conducted by small crews traveling on foot. The Gartersnake Conservation Program is designed to suppress potential gartersnake predators and increase native aquatic species abundance, availability, and diversity. The effects on gartersnakes are described in Section 3.2.2.2.1. Other general wildlife species that are preyed on by nonnative fish at Roosevelt Lake (such as invertebrates and small fish) or that prey on small native fish and frogs may also benefit from the Gartersnake Conservation Program. Scavengers would also experience short-term benefits from the fish carcasses which would be left on-site. Conversely, wildlife that predate on nonnative fish in lower Tonto Creek may experience minor, temporary, adverse effects from reduced prey, which would be minimized by the subsequent stocking of native aquatic prey. Additionally, because of the occurrence of nonnative predatory fish in Roosevelt Lake (and upstream and downstream of the Gisela Reach) and AGFD's intent to continue to stocking sportfish at Roosevelt Lake, these nonnative predatory fish species are likely to return seasonally to the permit area.

CONCLUSION

In summary, SRP's covered activities under the Proposed Action would have minor, temporary, localized impacts on general wildlife due to the fluctuating availability of habitats in the CS and FCS. These effects would be greatest during the planned deviation period and the subsequent period of habitat recovery. The suppression of nonnative predatory sportfish for the Gartersnake Conservation Program would also have minor, temporary, localized effects on general wildlife species in lower Tonto Creek and the Gisela Reach mitigation site that could be both beneficial (i.e., reduced predation) and adverse (i.e., reduced prey

availability). Native wildlife would be expected to benefit in the long term, since native species would be stocked following sportfish suppression.

No Planned Deviation Alternative

Under the No Planned Deviation Alternative, SRP's ongoing CS operations, normal flood control operations, and the Gartersnake Conservation Program would have the same effects on general wildlife as described for the Proposed Action. However, the effects on general wildlife would be slightly reduced because the planned deviation would not occur.

No Action Alternative

CONSERVATION SPACE OPERATIONS

As described in Section 2.3, without an amendment to their ITP, SRP would temporarily operate the CS in a manner that avoids, to the extent possible, lake elevation increases that would inundate gartersnake habitat until alternative authorization for gartersnake take is achieved. The No Permit Alternative considered in the 2002 RHCP EIS (FWS 2002a) also entailed managing the lake to avoid elevation increases within the CS. Therefore, the short-term effects on wildlife in the CS under the No Action Alternative would be similar to those described in Section 4.5.2.1 of the 2002 RHCP EIS (FWS 2002a), which concluded that riparian habitat would gradually be reduced, eventually becoming restricted to the fringes of the lake near the Tonto Creek and Salt River inflows. These remaining riparian habitats would also be more likely to experience temporary reductions after scouring flood flows. These effects may be both beneficial (e.g., increased habitat for upland species) and adverse (e.g., decreased habitat for riparian species).

FLOOD CONTROL SPACE OPERATIONS

Under the No Action Alternative, SRP would temporarily prevent Roosevelt Lake from entering the FCS to the greatest extent possible. The lake has not entered the FCS since 2010 until recently (briefly in April 2023); therefore, this would have the effect of perpetuating the existing conditions in the FCS. If the alternative gartersnake take authorization developed under the No Action Alternative restores normal FCS operations, the effects would be similar to those described for normal flood control operations under the Proposed Action.

PLANNED DEVIATION

The planned deviation would not be approved under the No Action Alternative; therefore, the effects on general wildlife described for the planned deviation under the Proposed Action would not occur.

CONSERVATION ACTIONS

The Gartersnake Conservation Program would not be implemented under the No Action Alternative; therefore, the effects on general wildlife described for the Gartersnake Conservation Program under the Proposed Action would not occur.

CONCLUSION

In summary, under the No Action Alternative, there would be minor, short-term, localized impacts to general wildlife in the CS that would adversely impact species that depend on riparian vegetation and benefit species that depend on upland vegetation. The long-term effects on general wildlife are not

possible to determine at this time and would depend on Modified Roosevelt operations under future amendments to the RHCP.

H.2 OTHER PROTECTED SPECIES

H.2.1 Affected Environment

Other Threatened and Endangered Species

SPIKEDACE

The FWS listed the spikedace as threatened under the ESA in 1986 (FWS 1986) and reclassified it as endangered in 2012 (FWS 2012). The primary reasons for spikedace decline were predation by nonnative fish species and the habitat loss from water withdrawals, stream channel alteration, and impoundments (FWS 1991). The spikedace was not a covered species in the 2002 RHCP, and SRP is not seeking coverage under the RHCP addendum.

Roosevelt Lake does not include spikedace habitat because it lacks the shallow, fast-flowing water the fish inhabits (FWS 2012). Water diversion, agriculture, roads, and the introduction of nonnative species degrade spikedace habitat in the lower Tonto Creek permit area above Greenback Creek (which overlaps with the FCS) and the Gisela Reach mitigation site (FWS 2000). Although the Salt River is a large perennial stream, the upper Salt River and Roosevelt Lake inflow does not provide essential shallow riffle habitats.

Historically, spikedace occurred throughout the upper Gila River basin in Arizona and New Mexico, including the Gila, Salt, and Verde Rivers and their major tributaries upstream of the present-day Phoenix metropolitan area (FWS 1991). As of 2019, there were five known remnant spikedace populations, with the only large populations occurring in Aravaipa Creek in Arizona and one section of the Gila River in New Mexico. A smaller population from the Middle Fork Gila River has not been observed since 1991, and upper Verde River and Eagle Creek populations have not been observed in more than a decade (FWS 2019).

Spikedace historical records indicate it was observed and/or captured: 1) at the Cibecue Creek and Salt River confluence (upstream of Roosevelt Lake); 2) downstream of the Roosevelt Dam on the Salt River; and 3) in the Salt River prior to the location that is now Saguaro Lake (FWS 2010a). Spikedace do not currently occupy any Salt River locations. The Spikedace Recovery Plan amendment (FWS 2019) identified the Verde River and lower Salt River as Recovery Unit 1. The FWS modified recovery criteria to establish two additional spikedace populations within Recovery Unit 1 to downlist to threatened status and a third population for delisting.

Within the current or RHCP addendum permit area, there are no known spikedace populations within the CS, FCS, lower Tonto Creek permit area, or Gisela Reach mitigation site. The single historical record (from 1937) in Tonto Creek was thought to persist at listing in 1986; however, spikedace no longer occur (FWS 2010a).

Critical Habitat

The current spikedace critical habitat designation was revised in 2012, when the fish was reclassified from threatened to endangered (FWS 2012). Previously, multiple spikedace critical habitat designations were designated, set aside by the U.S. District Court of New Mexico, and revised (FWS 1998, 2000, 2007b, 2010a). The current critical habitat designation includes 629 river miles in Arizona and New

Mexico, 61.3 miles of which are tributaries to the Salt River (Unit 2). Spikedace critical habitat in Unit 2 includes 29.7 miles of Tonto Creek from the confluence with Greenback Creek upstream to the confluence with Houston Creek. Unit 2 also includes 9.4 miles of Greenback Creek from its confluence with Tonto Creek upstream to the confluence with Lime Springs (see Figure 14 in the RHCP addendum). All the Salt River Subbasin stream segments (Unit 2) are classified as "2b," which indicates these streams were not occupied when critical habitat was designated, but which would allow for its conservation in the future (FWS 2012). Although spikedace historically inhabited the Salt River's mainstem, it was not designated as critical habitat because numerous dams have created lakes and altered stream flow regimes.

Tonto Creek below Greenback Creek (near the Roosevelt Lake CS) was not designated as spikedace critical habitat, because Roosevelt Lake has rendered the habitat unsuitable. Farther upstream, above the town of Gisela at Houston Creek, Tonto Creek's gradient and substrate are unsuitable for spikedace. Although spikedace have never been recorded in lower Greenback Creek, the FWS included it in the critical habitat designation because its connection to Tonto Creek and federal land management makes it an option for future recovery (FWS 2012). Although spikedace critical habitat along Tonto and Greenback Creeks does not overlap with the Roosevelt Lake CS, approximately 1.1 miles are within the FCS, which includes 0.8 mile along Tonto Creek (0.25 mile of which falls within the bottom 5 feet of the FCS) and 0.2 mile along Greenback Creek (see Figure 15 in the RHCP addendum). An additional 14.4 miles of spikedace critical habitat are within the lower Tonto Creek permit area (i.e., from the top of the FCS to East del Chi Drive). Spikedace critical habitat is also present at the Gisela Reach mitigation site along 3.0 miles of lower Tonto Creek. While spikedace habitat exists along lower Tonto and Greenback Creeks, there have been no attempts to improve habitat conditions and no plans to reintroduce the fish.

The FWS identified six spikedace critical habitat PCEs: 1) appropriate stream habitat; 2) availability of aquatic insect prey species; 3) low levels of water pollution; 4) perennial or intermittent flows that connect habitats; 5) no or low levels of nonnative aquatic species; and 6) natural, unregulated flows, or modified or regulated flows that allow for adequate river function (FWS 2012). These PCEs are generally present along lower Tonto Creek designated critical habitat, with the exception of PCE 5 (due to the presence of nonnative fish species).

NARROW-HEADED GARTERSNAKE

The FWS listed the narrow-headed gartersnake (*Thamnophis rufipunctatus*) as a threatened species under the ESA in 2014 (FWS 2014a). The primary threats were the same as those identified for the northern Mexican gartersnake (see Section 3.2.2.2.1), which include predation from and competition with nonnative species, and habitat impacts from changes in land use and surface water impoundments and diversion (FWS 2014a).

The narrow-headed gartersnake was not a covered species in the 2002 RHCP, and SRP is not seeking coverage for this snake under the RHCP addendum. However, the northern Mexican gartersnake Conservation Program may affect the narrow-headed gartersnake and its critical habitat. A description of its life history, baseline status in the permit area, and critical habitat is provided below.

The narrow-headed gartersnake is a small to medium-sized gartersnake (up to 44 inches long). It is usually active at the ground surface from March through November and appears more cold-tolerant than other gartersnakes, based on it foraging in cold streams at higher elevations (AGFD 2021; FWS 2014a). Female gartersnakes begin breeding at about 2 years old and can give birth to four to 17 young (AGFD 2021; FWS 2014a). They can live up to 10 years in the wild.

Narrow-headed gartersnakes are more aquatic than other gartersnakes and are strongly associated with clear, rocky streams at elevations from 2,300 to 8,000 feet amsl. Narrow-headed gartersnakes can forage

underwater and specialize on fish. Prey species include native fish such as Sonora sucker, desert sucker, speckled dace, and several chub species, as well as young nonnative predatory sportfish such as brown trout, green sunfish, and smallmouth bass. Consuming spiny-rayed nonnative fish can injure gartersnakes (AGFD 2021; FWS 2014a).

