



United States Department of the Interior

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In reply refer to:

AESO/SE

22410-2009-I-0195

02EAAZ00-2018-F-1018

November 2, 2018

Memorandum

To: Field Manager, Tucson Field Office, Bureau of Land Management, Tucson, Arizona (Attention: Jayme Lopez)

From: Field Supervisor

Subject: Reinitiation of San Pedro Riparian National Conservation Area Tamarisk Management Project (Consultation #22410-2009-I-0195)
(CORRECTED Version)

We are in receipt of your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1531-1544), as amended (Act). Specifically, this request is a reinitiation of Consultation Number 22410-2009-I-0195. Your request was dated October 30, 2018, and received in our office on October 30, 2018. At issue are impacts that may result from the ongoing tamarisk management activities within the San Pedro Riparian National Conservation Area (SPRNCA) located in Cochise County, Arizona. You have determined that the proposed action may affect and is likely to adversely affect the threatened northern Mexican gartersnake.

You have also determined that the proposed action may affect, but is not likely to adversely affect the threatened yellow-billed cuckoo (*Coccyzus americanus*) and its proposed critical habitat, and the proposed critical habitat for the northern Mexican gartersnake. We concur with these determinations. This document, therefore, also represents our conference report on the yellow-billed cuckoo and on both species' proposed critical habitats, which may be converted to a concurrence if these proposed critical habitats are designated as critical habitat. Our rationale for these concurrences and recommendations under conference for these species and proposed critical habitats can be found in Appendix A of this biological opinion (BO).

This biological opinion is based on information provided in the final October 2018 biological assessment, phone calls, electronic mail, field investigations, and other sources of information.

Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, non-native species management and its effects, or on other subjects considered in this opinion. A complete record of this consultation is on file at this office.

Consultation History

- March 2009 – We completed informal consultation with your office on the original SPRNCA tamarisk management program (Consultation #22410-2009-I-0195).
- October 2017 – October 2018: Reinitiation of the existing consultation was determined to be necessary because of the recent listing and critical habitat proposals for the yellow-billed cuckoo and the northern Mexican gartersnake. We provided input to your staff as they worked to finalize a draft Biological Assessment for the reinitiation, including a field trip and numerous email communications.
- October 30, 2018: We received your request for reinitiation of the March 2009 consultation and the final biological assessment for the proposed action.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action remains generally the same as the described in the SPRNCA Area Wide Tamarisk Management Environmental Assessment used in the 2009 section 7 consultation (Consultation #22410--2009-I-0195) and is incorporated herein by reference. In summary, the proposed action, in accordance with Public Law 100-696 and with guidance from H.R. 2720, is an experimental riparian restoration project to determine the most effective and cost efficient control method for reducing the spread of invasive components (specifically tamarisk) along ~43 river miles of the San Pedro River (and tributaries) within the SPRNCA starting at the U.S./Mexico International border and continuing north to approximately three miles south of St. David, Arizona. However, because that information in the 2009 Environmental Assessment is now nine years old, more up-to-date information on the status of SPRNCA tamarisk management is described below. For the purposes of this consultation, the term “eradication” is used to describe areas where tamarisk has been completely removed, while the term “control” is used to describe areas where some tamarisk is allowed to remain.

The Sonoran Institute conducted a survey of tamarisk and other invasive plants on SPRNCA during 2009 (Fitzgerald-DeHoog and Cheryl McIntyre 2011). Field crews surveyed approximately 13.9 river miles in the area north of Hwy. 82. The entire survey area consisted of approximately 725 acres of which 332 acres were found to be affected by tamarisk. The method used is described in the 2009 report, and this method was also used to calculate the area of tamarisk infestation on other areas of SPRNCA (see Table 1 below).