The narrow-headed gartersnake's historical range once extended along the entire Mogollon Rim and associated perennial stream drainages, from central and eastern Arizona down into southwestern New Mexico. Major subbasins within its historical range include the Salt and Verde River subbasins in Arizona and the Gila and San Francisco subbasins in New Mexico. Narrow-headed gartersnakes are unlikely to have ever occupied the lower stretches of these rivers, even where perennial flow existed. As of 2011, only five potentially viable populations remained: two in New Mexico in Diamond Creek and the Tularosa River, and three in Arizona in Fish Creek, Oak Creek, and West Fork Oak Creek. At that time, there were narrow-headed gartersnake occurrences from 31 other localities (including Tonto Creek), but those populations were unlikely to be viable because of low detection rates or duration since last detection. However, due to the lack of surveys, it was not possible to conclusively determine whether these populations had been extirpated (FWS 2014a). Even within areas where viable populations remain, recent surveys have failed to detect narrow-headed gartersnakes (O'Donnell et al. 2018).

On Tonto Creek, the narrow-headed gartersnake was last recorded in 2005, within 3 miles upstream of the Gisela Reach mitigation site (AGFD 2022; FWS 2014a). However, the Gisela Reach has not recently been surveyed for narrow-headed gartersnakes. There are no narrow-headed gartersnake records within the lower Tonto Creek permit area. USGS (2018) habitat modeling indicates that there is little narrow-headed gartersnake habitat along lower Tonto Creek, although habitat may occur in the Gisela Reach and upper reaches of Tonto Creek tributaries (such as Greenback Creek).

Critical Habitat

The FWS (2021a) designated 23,785 acres as narrow-headed gartersnake critical habitat, divided between eight units, comprising approximately 447 total stream miles. Six critical habitat units (Blue River Subbasin, Eagle Creek, Black River Subbasin, Canyon Creek, Tonto Creek, and Verde River Subbasin) are located entirely or mostly within Arizona. None of these critical habitat units overlap with the permit area (including the CS, FCS, and lower Tonto Creek). Approximately 73.3 acres of the Tonto Creek Critical Habitat Unit falls within the Gisela Reach mitigation site (see Figure 3-1), representing approximately 3% of the 2,293 acres within the Tonto Creek unit (FWS 2021a).

There are five PBFs essential to support narrow-headed gartersnake life history needs (FWS 2021a). PBFs 1 through 3 are habitat features related to hydrologic conditions and prey resources. PBF 5 is the gartersnake's elevational range (2,300 to 8,200 feet amsl). PBF 4 is the presence of nonnative aquatic species. The FWS concluded the Tonto Creek Unit would require special management considerations due to competition with and predation by nonnative species, water diversions and flood-control projects, the potential for high-intensity wildfires, and development of areas within or adjacent to critical habitat (FWS 2021a).

Migratory Birds

The Migratory Bird Treaty Act of 1918 (16 USC 703–712) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the U.S. Department of the Interior (DOI). Migratory birds include neotropical (long- distance) and temperate (short-distance) migrants, as well as resident species. The analysis area provides suitable breeding, nesting, feeding, foraging, resting, and/or roosting habitat for a number of migratory bird species.

Species of Greatest Conservation Need and USFS-Sensitive Species

Table H-2 lists the 139 SGCN and USFS-sensitive species that were determined as likely to be exposed to, and potentially impacted by, covered activities. Table H-2 excludes any species that are also federally listed. Refer to Appendix C of the RHCP addendum for the complete list of evaluated species and rationale for inclusion or exclusion in this EA.

The majority of the lands surrounding Roosevelt Lake are managed by the USFS in accordance with the Tonto National Forest Plan (USFS 2022). USFS Manual 2670 (USFS 2015) describes the habitat management objectives and policies for sensitive species, for which the Regional Forester identifies population viability as a concern. These are species experiencing, or that are predicted to experience, a substantial downward trend in population numbers or density, or a substantial downward trend in habitat availability or suitability that would reduce distribution (USFS 2015).

AGFD's (2012) State Wildlife Action Plan identifies vertebrate, crustacean, and mollusk as SGCN. These species are indicative of Arizona's diversity and health that warrant heightened attention due to low or declining populations. The AGFD (2012) prioritized SGCN species into two tiers: 1 and 2. Tier 1 is for species that AGFD has deemed vulnerable and is either federally listed under the ESA, recently removed from ESA listing specifically covered under a conservation agreement, or is identified by AGFD as a closed season species (i.e., no take permitted). Tier 2 represents the remainder of the species meeting vulnerable criteria. Species identified as vulnerable that may occur in the analysis area are listed in Table H-2.

Table H-2. Species of Greatest Conservation Need and USFS-Sensitive Species Potentially Present in the Analysis Area

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Amphibians			
Arizona toad	*Anaxyrus microscaphus*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records (iNaturalist 2023) from Tonto Creek vicinity.
Chiricahua leopard frog	*Lithobates chiricahuensis*	LT, SGCN 1	Unlikely to occur. The analysis area is within the species' range, but the species has not been recorded in the vicinity of the analysis area since 1999.
Lowland leopard frog	*Lithobates yavapaiensis*	TNF-S, SGCN 1	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity.
Northern leopard frog	*Lithobates pipiens*	SGCN 1	Unlikely to occur. The analysis area is within the species' range, but the Arizona population is currently restricted to stock tanks above Mogollon Rim.
Sonoran desert toad	*Incilius alvarius*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity.

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Birds			
Abert's towhee	*Melozone aberti*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
American bittern	*Botaurus lentiginosus*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but habitat for bitterns is limited and the species has not been recorded in the analysis area or vicinity.
American dipper	*Cinclus mexicanus*	TNF-S	Unlikely to occur. The analysis area is within the species' range, but habitat for dippers is not present and the species has not been recorded in the analysis area of vicinity.
American kestrel	*Falco sparverius*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
American peregrine falcon	*Falco peregrinus anatum*	SGCN 1	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Bald eagle	*Haliaeetus leucocephalus*	BGEPA, SGCN 1	Known to occur. See Section 3.2.2.
Band-tailed pigeon	*Patagioenas fasciata*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Bendire's thrasher	*Toxostoma bendirei*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but all nearby records are from lower elevation valleys (eBird 2023).
Black-throated gray warbler	*Setophaga nigrescens*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Brewer's sparrow	*Spizella breweri*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Broad-billed hummingbird	*Cynanthus latirostris*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from Tonto Creek (eBird 2023).
Bullock's oriole	*Icterus bullockii*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Cactus wren	*Campylorhynchus brunneicapillus*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
California least tern	*Sterna antillarum browni*	LE	Unlikely to occur. The analysis area contains suitable open, sandy habitat for the tern, however, the species is typically found at lower elevations (below 2,000 feet) and there have been very few records of the species in Arizona. A breeding pair was documented in Maricopa County approximately 30 miles west of the evaluation area (Marschalek 2010). Transient migrants occur more frequently and have been recently documented in Mohave and Pima counties (Arizona Field Ornithologists 2013; Marschalek 2010).
Cassin's finch	*Haemorhous cassinii*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from Tonto Creek (eBird 2023).
Clark's Grebe	*Aechmophorus clarkii*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from Roosevelt Lake (eBird 2023).
Common black hawk	*Buteogallus anthracinus*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Common nighthawk	*Chordeiles minor*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but the nearest records are from the Phoenix area (eBird 2023).
Costa's Hummingbird	*Calypte costae*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Ferruginous hawk	*Buteo regalis*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Flammulated Owl	*Psiloscops flammeolus*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but all nearby records are from high-elevation forests (eBird 2023).
Gila woodpecker	*Melanerpes uropygialis*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Gilded flicker	*Colaptes chrysoides*	TNF-S, SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Golden eagle	*Aquila chrysaetos*	BGEPA, SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Gray flycatcher	*Empidonax wrightii*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Harris's hawk	*Parabuteo unicinctus*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Hooded oriole	*Icterus cucullatus*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Inca dove	*Columbina inca*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Lincoln's sparrow	*Melospiza lincolnii*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Loggerhead shrike	*Lanius ludovicianus*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Long-eared owl	*Asio otus*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but habitat for long-eared owls is limited and the species has not been recorded in the analysis area or vicinity.
Mexican spotted owl	*Strix occidentalis lucida*	LT, SGCN 1	Unlikely to occur. The analysis area is within the species' range, but does not provide habitats preferred by the Mexican spotted owl (i.e., old-growth forests, Madrean evergreen woodlands, and wooded canyons). All nearby records are from higher elevation forests (eBird 2023).
Northern beardless-tyrannulet	*Camptostoma imberbe*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the Gisela Reach (eBird 2023).
Northern goshawk	*Accipiter gentilis*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but all nearby records are from high-elevation forests (eBird 2023).
Pacific wren	*Troglodytes pacificus*	TNF-S, SGCN 2	Unlikely to occur. The analysis area is within the species' range, but all nearby records are from high-elevation forests (eBird 2023).
Pinyon jay	*Gymnorhinus cyanocephalus*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but all nearby records are from high-elevation forests (eBird 2023).
Prairie falcon	*Falco mexicanus*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Rivoli's hummingbird	*Eugenes fulgens*	SGCN 2	May occur. The analysis area is within the species' range; there are historic records from Roosevelt Lake, but all recent records in the vicinity are from high-elevation forests (eBird 2023).

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Savannah sparrow	*Passerculus sandwichensis*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Scott's oriole	*Icterus parisorum*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Southwestern willow flycatcher	*Empidonax traillii extimus*	LE, SGCN 1	Know to occur. See Section 3.2.2.
Sprague's pipit	*Anthus spragueii*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but the species has not been recorded in the analysis area or vicinity.
Swainson's hawk	*Buteo swainsoni*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Swainson's thrush	*Catharus ustulatus*	SGCN 2	Unlikely to occur. The analysis area is within the species' range, but all nearby records are from high-elevation forests (eBird 2023).
Townsend's solitaire	*Myadestes townsendi*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from Tonto Creek and the Gisela Reach (eBird 2023).
Verdin	*Auriparus flaviceps*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Vesper sparrow	*Pooecetes gramineus*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Western grebe	*Aechmophorus occidentalis*	SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records of the species from the analysis area and vicinity (eBird 2023).
Western yellow-billed cuckoo (Western DPS)	*Coccyzus americanus*	LT, SGCN 1	Known to occur. See Section 3.2.2.
Yellow-eyed junco	*Junco phaeonotus*	TNF-S	Unlikely to occur. The analysis area is within the species' range, but all nearby records are from high-elevation forests (eBird 2023).
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	LE, SGCN 1	Known to occur. See Section 3.2.2.

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Fish			
Colorado pikeminnow	*Ptychocheilus Lucius*	LE, XN, SGCN 1	Unlikely to occur. The analysis area is within the species' range, but the current Salt River population is located above Roosevelt Lake.
Desert pupfish	*Cyprinodon macularius*	LE	Unlikely to occur. Desert pupfish inhabit smaller streams and springs rather than reservoirs and large rivers. Populations in Arizona are limited to a handful of sites where reintroductions have occurred.
Desert sucker	*Catostomus clarkii*	SGCN 2	Known to occur. The analysis area is within the species' range and there are recent records from the analysis area and vicinity.
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	LE, SGCN 1	Unlikely to occur. The analysis area is within the species' range, but all recent records are from below Modified Roosevelt.
Longfin dace	*Agosia chrysogaster*	SGCN 2	Known to occur. The analysis area is within the species' range and there are recent records from Tonto Creek.
Razorback sucker	*Xyrauchen texanus*	LE, PT, SGCN 1	Unlikely to occur. Range intersects with project footprint but no records within 3 miles.
Roundtail chub	*Gila robusta*	TNF-S, SGCN 1	Likely to occur. The analysis area is within the species' range and there are historic records from Tonto Creek; recent records are from below Modified Roosevelt.
Sonora sucker	*Catostomus insignis*	SGCN 2	Known to occur. The analysis area is within the species' range and there are recent records from Tonto Creek
Spikedace	*Meda fulgida*	LE	Unlikely to occur, but critical habitat is present in the analysis area. See Section F.3.4.
Insects/Invertebrates			
A mayfly	*Fallceon eatoni*	TNF-S	May occur. The analysis area is within the species' range, and it was recorded in 2006 in the Salt River Canyon near the analysis area (FWS 2010b).
Ancha mountainsnail	*Oreohelix anchana*	TNF-S, SGCN 2	Unlikely to occur. The analysis area is outside the known range for the species; the only records for the species are from the Sierra Ancha Mountains.
Fossil springsnail	*Pyrgulopsis simplex*	TNF-S, SGCN 1	Unlikely to occur. The analysis area is outside the known range for the species; the only records for the species are from two spring systems well outside the analysis area.
Milk Ranch talussnail	*Sonorella micromphala*	TNF-S, SGCN 2	Unlikely to occur. Only found on talus slopes on the Mogollon Rim near Pine, Arizona.
Monarch butterfly	*Danaus plexippus*	CA, TNF-S	Known to occur. The analysis area is within the species' range, and there are recent records from Tonto Creek (Western Monarch Milkweed Mapper 2023).

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Net-winged midge	*Agathon arizonicus*	TNF-S	Unlikely to occur. The species range in Arizona is limited to highlands in the southeast of the state.
Richinbar talussnail	*Sonorella ashmuni*	TNF-S, SGCN 2	May occur. The analysis area is within the species' range, and limited habitat for the species is present in Tonto Creek and the Gisela Reach.
Roosevelt talussnail	*Sonorella rooseveltiana*	TNF-S, SGCN 2	Known to occur. The analysis area is within the species' range, and there are recent records from the analysis area and vicinity.
Sierra Ancha talussnail	*Sonorella anchana*	TNF-S, SGCN 2	Unlikely to occur. The analysis area is outside the known range for the species; the only records for the species are from the Sierra Ancha Mountains.
Verde Rim springsnail	*Pyrgulopsis glandulosa*	TNF-S, SGCN 1	Unlikely to occur. The analysis area is outside the known range for the species; the only records for the species are from Yavapai County.
Plants			
Aravaipa sage	*Salvia amissa*	TNF-S	May occur. Grows along streams between 450–900 m. Has been collected along Fish Creek south of analysis area (Kearney and Peebles 1960).
Arizona bugbane	*Cimicifuga arizonica*	TNF-S, HS	Unlikely to occur Grows in moist, loamy soil of the ecotone between the coniferous forest and the riparian habitat, 1,600–2,100 m. Nearest records are from Sierra Ancha Mountains.
Blumer's dock	*Rumex orthoneurus*	TNF-S, HS	Unlikely to occur. Grows along streams at 2,500 m. Nearest records are from Sierra Ancha Mountains.
Broadleaf lupine	*Lupinus latifolius* ssp. *leucanthus*	TNF-S	Unlikely to occur. Grows along streams and moist soils in oak-cottonwood, mixed scrub, and ponderosa pine communities between 1,464–2,2135 m. There are no nearby records of the species.
Chiricahua Mountain alumroot	*Heuchera glomerulata*	TNF-S	Unlikely to occur. Grows on shaded, rocky slopes between 1,300–2,000 m. The nearest records are from Jackson Butte.
Chihuahuan sedge	*Carex chihuahuensis*	TNF-S	Unlikely to occur. Grows along stream banks, springs, and seeps between 1,000–3,000 m. Nearest records are from Sierra Ancha Mountains.
Cochise sedge	*Carex ultra*	TNF-S	Unlikely to occur Grows sandy or gravelly moist soils or marshy sites between 1,524–1,829 m. There are no nearby records.
Davidson's sage	*Salvia davidsonii*	TNF-S	Unlikely to occur. Grows in canyons and in moist soils on wooded slopes between 488–2,900 m. There are no nearby records for the species.

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Fish creek fleabane	*Erigeron piscaticus*	TNF-S	May occur. Grows on gravelly and sandy washes between 700–1,200 m. Only currently known populations are in Oak Grove Canyon in Graham County.
Fish Creek rockdaisy	*Perityle saxicola*	TNF-S	Known to occur. Grows in crevices of igneous rocks between 700–1,100 m. There are recent records of the species in the vicinity of the analysis area.
Flagstaff beardtongue	*Penstemon nudiflorus*	TNF-S	Unlikely to occur. Grows in rocky basaltic soil in pinyon-juniper woodlands between 1,500–2,300 m. There are no nearby records for the species.
Gila rock daisy	*Perityle gilensis* var. *gilensis*	TNF-S	Unlikely to occur. Grows in crevices of igneous bluffs and boulders between 500–1,300 m. There are no nearby records for the species
Grand Canyon century plant	*Agave phillipsiana*	TNF-S, HS	Unlikely to occur. Only known from sites within Grand Canyon National Park.
Hodgson's fleabane	*Erigeron hodgsoniae*	TNF-S	Unlikely to occur. Only known from Cold Water Canyon in Sierra Ancha mountains, at 1,188 m.
Hohokam agave	*Agave murpheyi*	TNF-S, HS	May occur. Grows near major drainages on open slopes within desert scrub between 400–890 m. Documented within 3 miles of project vicinity (AGFD 2023c). Highly Safeguarded species under Arizona native plant law.
Horseshoe deer vetch	*Hippocrepis comosa*	TNF-S	Unlikely to occur. Grows on limestone tertiary lakebed deposits at 640 m. Only collections from Horseshoe Reservoir and in the Verde Valley.
James' rubberweed	*Hymenoxys jamesii*	TNF-S	Unlikely to occur. Grows in open areas, edges of juniper pine forest, and roadsides between 2,000–2,500 m.
Mapleleaf false snapdragon	*Mabrya acerifolia*	TNF-S	May occur. Grows in rock walls, canyons, cliffs, and road cuts 200–1,000 m. Collected south of analysis area along Salt River.
Marsh rosemary	*Limonium limbatum*	TNF-S	May occur. Grows in wet meadows, salt flats, alkaline depressions, and gypsum soils between 400–1,800 m. Collected upstream of analysis area along Salt River.
Metcalfe's ticktrefoil	*Desmodium metcalfei*	TNF-S	Unlikely to occur. Grows on rocky slopes and canyons in grasslands, in oak pinyon juniper woodlands, and riparian areas between 840–2,500 m.
Mt. Dellenbaugh sandwort	*Arenaria aberrans*	TNF-S	May occur. Grows in oak and pine forests between 1,500–2,800 m. The species has been recorded at Tonto National Monument.
Pringle's fleabane	*Erigeron pringlei*	TNF-S	Unlikely to occur. Grows on shaded ledges and crevices, between 1,500–2,800 m. Nearest records are from Sierra Ancha Mountains.

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Ripley wild buckwheat	*Eriogonum ripleyi*	TNF-S	Unlikely to occur. Grows on sandy clay flats, sandstone outcrops, and pinyon juniper woodlands between 1,000–1,900 m. Known only from five scattered localities outside the analysis area.
Rusby's milkwort	*Polygala rusbyi*	TNF-S	Unlikely to occur. Grows in desert grasslands and juniper woodlands between 900–1,800 m. Nearest records are from Verde River.
Salt River rockdaisy	*Perityle gilensis* var. *salensis*	TNF-S	Unlikely to occur. Has only been collected in Salt River Canyon growing on crevices and leges of igneous canyon walls between 900–1,000 m.
Senator mine alumroot	*Heuchera eastwoodiae*	TNF-S	Unlikely to occur Grows on shaded, rocky slopes between 1,500–1,900 m. Nearest records are from Sierra Ancha Mountains.
Sierra Ancha fleabane	*Erigeron anchana*	TNF-S	Unlikely to occur. Grows on granite cliff faces through pine forests between 1,070–2,135 m.
Sonoran maiden fern	*Thelypteris puberula* var. *sonorensis*	TNF-S	Likely to occur. Arizona State University herbarium collection within analysis area (SEINet 2023). Occurs in canyons between 100–1,300 m.
Tonto Basin agave	*Agave delamateri*	TNF-S, HS	Known to occur. Grows near major drainages on open slopes within upland subdivision of the Sonoran Desert between 725–1,554 m. The species has been recorded in the vicinity of the analysis area.
Toumey's groundsel	*Packera neomexicana* var. *toumeyi (=Senecio n.* var. *t.)*	TNF-S	Unlikely to occur. Grows in well drained soils in coniferous woodlands between 1,800–2,500 m. Nearest records are from the Sierra Ancha Mountains (iNaturalist 2023).
Mammals			
Allen's lappet-browed bat	*Idionycteris phyllotis*	TNF-S	May occur. Prefers higher elevation woodlands, but uses low elevation riparian habitats at times.
Arizona cotton rat	*Sigmodon arizonae cienegae*	SGCN 2	May occur. Range intersects with project footprint.
Arizona gray squirrel	*Sciurus arizonensis*	SGCN 2	May occur. The analysis area is within the species' range, but limited habitat is present (at Gisela Reach) and most nearby records are from higher elevations.
Arizona pocket mouse	*Perognathus amplus*	SGCN 2	May occur. The analysis area is within the species' range and habitat is present, but most nearby records are from lower elevations.
Bailey's pocket mouse	*Chaetodipus baileyi*	SGCN 2	Likely to occur. The analysis area is within the species' range and there are records of the species from Tonto National Monument.