Implementation of the EA began in 2009, starting at the International Border and progressively working north. This method has worked well in prohibiting future spread of tamarisk seeds downstream and subsequent establishment of tamarisk seedlings. No seedlings have been observed on SPRNCA, other than those that have become established downstream of completed treatments (Willow Wash area north of Fairbank and further downstream). This may indicate that the seed source from Mexico is low or non-existent, and/or that there are no available niches for tamarisk to become established. The riparian floodplain is densely covered with other non-native vegetation, mostly Johnsongrass (*Sorghum halepense*) and Bermudagrass (*Cynodon dactylon*), and native vegetation, making establishment by tamarisk seedlings difficult due to competition.

During the initial weeks of tamarisk management, eradication efforts were careful to remove cut tamarisk branches from the immediate floodplain of the San Pedro River so that rooting of branches would not occur. However, this measure proved to be not needed, as none of the cut branches rooted. As work progressed north or downstream, cut branches were allowed to remain at or near the point where they were cut. These branches also did not root. The lack of rooting branches is probably attributed to the time of year when branches are cut. Cutting only occurs during winter months and precipitation has been lacking. Branches dry out quickly and lose their viability before summer rains begin.

Branches are now left in place or close to where they fall. Some small brush piles are made to allow for access and wildlife use. Many, but not all, of the branches left near bankfull or in the immediate floodplain are later swept away during large flood events. The branches that are swept away are sometimes noted downstream, where they also have not rooted, but do create woody debris for wildlife habitat and riparian restoration (slowing water and providing organic material). Brush pile burning or use of branches for commercial use has not been used at any time during implementation of the project, and it is not anticipated that these methods will be used in the future. However, the proposed action does allow pile burning or commercial use of material.

Just as pile burning and commercial use have not been implemented, mechanical treatments using equipment has also not been used during this project, for several reasons. Eradication efforts from the border to Fairbank has occurred in areas where there are no existing roads or access to the river. Control efforts are now in areas of SPRNCA that are difficult to access. The EA does not allow construction of new roads, although existing routes and/or the dry river bed could be used. Existing routes that access the river are available in only a few places where continuing tamarisk control may occur. Since eradication is currently complete from the International Border to approximately 1.5 miles north of Fairbank, the only existing access roads that could be used include the road to Contention, the road to Summers Well, and the roads through private property to the St. David Diversion Dam and Escalante Road. The road into Summers Well does not access the river and a new access road to the river would not be built. Access to the river could be obtained only from Contention, and possibly St. David Diversion Dam or Escalante Road if permission was obtained from the private property owners. This access would provide a river route (north of Contention) along any sections of the river that are dry. However, full coordination with USACE would be required to obtain appropriate permits and fulfill regulatory requirements outlined under the Federal Water Pollution Control Act, and it is unlikely this would occur.

Mechanical control using heavy equipment will probably also not be used in the future because of changing conditions related to the modeled arrival of the subtropical tamarisk beetle (STB). Defoliation of existing tamarisk is expected once the STB arrives on the San Pedro River from the Gila River. If defoliation by STB regularly occurs, tamarisk resprouts would be more easily controlled using foliar spray, with fewer resource impacts. Wildfire that burns tamarisk and results in resprouts would also allow easier control using foliar spray, with fewer resource impacts than mechanical control using equipment. It is more likely that tamarisk control on SPRNCA would occur under this scenario than mechanical control.

The only methods of tamarisk management on SPRNCA to-date include herbicide treatments using cut-stump removal using chain-saw or lopper and treatment of the stump, or foliar application of herbicide to stumps or small tamarisk with backpack sprayer or hand-held bottle sprayer. A certified pesticide applicator has been present for all herbicide applications. Hand-pulling of tamarisk seedlings has only occurred in a few instances when seedlings were small enough and the soil wet enough to effectively remove the roots from the soil. Truck or OHV mounted sprayer is allowed in the proposed action, however, this type of equipment has not been utilized because it has not been available.

Initial treatments at the International Border used glyphosate as the active ingredient for the herbicide used. However, glyphosate did not appear to have as effective control as imazapyr. Therefore, imazapyr has been the herbicide of choice for roughly the area from Hwy. 92 to north of Hwy. 82. Effectiveness of either herbicide seems to be tied to how fast the herbicide is applied to the stump after cutting, the amount of branches cut from one root system, how close to the ground the branch is cut, and the season when application of the herbicide is made.