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Big free-tailed bat	*Nyctinomops macrotis*	SGCN 2	Likely to occur. The analysis area is within the species range and there are records of the species from Tonto National Monument.
California leaf-nosed bat	*Macrotus californicus*	SGCN 2	May occur. The analysis area is within the species range and habitat is present, but there are no nearby records of the species.
Cave myotis	*Myotis velifer*	SGCN 2	Known to occur. The analysis area is within the species range and there are records of the species from the analysis area and vicinity.
Fringed myotis	*Myotis thysanodes*	TNF-S, SGCN 2	May occur. The analysis area is within the species range and habitat is present, but the species prefers higher elevation forests.
Hoary bat	*Lasiurus cinereus*	SGCN 2	Known to occur. The analysis area is within the species range and the species has been recorded near Tonto Creek.
Mexican wolf	*Canis lupus baileyi*	NEP	Unlikely to occur. The analysis area is within the Mexican Wolf Experimental Population Area, where wolves are allowed to naturally disperse, and suitable woodland habitat is present. The Gisela Reach is approximately 9 miles from the currently occupied range for the subspecies; however, the majority of the analysis area is more than 30 miles south of the currently occupied range. The nearest recent siting of a Mexican wolf was in March 2023, approximately 50 miles north of the Gisela Reach.
Ocelot	*Leopardus (=Felis) pardalis*	LE	Unlikely to occur. Dense, brushy thickets and riparian bottomlands preferred by Ocelot are present in the analysis area. However, the species is extremely rare in Arizona. In 2010 an Ocelot that had been struck by a vehicle was documented along U.S. Route 60 approximately 20 miles south of the analysis area; all other recent records are from further south in Cochise County.
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	TNF-S, SGCN 1	Known to occur. The analysis area is within the species range and the species has been recorded in the vicinity.
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	SGCN 2	Likely to occur. The analysis area is within the species range and there are records of the species from Tonto National Monument.
Spotted bat	*Euderma maculatum*	SGCN 2	May occur. The analysis area is within the species range and limited habitat is present.
Southwestern myotis	*Myotis auriculus*	SGCN 2	Likely to occur. The analysis area is within the species range and there are records of the species from Tonto National Monument.

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Southwestern river otter	*Lontra canadensis sonora*	SGCN 2	Unlikely to occur. The analysis area is within the species range and habitat is present in Tonto Creek and the Salt Arm, but the reintroduced population in Arizona is on the Verde River.
Stephen's woodrat	*Neotoma stephensi*	SGCN 2	Unlikely to occur. The analysis area is at the southern edge of the species range and it prefers higher elevation forests.
Western red bat	*Lasiurus blossevillii*	TNF-S, SGCN 2	May occur. The analysis area is within the species range and habitat is present in Tonto Creek but there are no nearby records for the species.
Western yellow bat	*Lasiurus xanthinus*	SGCN 2	May occur. The analysis area is within the species range and habitat is present in Tonto Creek but there are no nearby records for the species.
Yuma myotis	*Myotis yumanensis*	SC, SGCN 2	Known to occur. The analysis area is within the species range and the species has been recorded in the vicinity.
Reptiles			
Arizona black rattlesnake	*Crotalus cerberus*	SGCN 2	Known to occur. The species prefers higher elevation forests but there are records from Roosevelt Lake (iNaturalist 2023) and Tonto National Monument.
Bezy's night lizard	*Xantusia bezyi*	TNF-S, SGCN 2	Known to occur. The analysis area is within the species range and the species has been recorded in the vicinity.
Desert mud turtle	*Kinosternon sonoriense sonoriense*	SGCN 2	Known to occur. The analysis area is within the species range and the species has been recorded in the vicinity.
Gila monster	*Heloderma suspectum*	SGCN 1	Known to occur. The analysis area is within the species range and the species has been recorded in the vicinity.
Madrean alligator lizard	*Elgaria kingii*	SGCN 2	May occur. The analysis area is within the species range and habitat is present along Tonto Creek and the Gisela Reach, but most nearby records are from higher elevations.
Regal horned lizard	*Phrynosoma solare*	SGCN 2	Known to occur. The analysis area is within the species range and the species has been recorded in the analysis area and vicinity.
Saddled leaf-nosed snake	*Phyllorhynchus browni*	SGCN 2	May occur. The analysis area is within the species range and habitat is present, but there are no nearby records of the species.
Sonoran coralsnake	*Micruroides euryxanthus*	SGCN 2	May occur. The analysis area is within the species range and habitat is present, but there are no nearby records of the species.

Species Common Name	Species Scientific Name	Current Listing Status*	Occurrence Status
Sonoran desert tortoise	*Gopherus morafkai*	CCA, TNF-S, SGCN 1	May occur. The analysis area is within the species range and habitat is present, but most nearby records are from lower elevations.
Sonoran spotted whiptail	*Aspidoscelis sonorae*	SGCN 2	Likely to occur. Range intersects with project footprint. iNaturalist records (w/photos) within vicinity of Roosevelt Lake.
Sonoran whipsnake	*Coluber bilineatus*	SGCN 2	Known to occur. The species prefers higher elevation forests but there are records from Roosevelt Lake (iNaturalist 2023) and Tonto National Monument.
Tiger rattlesnake	*Crotalus tigris*	SGCN 2	May occur. The analysis area is within the species range and habitat is present, but most nearby records are from lower elevations.
Variable sandsnake	*Chilomeniscus stramineus*	SGCN 2	May occur. The analysis area is within the species range and habitat is present, but most nearby records are from lower elevations.

* Federal Status Definitions:

BGEPA = Bald and Golden Eagle Protection Act

CA = Candidate for federal listing

CCA = Candidate Conservation Agreement

LE = Listed Endangered. Endangered species are those in danger of extinction throughout all or a significant portion of their range.

LT = Listed Threatened. Threatened species are those likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

NEP = nonessential experimental population

PT = Proposed Threatened.

SGCN = Species of Greatest Conservation Need

SGCN 1 = species for which AGFD has deemed vulnerable (scored "1") in at least one of the seven categories AND matches at least one of the following:

- Federally listed as endangered or threatened under the ESA.
- Recently removed from ESA and currently requires post-delisting monitoring.
- Specifically covered under a signed conservation agreement, Candidate Conservation Agreement, or a Candidate Conservation Agreement with Assurances, or a Conservation Strategy and Assessment or Strategic Conservation Plan.
- Closed season species (i.e., no take permitted) as identified in Arizona Game and Fish Commission Orders 40, 41, 42 or 43 entered into an agreement or has legal or other contractual obligations or warrants the protection of a closed season.

SGCN 2 = species for which AGFD has deemed vulnerable (scored "1") in at least one of the seven categories above, but matched none of the additional criteria for Tier 1.

SC = Species of Concern

TNF-S = Tonto National Forest Species of Conservation Concern.

XN = Experimental Nonessential population.

Arizona Native Plant Law Status Definitions:

HS = Highly Safeguarded: no collection allowed. Those species of native plants and parts of plants, including the seeds and fruit, whose prospects for survival in Arizona are in jeopardy or which are in danger of extinction throughout all or a significant portion of their ranges.

Table Note: Range, habitat, and occurrence information are from AGFD (2022, 2023a, 2023b, 2023c); Arizona Rare Plant Committee (2000); Flora of North America (2023); National Park Service (2023); SEINet (2023); and FWS (2023a, 2023b) unless otherwise noted.

H.2.2 Environmental Consequences

Proposed Action Alternative

OTHER THREATENED AND ENDANGERED SPECIES

Spikedace

The Proposed Action would have no effect on spikedace, as the species does not currently inhabit Roosevelt Lake, lower Tonto Creek, the Gisela Reach, or the lower Salt River.

Critical Habitat

CONSERVATION SPACE OPERATIONS

Spikedace critical habitat is not present in the CS; however, SRP's CS operations would continue to provide consistent aquatic habitat for predatory sportfish in the CS, which has a minor to moderate contribution to their negative effects on PCE 5 (absence of predatory nonnative fish) for approximately 1,338 acres of designated spikedace critical habitat along lower Tonto Creek (including Tonto Creek within the FCS). Effects on PCE 5 (absence of predatory nonnative fish) would only occur when Tonto Creek inflows are high enough to create a hydrologic connection between Roosevelt Lake and Tonto Creek that allows fish to migrate upstream. SRP's continued operations in the CS would have no effect on PCEs 1–4 or PCE 6.

FLOOD CONTROL SPACE OPERATIONS

SRP's normal flood control operations may affect approximately 1 mile of designated spikedace critical habitat in the FCS. The inundation of the FCS during normal flood control operations would render some stream habitat for spikedace unsuitable for up to 20 days after each fill event because of the increased water depth and reduced flow rates (PCE 1). However, this effect may be minimized by the creation of additional shallow-water habitats that may be suitable for spikedace (PCE 1). Inundation of the FCS can affect the distribution and availability of aquatic insect prey species (PCE 2) as described in Section 3.2.2.1.2, Southwestern Willow Flycatcher. SRP's current operations of Modified Roosevelt within the FCS would have little to no impact on the level of water pollutants (PCE 3) but may benefit PCE 4 (habitat connectivity) because periodic inundation of the FCS would provide connectivity between the isolated pools present at lower lake levels. Flood control operations would also alter the flow regime (PCE 6) of the short segment of Tonto Creek that falls within the FCS. However, since normal flood operations require the evacuation of the FCS within 20 days of water entering the FCS, any effects on spikedace critical habitat in the FCS would be brief and infrequent.

SRP's normal flood control operations would have little detectable contribution to the ongoing degradation of PCE 5 (absence of predatory nonnative fish) in the FCS, since inundation is too brief and infrequent to create additional persistent nonnative fish habitat. Nonnative fish may move into the FCS when it is inundated, but as water is released and lake levels decline, these individuals may move back to the consistent habitat in the CS or die as the pools they have become trapped in desiccate. Thus, while CS actions and the presence of nonnative fish in lower Tonto Creek within the FCS would continue to degrade PCE 5, SRP's brief and infrequent flood control operations do not noticeably change the baseline, affecting spikedace critical habitat.

PLANNED DEVIATION

Under the Proposed Action, the planned deviation would extend the duration of inundation of the 0.25 mile of spikedace critical habitat in the bottom 5 feet of the FCS to 120 days in up to 3 of the 5 years immediately following approval of the RHCP addendum. While the FCS would still be evacuated after 120 days of water entering the FCS, the planned deviation may extend the duration of nonnative predatory fish species presence in 0.25 mile of spikedace critical habitat and temporarily contribute to the degradation of PCE 5 (absence of predatory nonnative fish). The planned deviation may also extend the duration of impacts to PCEs 1–4 and PCE 6 (as described for the No Action Alternative) in the bottom 5 feet of the FCS, but those effects would be limited to 0.25-mile of critical habitat that is already in a degraded condition and would occur in no more than 3 of the first 5 years of plan implementation

CONSERVATION ACTIONS

Implementation of the Gartersnake Conservation Program under the Proposed Action may benefit spikedace critical habitat. The Gartersnake Conservation Program would suppress predatory nonnative fish species and stock native fish and (possibly) lowland leopard frogs in persistent pools in the lower Tonto Creek permit area and at the Gisela Reach mitigation site. Native fish and (possibly) lowland leopard frog stocking would also occur at persistent pools in Tonto Creek within the FCS, but nonnative fish suppression would not be conducted at these sites. The suppression of predatory nonnative fish in persistent pools in Tonto Creek would directly enhance spikedace critical habitat PCE 5 (absence of predatory nonnative fish). PCE 2 (aquatic insect prey base) may be influenced by replacing nonnative fish species with native fish and (possibly) lowland leopard frogs in lower Tonto Creek and the Gisela Reach mitigation site, but it is likely the scale of effort and enhancing native species would not cause a detectable change to insect populations. The Gartersnake Conservation Program would have no effect on PCEs 1, 3, 4, and 6.

Narrow-headed Gartersnake

Since narrow-headed gartersnakes do not occur in the CS, FCS, or the lower Tonto Creek permit area, operation of Modified Roosevelt under the Proposed Action, including the planned deviation, would have no effect on narrow-headed gartersnakes.

Since the narrow-headed gartersnake's life history requirements are similar to northern Mexican gartersnake, the Gartersnake Conservation Program would have similar beneficial effects (see Section 3.2.2.2.1) on narrow-headed gartersnake. Although narrow-headed gartersnakes have not been recorded within the Gisela Reach mitigation site, there are records within 3 miles (AGFD 2022), and suitable habitat is present (USGS 2018). Therefore, narrow-headed gartersnakes may occur at the Gisela Reach. Suppressing nonnative predatory fish and stocking native fish reduces competition and predation and increases prey availability and diversity. Competition between northern Mexican gartersnake and narrow-headed gartersnake is unlikely due to the species' differing foraging strategies.

Critical Habitat

Critical habitat for the narrow-headed gartersnake is present within the Gisela Reach, but none is present within the CS, FCS, or lower Tonto Creek permit area. SRP's Modified Roosevelt CS and FCS operations and the planned deviation would have no detectable effect on narrow-headed gartersnake critical habitat, because of the existing baseline, distance from Roosevelt Lake, and existing barriers to upstream fish passage.

Effects on narrow-headed gartersnake critical habitat from implementation of the Gartersnake Conservation Program for the northern Mexican gartersnake would be essentially the same

(see Section 3.2.2.1.1) since critical habitat PBFs for both species is nearly identical (FWS 2020a). There would be no effect on PBF 1 (hydrologic conditions), PBF 2 (upland habitat), or PBF 5 (elevation range) from suppressing predatory fish and stocking native aquatic species. There would be beneficial effects on PBF 3 (native prey base) and PBF 4 (absence of nonnative and invasive predators and competitors) from suppressing nonnative predatory sportfish and stocking of native fish and (possibly) lowland leopard frogs. Therefore, the effects of the Proposed Action on narrow-headed gartersnake critical habitat are expected to be wholly beneficial.

MIGRATORY BIRDS

Conservation Space Operations

The Proposed Action would not modify SRP's operations of Modified Roosevelt Dam within the CS. The effect of continued CS operations on migratory birds in the CS would be similar to those described for the Full Operation Alternative in the 2002 RHCP EIS (FWS 2002a: Section 4.5.2.2), which concluded that existing upland habitats would not be affected and that the availability of riparian habitats would fluctuate over time due to cycles of vegetation inundation and desiccation. CS operations would continue to create the consistent aquatic habitat that contributes to the presence of nonnative fish in lower Tonto Creek, which may be prey resources for some migratory birds.

Flood Control Space Operations

SRP's current flood control operations were analyzed in the 1996 EA for the WCM (DOI and Reclamation 1996), which concluded that inundation of the FCS would be too brief and infrequent to lead to readily detectable impacts on migratory birds and other resources. However, the most recent Reservoir Planning Model anticipates a more frequent and extended presence of water in the FCS. While this could lead to some short-term impacts on vegetation rooted near the bottom of the FCS (see Section 3.2.1.2.1), these effects would be too minor and localized to notably impact most migratory birds. While there may be no long-term reduction in the spatial extent of habitat for migratory birds in the FCS, the temporal availability of these habitats would be reduced. During and after inundation events, migratory birds could be temporarily displaced from the FCS. Large amounts of upland habitat would remain in the surrounding area to support migratory birds displaced from the FCS, but migratory birds displaced from the FCS could experience increased predation or competition for resources. Migratory birds that depend on riparian habitat would likely experience greater effects since there is relatively little riparian habitat in the surrounding region for these species to disperse to when the FCS is inundated.

Planned Deviation

Under the Proposed Action, the planned deviation could impact vegetation (see Section 3.2.1.2.1), though the response of mature riparian vegetation to repeated inundation for 120 days is uncertain, and the recent colonization of Roosevelt Lake by the tamarisk leaf beetle increases the uncertainty in these effects (see Appendix F, Cumulative Effects). Even if a shift in vegetation communities were to occur, the area within the bottom 5 feet of the FCS is relatively small (740 acres) relative to the entire permit area, and the overall impact on migratory bird habitat at Roosevelt Lake would be minimal.

Like normal flood control operations, the planned deviation would temporarily decrease the availability of riparian habitats in the bottom 5 feet of the FCS but would extend the duration of inundation further into the migratory bird nesting season in years when it is implemented, thereby limiting the availability of upland migratory bird breeding habitat. Direct inundation of nests or drowning of young are unlikely to occur because the lake typically enters the FCS prior to the onset of the migratory bird breeding season, and the planned deviation would not alter this pattern.

Although changes in lake levels from the planned deviation may lead to small shifts in the distribution or abundance of prey species inhabiting aquatic or littoral habitats, this is unlikely to noticeably impact mobile migratory birds that adjust habitat use as prey resources shift. Any effects in the CS or FCS would be temporary and are not expected to create consistent aquatic habitat that leads to long-term changes in prey availability for migratory birds.

Gartersnake Conservation Program

Under the Proposed Action, fish suppression and stocking for the Gartersnake Conservation Program could temporarily alter prey resources, but any effect is likely to be too small to result in a readily detectable impact on migratory birds. Minor noise and disturbance effects from crews implementing the Gartersnake Conservation Program would be too brief and infrequent to substantially affect migratory birds or their habitat.

Conclusion

In summary, operation of Modified Roosevelt under the Proposed Action would have minor, temporary, localized impacts on migratory birds.

SPECIES OF GREATEST CONSERVATION NEED AND USFS-SENSITIVE SPECIES

Conservation Space Operations

The Proposed Action would not modify SRP's operations of Modified Roosevelt Dam within the CS. The effect of continued CS operations on SGCNs and USFS-sensitive species in the CS would be similar to those described for general wildlife in Section H.1.2, which concluded that existing upland habitats would not be affected and that the availability of riparian habitats would fluctuate over time due to cycles of vegetation inundation and desiccation. CS operations would continue to create the consistent aquatic habitat that contributes to the presence of nonnative fish in lower Tonto Creek, which may be prey resources for some SGCNs and USFS-sensitive species but predate on others. Although SGCNs and USFS-sensitive species are inherently more vulnerable to disturbance and displacement than general wildlife species, species that rely on riparian habitats are most likely well adapted to the fluctuating nature of these habitats and would not experience increased effects from the continuation of current CS operations.

Flood Control Space Operations

SRP's current flood control operations were analyzed in the 1996 EA for the WCM (DOI and Reclamation 1996), which concluded that inundation of the FCS would be too brief and infrequent to lead to readily detectable impacts on wildlife and other resources. However, the most recent Reservoir Planning Model anticipates a more frequent and extended presence of water in the FCS. While this could lead to some short-term impacts on vegetation rooted near the bottom of the FCS (see Section 3.2.1.2.1), these effects would be too minor and localized to notably impact most SGCNs and USFS-sensitive species. While there may be no long-term reduction in the spatial extent of habitat for SGCNs and USFS-sensitive species in the FCS, the temporal availability of these habitats would be reduced.

During and after inundation events, SGCNs and USFS-sensitive species could be temporarily displaced from the FCS. Large amounts of similar habitat would remain in the surrounding area to support individuals displaced from the FCS, but those individuals could experience increased predation or competition for resources. SGCNs and USFS-sensitive species that depend on riparian habitat would likely experience greater effects since there is relatively little riparian habitat in the surrounding region for these species to disperse to when the FCS is inundated. While this could result in reduced productivity or

mortality of individual SGCNs and USFS-sensitive wildlife, it is expected that relatively few individuals would be affected in any given year since FCS operations are infrequent and typically do not inundate all 3,596 acres of the FCS. The interval between FCS operations would provide time for habitats to recover from inundation and for SGCNs and USFS-sensitive species to return to the FCS. In the long term, the increased frequency of FCS operations could enhance riparian habitat in the FCS for SGCNs and USFS- sensitive species by providing increased soil moisture for vegetation.

Sonora sucker is the only aquatic SGCN or USFS-sensitive species that occurs in the permit area; they can be found in Tonto Creek. Sonora suckers do not inhabit large reservoirs and at Roosevelt Lake they are only found in the FCS where these areas overlap with the Tonto Creek inflow. Some Sonora suckers could be trapped in pools in the FCS as it is evacuated, where they could die if the pool dries out or be subject to increased predation from nonnative sportfish also trapped in these pools. Since the sucker's primary habitat is in Tonto Creek, above the influence of the lake, these effects would most likely be limited to a very small proportion of the sucker population in lower Tonto Creek.

Planned Deviation

Under the Proposed Action, extended inundation of the bottom 5 feet of the FCS could result in effects on vegetation as described in Section 3.2.1.2.1, which could impact the availability of habitat for some SGCN and USFS-sensitive species. These effects would be similar to those described for general wildlife in Section H.1.2 and are expected to be minimal. SGCN and USFS-sensitive species that inhabit upland vegetation would be the least impacted, as there are extensive areas of upland vegetation surrounding Roosevelt Lake that would be available to individuals displaced from the FCS. SGCN and USFS-sensitive species that depend on riparian vegetation would experience greater effects, since riparian vegetation is much less abundant in the surrounding region. The increased duration of inundation would not be expected to change the effects on Sonora sucker described above for flood control operations.

Conservation Actions

Under the Proposed Action, SRP would implement the Gartersnake Conservation Program described in the RHCP addendum, which would involve removing nonnative fish from persistent pools in the lower Tonto Creek permit area and Gisela Reach mitigation site and stocking native fish and (possibly) lowland leopard frogs. Persistent pools within the FCS along lower Tonto Creek would also be stocked with native fish and (possibly) lowland leopard frogs, though no nonnative fish suppression would occur at these sites. SRP would coordinate with AGFD and FWS to determine appropriate native fish species for stocking at these sites, but is anticipated that many of the species that are likely to be stocked—such as longfin dace, speckled dace, Gila topminnow, and native suckers—would be either SGCN, USFS-sensitive species, or both, and many are ESA listed as well. SRP's stocking of these native fish species would directly increase their populations at these sites. SRP's stocking activities would also directly increase the population of lowland leopard frog—an SGCN and USFS-sensitive species—if a suitable stocking program and rearing facility for lowland leopard frogs can be established.