Generally speaking, cut-stump or foliar application of herbicide is thought to be more effective during fall when the sap is moving into the roots, and translocation of the herbicide to the roots occurs more readily. Herbicide treatment of the stump or foliar application is thought to be less effective in the spring, when sap is moving away from the roots into the new leaves. Fall applications have not occurred until late September or October, when the herbicide is expected to move into the roots; this application timeframe may not be as effective because sap may have already begun to move into the roots prior to herbicide application. It may be that stump treatments in August to early September might be more effective, but this timeframe has not been tested due to the presence of nesting birds, and accessibility and safety during monsoonal rains. Nevertheless, cut-stump tamarisk treatments on SPRNCA have been very successful during fall, winter, and early spring (late September into early March) and there are no plans to continue tamarisk treatments in the summer. The 2009 BA and section 7 consultation allow tamarisk removal when areas have been surveyed and no southwestern willow flycatchers are present. However, flycatcher surveys have not been used during implementation of tamarisk management because work is not completed from April to the end of September. However, tamarisk control efforts could be utilized during April if habitat is first surveyed for flycatchers and none are documented.

Cut-stump treatment is usually accomplished using chainsaws, but loppers have been used on small plants. Either method involves removal by hand of any flood debris (leaves, branches, soil), if flood debris is present around the base of the trunk(s). The flood debris is not removed from the site, but moved away from the stumps in order to cut the trunk as close to the roots as possible. Applying the herbicide closer to the roots improves mortality of the plant.

The proposed action does, however, allow methods of tamarisk removal during the summer if surveys indicate southwestern willow flycatchers are not nesting. In order to avoid disturbance to yellow-billed cuckoos, a nesting avoidance measure will be implemented for this reinitiation of consultation, because yellow-billed cuckoos are common nesters throughout riparian habitat on SPRNCA. Due to the widespread existence and secretive nature of yellow-billed cuckoos, it would be time-consuming and impossible for a biologist to document that yellow-billed cuckoos are not present in riparian areas where tamarisk management would occur. Thus, tamarisk control or eradication using vegetation disturbing activities will not (and have not in the past) be conducted from June 1 to September 30. However, foliar application of herbicide by one or two staff members may occur to small resprouts during June and/or September. Once monsoon season starts in July, the riparian area becomes impossible to access and dangerous due to flooding.

Annual tamarisk treatments have taken about two weeks of crew work during fall, winter, and early spring using cut-stump method. Crews used have included Arizona Dept. of Corrections

Wildland Fire crews, Arizona Conservation Crews, Veterans Fire Corps, BLM Gila District fire crews, and BLM staff. The prior winter's treatment areas are monitored the next spring once tamarisk leafs out and begins to grow (usually April-June). This has involved one or two staff walking the areas previously treated, and foliar spraying any resprouts using a backpack sprayer. This usually takes about 10 days every spring. Because the resprouts are small (usually about 1-2 feet high) and sparse, it is easy to see whether there are nests. There has not been. Treatment of resprouts is accomplished as needed, but not during July through August when the river is flooding.

Monitoring and treatment of resprouts of past treatments is conducted on a cyclical basis which covers segments of the treatment areas at least once every five years. The majority of the treatments on SPRNCA were monitored and re-treated during the spring of 2017. For older treatments, very few resprouts were treated, and only a few plants were found that were missed during initial treatments.

Future Tamarisk Management on SPRNCA

Eradication efforts have changed to control efforts in any areas currently not treated because the density, area covered, and size of tamarisk north of Hwy. 82 increases dramatically (where the river becomes mostly ephemeral). It is unlikely that the remainder of SPRNCA from roughly Willow Wash to the northern boundary (roughly 10 river miles) could be eradicated of tamarisk. Treatment units remaining for initial control include most of the Fairbank Unit (526 total acres surveyed and roughly 251 acres for control) near Willow Wash to the natural gas pipeline, and Cienega Unit (301 total acres surveyed and roughly 100 acres for control) from the natural gas pipeline to the northern SPRNCA boundary (Table 1).

Areas for future control will depend on available funding and crew size, and characteristics of the remaining tamarisk infestation. Continued monitoring and retreatment of resprouts in past treatment areas will continue in order to keep previously treated areas tamarisk-free. Most retreatment will occur while tamarisk resprouts are very small and can be completed with a backpack sprayer, although it is possible that some areas that were treated in the past may need additional cut-stump treatment if tamarisk is not monitored and allowed to grow for long periods.

Future opportunities for tamarisk control include treatment of remaining oxbows and bankfull areas of SPRNCA. A technique that will be used to mitigate for wildfire will be removal of tamarisk growing under, or in close proximity to, native trees (such as cottonwood, willow, ash, hackberry, and walnut). Some remaining oxbows for treatment have limited amounts of tamarisk closer to the river under the cottonwood/willow gallery, with larger infestations of tamarisk further away from the river. The infestations further away from the river may not be treated, due to their density, area covered, and large size. Treatment of tamarisk under the cottonwood/willow gallery may allow reduced competition for these native trees, and lowered mortality of native trees during wildfire. How much control occurs will likely depend upon staffing and funding constraints, such as number of people and time availability for chain-saw crews, and accessibility to the work site by crew members.

Other opportunities (mentioned above) include monitoring and treatment of any future effects of the STB and wildfire. Tamarisk plants defoliated by STB or burned by wildfire may be more susceptible to foliar spray of any reprints. This opportunity may be reserved for those areas where infestations were too large to be removed using the cut-stump or foliar spray method. Other areas, generally furthest north on SPRNCA, may not undergo any control efforts, based on the size of the infestations.

Another focus may be to treat tamarisk where perennial or intermittent water still exists, in order to maintain native cottonwood and willow habitat. These areas include a section between Contention and Summers Well, a section south of Escalante Road, and St. David Cienega.

More active measures for riparian restoration will likely become necessary in areas of heavier tamarisk infestations. These measures may include planting of desirable riparian vegetation, such as Fremont cottonwood, Goodding's willow, and native perennial grasses. Clonal willow species (e.g. *Salix taxifolia*, *S. lasiolepis*, *S. exigua*) are infrequent or only known from one clump on SPRNCA. These species could be pole planted in areas with sufficient water. Pole plantings of Fremont cottonwood and Goodding's willow were completed at areas of St. David Cienega. However, it appears these plantings were unsuccessful, probably due to utilization by trespass livestock. Plantings of more xeric native vegetation (e.g. mesquite, hackberry, ash, and Arizona walnut) will likely be necessary where tamarisk is removed over larger areas in the northern section of SPRNCA.

Control efforts will likely continue with the methods used previously on eradication, including cut-stump, foliar application, and hand-pulling. Larger fire crews, local fire staff, and/or AZCC crews will be used for cut-stump method of control during approximately two weeks during fall, winter, and spring. Resprouts will be sprayed as needed using one or two staff with backpack sprayers over another roughly two weeks during April to June.

Branches removed from tamarisk using the cut-stump method will continue to be allowed to fall close to or where they fall, however, branches could also be piled in some locations where other vegetation or topography allows. It is doubtful, but possible, that burning of slash piles and/or commercial use of biomass would occur as allowed in the EA. Commercial use would be restricted to existing access roads, of which there is one available that is not across private property. Mechanical control using heavy equipment (if accessibility is obtained on existing roads or dry river bed) or use of truck or OHV-mounted spraying equipment is unlikely, but is also allowed in the proposed action.

Conservation Measures

In addition to measures described above and as part of the proposed action, the BLM has proposed a number of conservation measures to reduce or eliminate potential effects to listed species and their critical habitats. These conservation measures include:

Conservation Measures from the 2009 EA

The following are some measures from the 2009 EA that will be continued during any future implementation of tamarisk management on SPRNCA.