As described in Section 3.2.1.2.1, the Gartersnake Conservation Program is not expected to directly impact other wildlife species, as these activities would be brief and infrequent and would be conducted by small crews traveling on foot. SGCN and USFS-sensitive species that prey on native fish or lowland leopard frogs would benefit from the increased prey availability, while those that prey on nonnative fish species may experience minor negative effects from temporary reduced prey availability. However, AGFD would continue to stock sportfish at Roosevelt Lake, and these species are likely to remain abundant in the permit area. Suppressing predatory nonnative fish and stocking native fish and lowland leopard frogs would likely have non-detectable impacts to insect prey and SGCN and USFS-sensitive species that rely on aquatic insects.

Conclusion

In summary, Modified Roosevelt operations under the Proposed Action would have minor, temporary, localized impacts on SGCNs and USFS-sensitive wildlife that may be both beneficial (e.g., enhanced riparian habitat from increased soil moisture) and adverse (e.g., decreased availability of habitat during inundation). In the long term, there would be moderate beneficial effects on SGCNs and USFS-sensitive species from the suppression of nonnative predatory sportfish and subsequent stocking of native species, several of which are SGCNs or USFS-sensitive species.

No Planned Deviation Alternative

OTHER THREATENED AND ENDANGERED SPECIES

Spikedace

The No Planned Deviation Alternative would have no effect on spikedace as the species does not currently inhabit Roosevelt Lake, lower Tonto Creek, the Gisela Reach, or the lower Salt River.

Critical Habitat

The No Planned Deviation Alternative would have the same effects on spikedace critical habitat as described for the Proposed Action, except the effects attributed to the planned deviation would not occur.

Narrow-headed Gartersnake

Since narrow-headed gartersnakes do not inhabit the CS, FCS, or lower Tonto Creek permit area, there would be no effect on the species from SRP's covered activities.

The No Deviation Alternative would also implement the Gartersnake Conservation Program, which would have the same effect on narrow-headed gartersnakes at the Gisela Reach mitigation site as described for the Proposed Action.

Critical Habitat

Narrow-headed gartersnake critical habitat is not present in the CS, FCS, or lower Tonto Creek; therefore, SRP's covered activities would have no effect on narrow-headed gartersnake critical habitat.

The effects on narrow-headed gartersnake critical habitat within the Gisela Reach from the implementation of the Gartersnake Conservation Program would be the same as those described for the Proposed Action.

MIGRATORY BIRDS

The No Planned Deviation Alternative would have the same effects on migratory birds as described for the Proposed Action. However, the effects on migratory birds would be slightly reduced because the planned deviation would not occur.

SPECIES OF GREATEST CONSERVATION NEED AND USFS-SENSITIVE SPECIES

The No Planned Deviation Alternative would have the same effects on SGCNs and USFS-sensitive species as described for the Proposed Action, However, the effects on SGCNs and USFS-sensitive species would be slightly reduced because the planned deviation would not occur.

No Action Alternative

OTHER THREATENED AND ENDANGERED SPECIES

Spikedace

Spikedace are not present in the analysis area and, under the No Action Alternative, temporarily operating the CS in a manner that avoids, to the extent possible, lake elevation increases would have no effect on spikedace. The CS would continue to provide consistent aquatic habitat for nonnative predatory sportfish which may move upstream and degrade PCE 5 (absence of predatory nonnative fish) for approximately 1,338 acres of designated spikedace critical habitat along lower Tonto Creek (including Tonto Creek within the FCS). However, nonnative fish suppression efforts would be implemented under the No Action alternative and would minimize these impacts.

Critical Habitat

CONSERVATION SPACE OPERATIONS

Under the No Action Alternative, the CS would continue to provide consistent aquatic habitat for nonnative fish, which would have the same contribution to effects on spikedace critical habitat PCE 5 (absence of predatory nonnative fish) as described for CS operations under the Proposed Action.

FLOOD CONTROL SPACE OPERATIONS

Under the No Action, SRP would prevent Roosevelt Lake from entering the FCS to the greatest extent possible and the effects on spikedace critical habitat described for flood control operations under the Proposed Action would not occur.

PLANNED DEVIATION

The planned deviation would not be approved under the No Action Alternative; therefore, the effects on spikedace critical habitat described for the planned deviation under the Proposed Action would not occur.

CONSERVATION ACTIONS

The Gartersnake Conservation Program would not be implemented under the No Action Alternative and the beneficial effects on spikedace critical habitat described under the Proposed Action would not occur.

Narrow-headed Gartersnake

Narrow-headed gartersnakes are not present in the analysis area and the No Action Alternative would have no effect on the narrow-headed gartersnake.

Critical Habitat

Narrow-headed gartersnake critical habitat is not present within the CS, FCS, or lower Tonto Creek. Therefore, the No Action Alternative would have no effect on narrow-headed gartersnake critical habitat.

While the Gartersnake Conservation Program would not be implemented under this alternative, nonnative fish suppression efforts would be conducted. The beneficial effects on narrow-headed gartersnake critical habitat within the Gisela Reach described for the Gartersnake Conservation Program under the Proposed Action would not occur.

MIGRATORY BIRDS

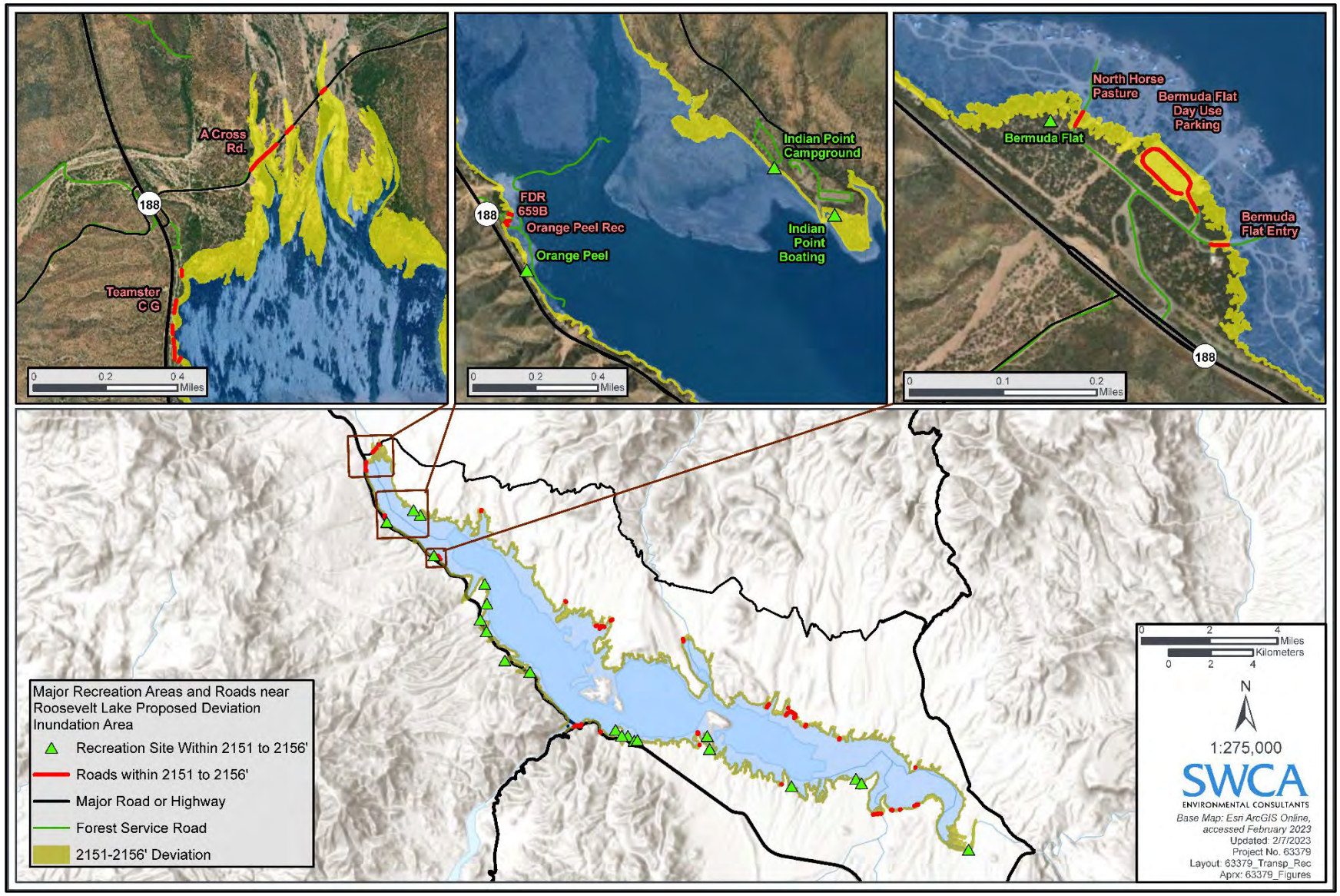
Under the No Action Alternative, short-term impacts to migratory birds from operations in the CS would be similar to those described in Section 4.5.2.1 of the 2002 RHCP EIS (FWS 2002a) and to those described for general wildlife above in Section H.1.2. Namely, there would be a gradual reduction in habitat for migratory birds that use riparian vegetation and open water and an increase in habitat for migratory birds that use upland vegetation.

SPECIES OF GREATEST CONSERVATION NEED AND USFS-SENSITIVE SPECIES

As with other wildlife, the short-term effects of the No Action Alternative would be a gradual decrease in riparian habitat and increase in upland habitat.