F. Only federally-registered and BLM-approved herbicides will be used.

G. Herbicides and adjuvant will be used only in accordance with product labeling and the respective Material Safety Data Sheet (MSDS). Herbicide application will be under the direct supervision of a Arizona Department of Agriculture certified Commercial Applicator. A Bureau of Land Management (BLM) Pesticide Use Proposal document will be approved for each herbicide before beginning application. In the event of a spill, BLM and/or the contractor will remove the contaminated soil and place the soil in plastic containers. The contaminated soil will be taken to an appropriate hazardous materials facility for disposal. Spill site location, size of spill, and disposal site will be documented and monitored.

H. All individuals associated with the handling or application of pesticides on public lands will be familiar with the herbicides used and emergency procedures to be used in case of pesticide spill.

I. The intake operation of water for mixing will be arranged so that an air gap or reservoir will be placed between the live water intake and the mixing tank to prevent back flow or siphoning of pesticide into the water source.

J. Pesticide containers will be disposed of as required by the Environmental Protection Agency (EPA).

K. Foliar application of herbicide will not occur within five meters of perennial surface water and/or native fish re-introduction sites.

L. Herbicide treatments will not occur within fifteen meters of any documented populations of Huachuca water umbel. Existing populations have been mapped and will be avoided. All employees responsible for implementing tamarisk control via chemical means will be capable of identifying Huachuca water umbel to ensure existing populations are not impacted and to document occurrence of new populations (if any).

M. Potential for drift of herbicide during foliar application will be minimized by using spray pressures no greater than required to obtain adequate coverage of each target plant individually, and with nozzle tips sized to produce large droplets. Herbicide foliar application will occur from less than two feet away in order to minimize drift. Potential for drift during stump cut applications is virtually non-existent because herbicide will be applied with an applicator wand. For both foliar and stump-cut methods, herbicide application will not occur during precipitation, if there is an impending threat of precipitation, and/or when wind velocity (greater than 10 mph) could carry herbicide beyond each target plant. Herbicide application will also not occur when air temperatures equal or exceed 85° F.

N. Foliar application will only be used when herbicide affect to vegetation species beneath the individual target plant is acceptable.

O. Annual monitoring by Tucson Field Office staff will provide data for determining the success rate of naturally reoccurring native plants. Photo points will be established from select treatment areas at the time of treatment. Annual monitoring and repeat photography of these sites will document herbicide effectiveness, non-target plant mortality, and regeneration. If monitoring results indicate the need to stimulate native riparian regeneration, BLM will plant desirable riparian species, (e.g. willows and cottonwoods) to mitigate soil erosion [and woodland habitat] in treated areas that contain only undesirable plant species.

P. For the purpose of not disrupting nesting/breeding avian species, including the southwestern willow flycatcher, yellow-billed cuckoo and all raptors, restrictions on motorized equipment use and approach near nesting areas would be applied until nest functions are complete.

Q. Any suitable southwestern willow flycatcher and/or yellow-billed cuckoo habitat identified for treatment during the nesting/breeding season (April through September) will be surveyed for nesting/breeding activities by a certified BLM biologist prior to any vegetative treatments. No mechanical or chemical treatment will occur until surveys document that territories are vacated.

R. During preparation of the Pesticide Use Proposal, the project area would be reviewed for known populations of plant species of special concern or their potential habitats. BLM will inventory potential habitat and confirm absence of sensitive plants prior to any herbicide use. Documented populations of plant species of special concern will be monitored following chemical treatment to assess the health and condition of existing populations.

S. Woody material produced from implementation of the proposed action will be piled on site unless an alternate preferred method is identified by the BLM on a case-by-case basis (e.g. burning, chipping, commercial sale, etc.).

T. To minimize impacts to natural drainage patterns and morphologic site conditions, the use of heavy equipment as a means of mechanical treatment (heavy equipment) will be limited to dry season conditions when soils are unsaturated.

U. Parking and fueling heavy equipment used for treatment will not occur within the 100-year flood plain as determined by BLM on a site-specific basis.

V. Access routes and treatment boundaries will be clearly marked prior to implementation of mechanical treatments requiring heavy equipment. The BLM project lead will be on-site at all times while heavy equipment is in use.

W. Heavy equipment (including trucks and trailers) brought from outside the SPRNCA will be pressure washed prior to entering the SPRNCA to remove any noxious/invasive plant species (seed) that may be transported in the undercarriage.

X. All herbicide solutions will be mixed and made ready for transport at the San Pedro Project Office or Las Cienegas Storage Shed. Herbicide will be poured into leak proof, high-impact plastic backpack sprayers, hand-held spray bottles, or wand applicators then placed into sealable dry boxes ready for transportation by vehicle to treatment areas.

Y. Sufficient ground cover (woody debris) will remain onsite to provide immediate bank stability and minimize erosion. The use of soil-stabilizing techniques such as (but not limited to) placement of biodegradable fabrics, straw wattles, straw bales, etc., may be implemented on a site-by-site basis to further reduce erosion and promote establishment of desirable vegetation. Implementation of stabilization methods will be at the discretion of the Field Office Hydrologist.

Yellow-billed Cuckoo:

- A. No mechanical treatment of tamarisk (e.g. heavy equipment, cut-stump method) and use of vehicles or OHVs in the river bed will occur during June 1 through September 30 in order to limit disturbance to nesting yellow-billed cuckoos.
- B. Where monotypic tamarisk is removed (maximum of 40 acres annually) and the water table is too low to allow cottonwood and willow to naturally regenerate and survive, plant mesquite or hackberry replacement trees within three years and within 20' of the footprint of tamarisk removed where existing native plants do not occur naturally. These species are regularly used by cuckoos for nesting. Prior to planting, develop a management and monitoring plan to ensure survival. Flushing salts and soil treatment may be necessary. Replace trees that do not survive.

Northern Mexican Gartersnake:

- A. If slash piles will be burned, woody debris from tamarisk plants or from removal of flood debris will be moved to the burn site and scattered (some loose piles may occur) for curing over a large area up to ¼ acre. Following curing, hand piling will be used to build the burn piles and the piles will be ignited the same week (5 days or less). A biologist will be on site during the piling and burning process.
- B. If slash piles were to be commercially used for biomass, woody debris will be moved to the commercial access site on existing roads and scattered (some loose piles may occur) for curing over a large area up to ¼ acre outside of the riparian area.
- C. Routes used by heavy equipment, vehicles, or OHVs along the dry river bed will only be used from October through March (pending BLM coordination with USACE to obtain appropriate permits and fulfill regulatory requirements outlined under the Federal Water Pollution Control Act).
- D. River routes used will be surveyed by a biologist for the presence of any northern Mexican gartersnakes immediately before the route was used. Any northern Mexican gartersnakes documented will be avoided during use of access routes.
- E. Loose-weave netting – Use erosion control products which have movable (not fixed or welded) joints between the horizontal and vertical twines, thus allowing the twines to move independently which reduces the likelihood of a gartersnake becoming entangled. Netting designs with movable joints may be called loose weave, leno weave, or gauze weave.

- F. Mesh Size – Avoid using products with a mesh size of 0.5 inch square; this mesh size have the highest likelihood of snake entanglement. Instead, consider larger mesh sizes (3 x 3, 3 x 4, or 1.7 x 0.8 inches), or rectangular meshes with a smaller, ¼-inch aperture in one direction (1.25 x 0.25 inches) which are less prone to snake entanglements.
- G. Natural-Fiber Materials – Use biodegradable, natural-fiber products (including netting, filling, and thread) are more wildlife-friendly than synthetic plastic products which allow entangled snakes a better opportunity to escape because of their lower tensile strength.
- H. Products without Netting – There are several choices of erosion and sediment control products that do not contain netting. These include net-less erosion control blankets (for example, made of excelsior), loose mulch, hydraulic mulch, soil binders, unreinforced silt fences, and straw bales. Net-less erosion control products do not risk entanglement of gartersnakes.
- I. Prompt Removal of Products – Remove erosion control products promptly after they have served their purpose to lessen the risk of gartersnake entanglement.
- J. Any northern Mexican gartersnakes documented during project implementation (e.g. use of dry river bed route) will be photo documented and reported to FWS within 5 working days.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment.