APPENDIX I

Recreation and Transportation Maps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Indian Point Campground
FDR 659B
Orange Peel Rec
Orange Peel
Indian Point Boating
188
0 0.2 0.4 Miles
North Horse Pasture
Bermuda Flat Day Use Parking
Bermuda Flat
Bermuda Flat Entry
188
0 0.1 0.2 Miles
Major Recreation Areas and Roads near Roosevelt Lake Proposed Deviation Inundation Area
Recreation Site Within 2151 to 2156'
Roads within 2151 to 2156'
Major Road or Highway
Forest Service Road
2151-2156' Deviation
0 2 4 Miles
0 2 4 Kilometers
N
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SWCA
ENVIRONMENTAL CONSULTANTS
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Updated: 2/7/2023
Project No. 63379
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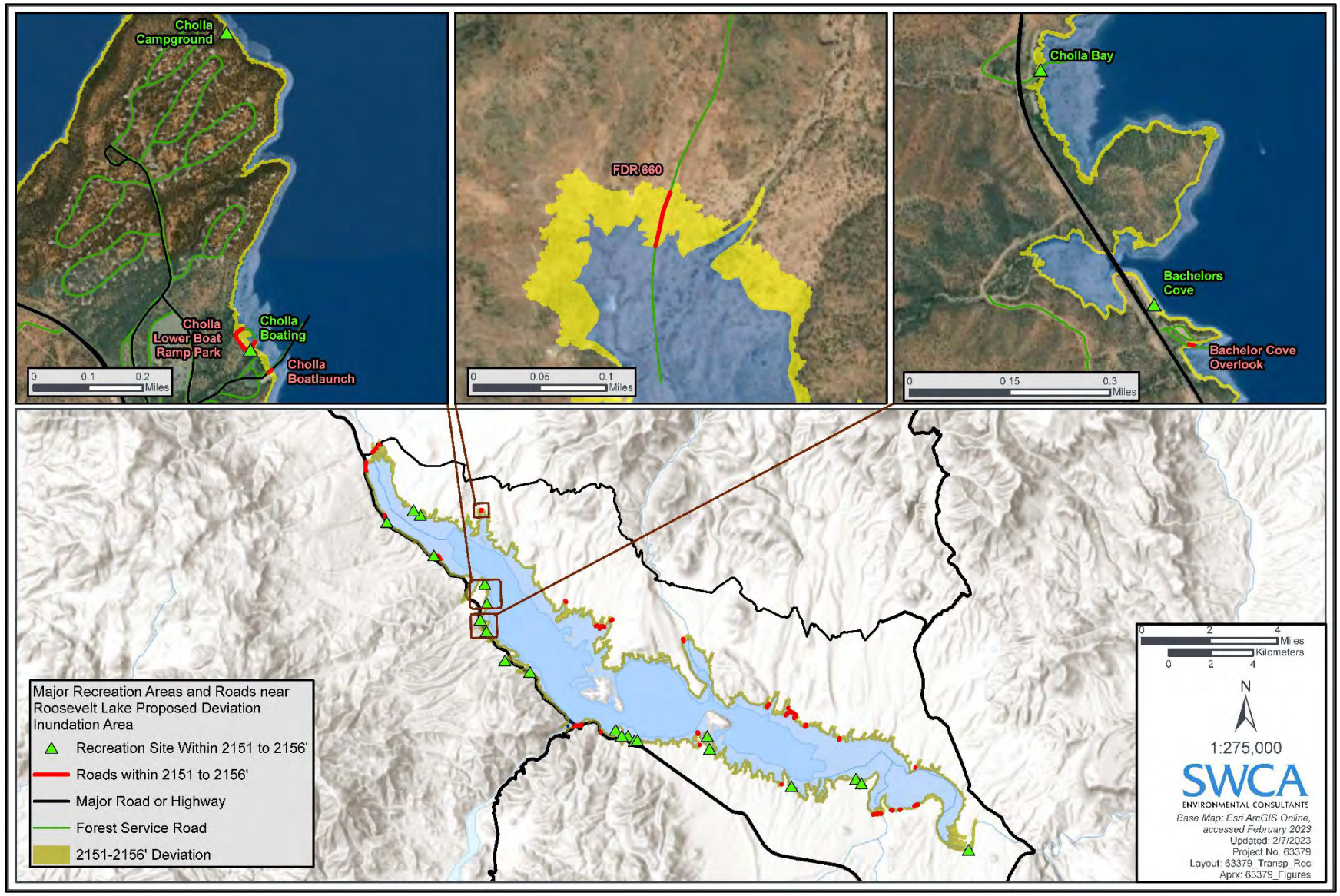
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Cholla Lower Boat Ramp Park
Cholla Boating
Cholla Boatlaunch
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FDR 660
0 0.05 0.1 Miles
Cholla Bay
Bachelors Cove
Bachelor Cove Overlook
0 0.15 0.3 Miles
Major Recreation Areas and Roads near Roosevelt Lake Proposed Deviation Inundation Area
Recreation Site Within 2151 to 2156'
Roads within 2151 to 2156'
Major Road or Highway
Forest Service Road
2151-2156' Deviation
0 2 4 Miles
0 2 4 Kilometers
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1:275,000
SWCA
ENVIRONMENTAL CONSULTANTS
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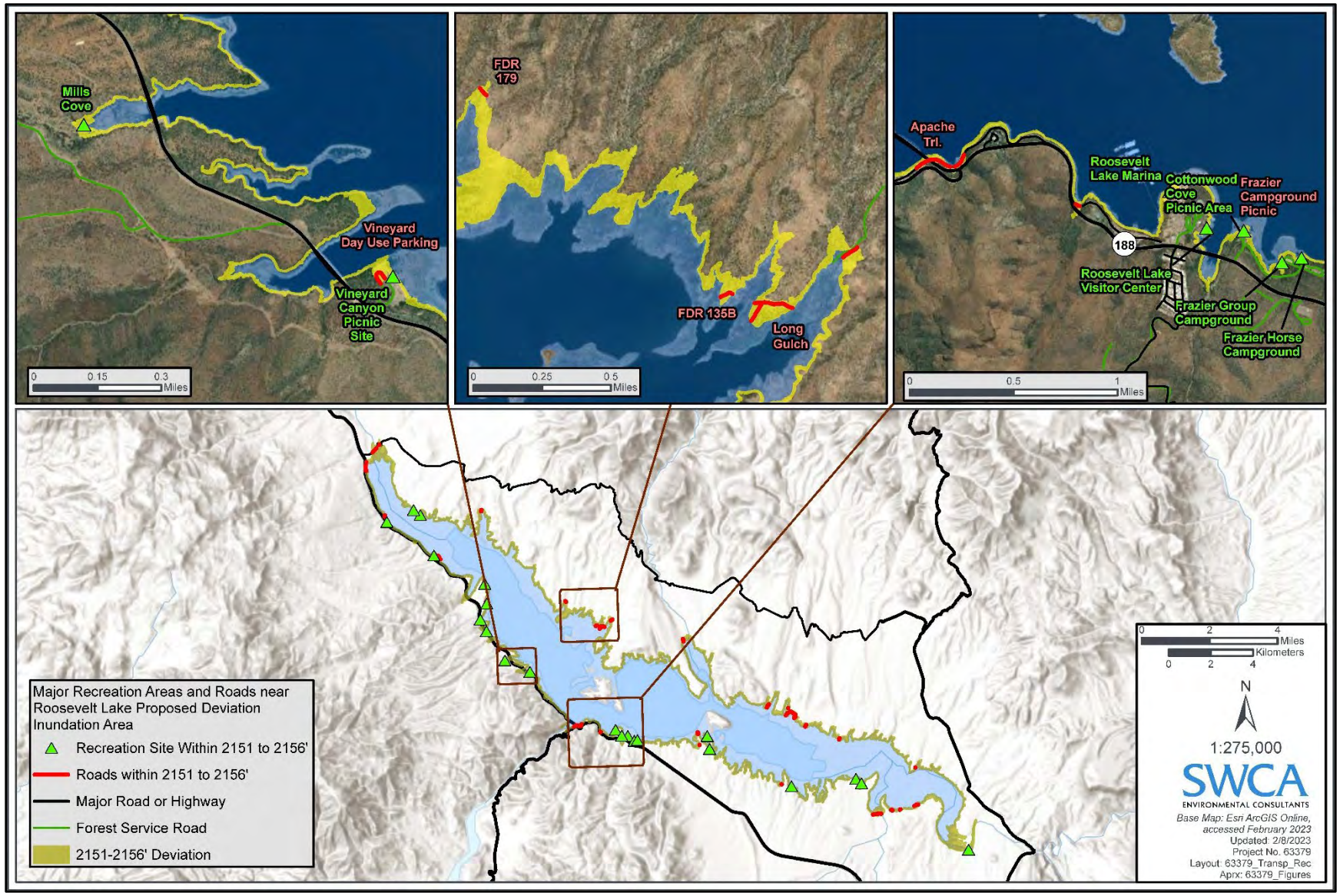
Mills Cove
Vineyard Day Use Parking
Vineyard Canyon Picnic Site
0 0.15 0.3 Miles
FDR 179
FDR 135B
Long Gulch
0 0.25 0.5 Miles
Apache Trl.
Roosevelt Lake Marina
Cottonwood Cove Picnic Area
Frazier Campground Picnic
188
Roosevelt Lake Visitor Center
Frazier Group Campground
Frazier Horse Campground
0 0.5 1 Miles
Major Recreation Areas and Roads near Roosevelt Lake Proposed Deviation Inundation Area
Recreation Site Within 2151 to 2156'
Roads within 2151 to 2156'
Major Road or Highway
Forest Service Road
2151-2156' Deviation
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0 2 4 Kilometers
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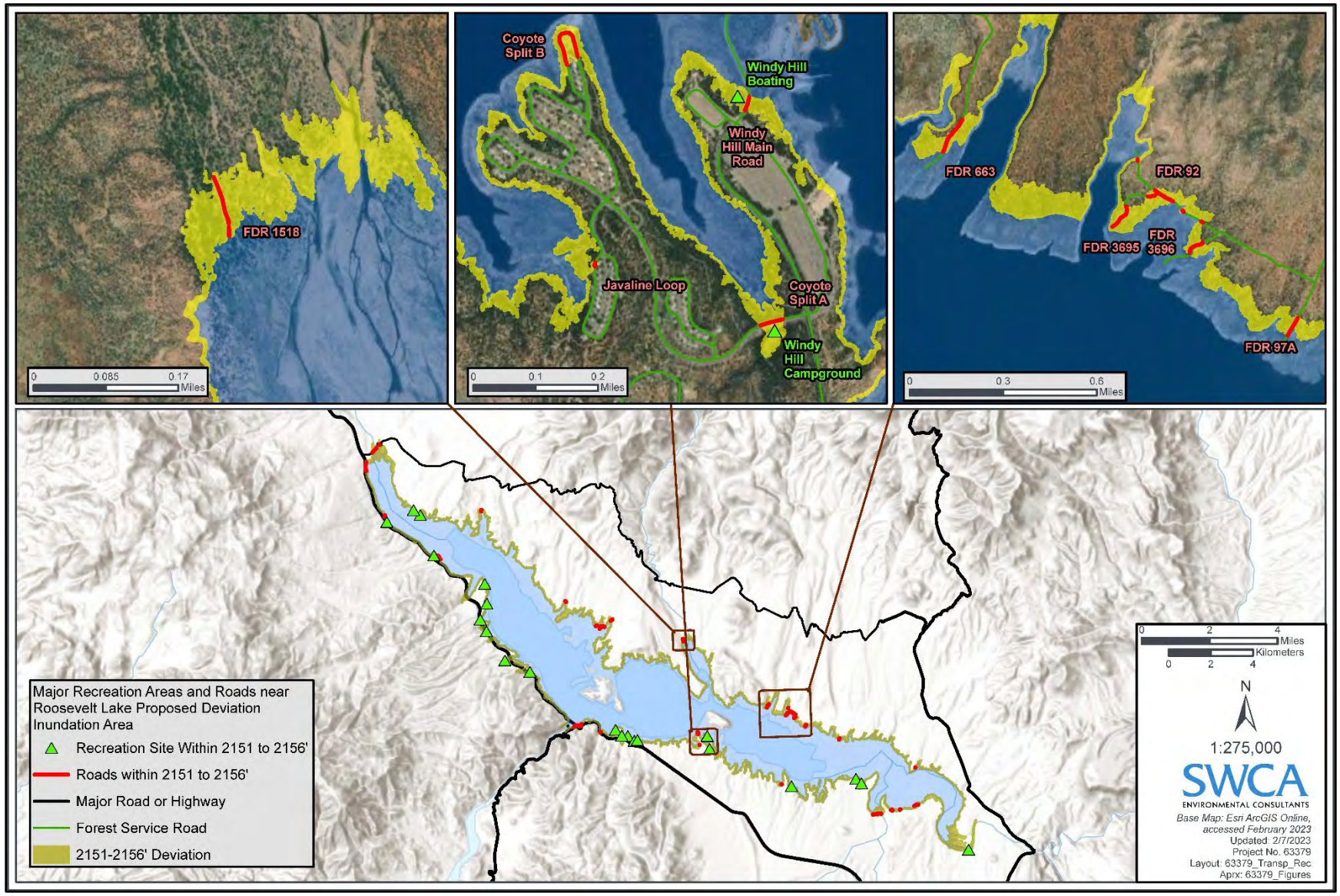
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Coyote Split B
Windy Hill Boating
Windy Hill Main Road
Javaline Loop
Coyote Split A
Windy Hill Campground
0 0.1 0.2 Miles
FDR 663
FDR 92
FDR 3695
FDR 3696
FDR 97A
0 0.3 0.6 Miles
Major Recreation Areas and Roads near Roosevelt Lake Proposed Deviation Inundation Area
Recreation Site Within 2151 to 2156'
Roads within 2151 to 2156'
Major Road or Highway
Forest Service Road
2151-2156' Deviation
0 2 4 Miles
0 2 4 Kilometers
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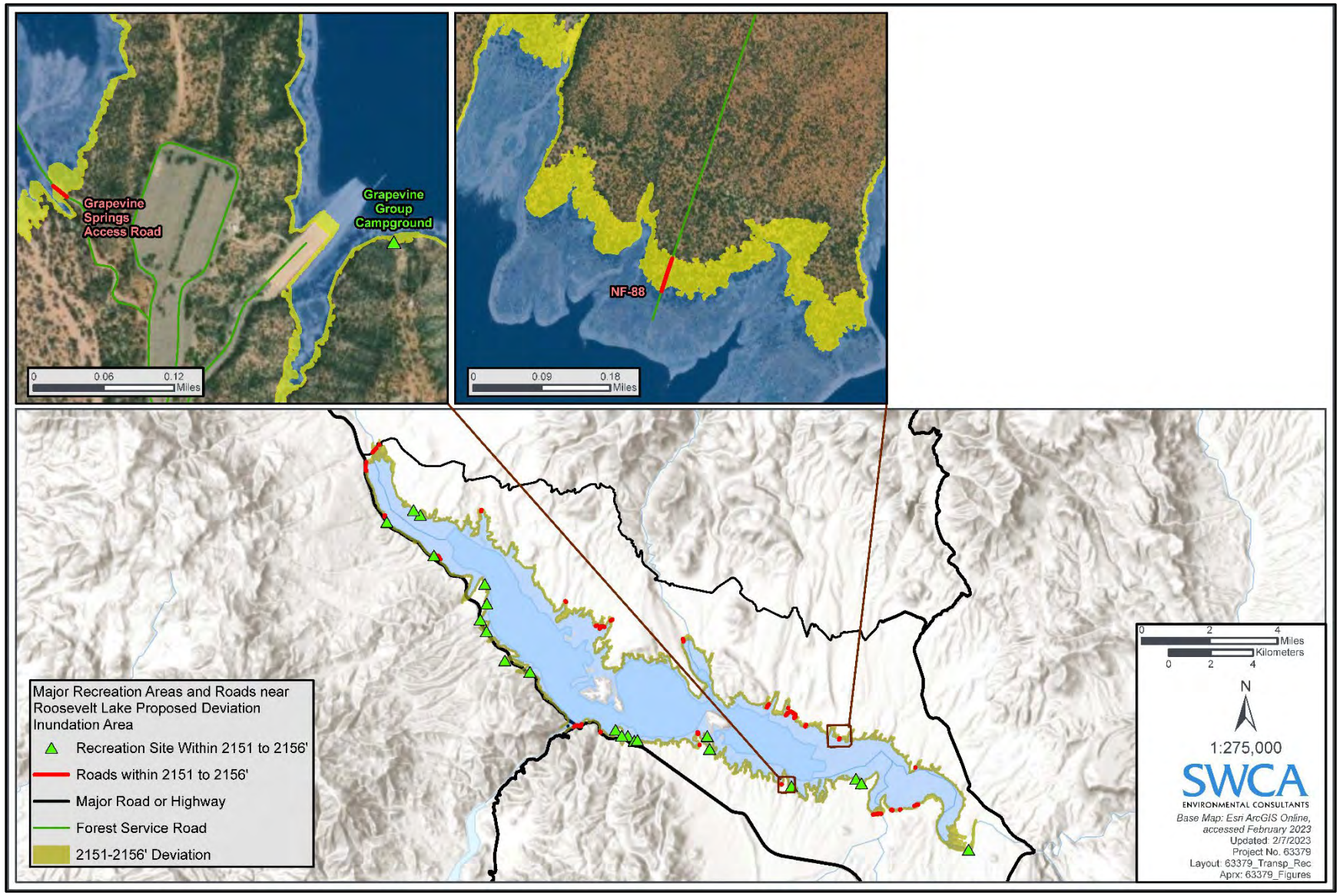
Grapevine Springs Access Road
Grapevine Group Campground
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NF-88
0 0.09 0.18 Miles
Major Recreation Areas and Roads near Roosevelt Lake Proposed Deviation Inundation Area
Recreation Site Within 2151 to 2156'
Roads within 2151 to 2156'
Major Road or Highway
Forest Service Road
2151-2156' Deviation
0 2 4 Miles
0 2 4 Kilometers
N
1:275,000
SWCA
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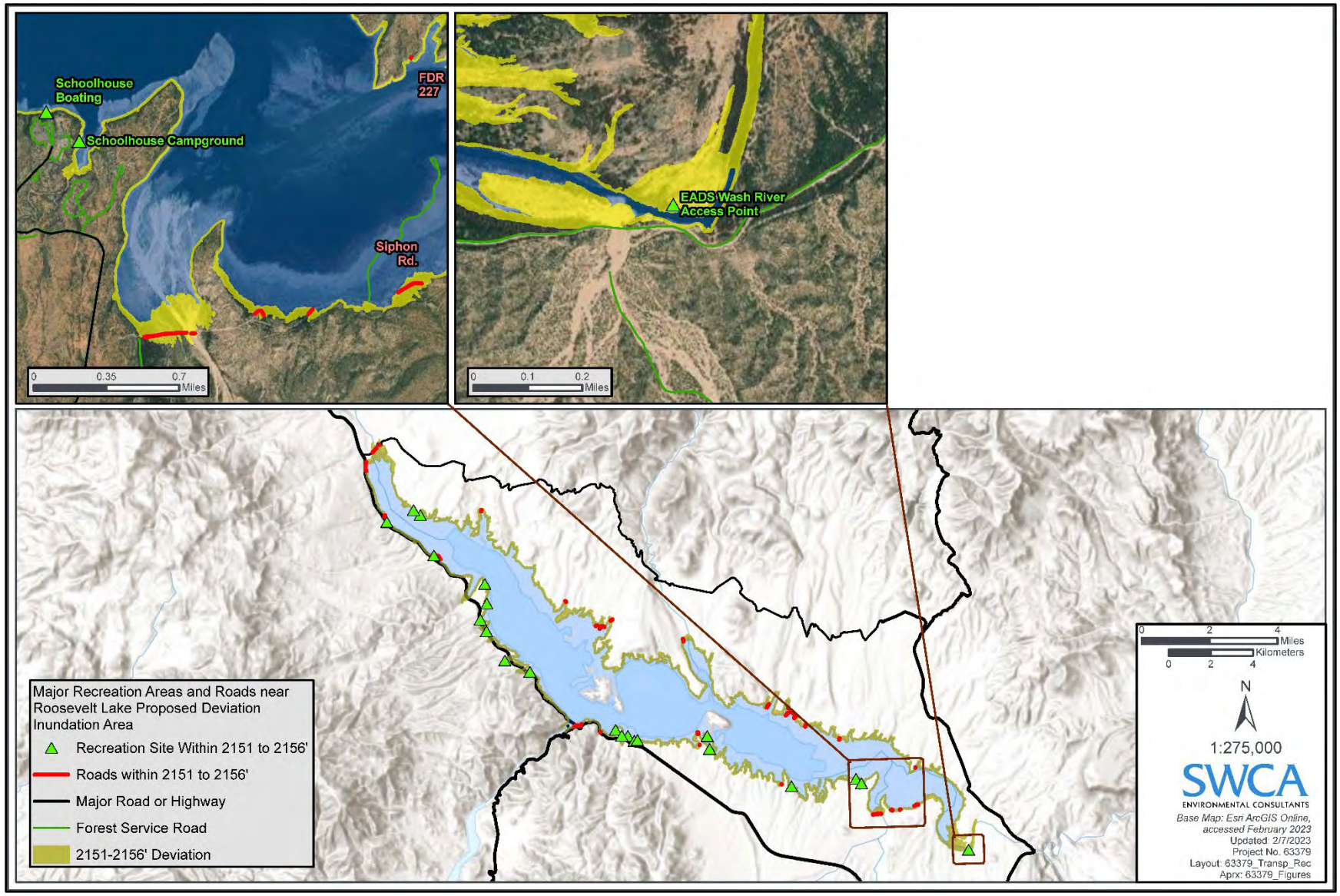
Schoolhouse Boating
Schoolhouse Campground
FDR 227
Siphon Rd.
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EADS Wash River Access Point
0 0.1 0.2 Miles
Major Recreation Areas and Roads near Roosevelt Lake Proposed Deviation Inundation Area
Recreation Site Within 2151 to 2156'
Roads within 2151 to 2156'
Major Road or Highway
Forest Service Road
2151-2156' Deviation
0 2 4 Miles
Kilometers
0 2 4
N
1:275,000
SWCA
ENVIRONMENTAL CONSULTANTS
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