The SPRNCA was designated by Congress with the enabling act (PL-100-696) on November 18, 1988 and, today, SPRNCA encompasses approximately 50,000 acres. Situated in southeastern Cochise County, the area is within two hours' drive of the rapidly growing Tucson metropolitan area. In addition to Tucson, the areas are readily accessible from the nearby towns of Sierra Vista, Hereford, Bisbee, Benson, and Tombstone. The proximity of metropolitan areas close to SPRNCA and its world-renowned natural resources result in high public demand for recreational pursuits and facilities. For the purposes of this consultation, the entire SPRNCA is considered the action area (see Map 1 of the BA).

STATUS OF THE SPECIES

The information in this section summarizes the rangewide status of each species that is considered in this BO. Further information on the status of these species can be found in the administrative record for this project, documents on our web page ([Arizona Ecological Services Office Documents by Species](#)), and in other references cited in each summary below.

Northern Mexican Gartersnake

The northern Mexican gartersnake (THEQ) was listed as threatened on 07/08/2014 (79 FR 38677-38746), and critical habitat was proposed on 07/10/2013 (Map 3, 78 FR 41549-41608).

THEQ is usually found in or near water (Stebbins 1985), primarily because of the presence of their primary aquatic prey base (78 FR 41553), although this species may be found hundreds of meters from water (Drummond and Marcias-Garcia 1983, Rosen and Schwalbe 1988). This diurnal predator forages for frogs, toads, tadpoles, fish, invertebrates and sometimes lizards and small mammals (Brennan and Holycross 2006). THEQ may use a variety of strategies when hunting, including ambush, active hunting, and opportunistic use of transitory concentrations of prey (Rosen and Schwalbe 1988).

THEQ may be surface active any part of the year when ambient temperatures range from 71 degrees Fahrenheit (F) to 91 degrees F (Rosen 1991), although the species appears to be most active during July and August, followed by June and September in the northern reaches of its range (Emmons and Nowak 2013). This species may use different sites as hibernacula during a single cold-season and will bask occasionally (79 FR 38679).

The mating season of THEQ has been documented in April and May with live birth of between 7 and 38 newborns in July and August (Rosen and Schwalbe 1988). However, observations in Arizona have indicated that mating may occur during the fall (78 FR 41504). Live young are born in June to July (Brennan and Holycross 2006), although perhaps into August (Stebbins 1985).

Historical distribution of THEQ in the U.S. included the Santa Cruz, San Pedro, Colorado, Gila, Salt, Agua Fria, Rio Yaqui, and Verde River watersheds. THEQ is likely extirpated in Mexico, and in Arizona has been reduced to less than 10 percent of its former range along mainstem rivers (AGFD 2012). THEQ appears to now be extirpated from the Agua Fria, Colorado, Gila, Salt, and most of the Santa Cruz and San Pedro Rivers (Brennan and Holycross 2006). However, there have been limited survey efforts and this species is difficult to detect during surveys, therefore, it is possible that THEQ may have limited occurrence in these areas.

Reasons for this species decline include destruction or modification of habitat, predation from nonnative species, reductions in its native prey base, and genetic effects from fragmented habitat. In Arizona, habitats used by THEQ include ponds (including stock tanks) and cienegas, lowland river riparian forests and woodlands, and upland stream gallery forests between 3,000 to 8,500 feet (AGFD 2012). In addition to aquatic habitat, THEQ relies on terrestrial habitat for thermoregulation, gestation, shelter, protection from predators, immigration, emigration, and brumation (78 FR 41553). THEQ may exhibit seasonal variation in habitat selection and activity, selecting wetland edges and moving longer distances during the active season and being less mobile and selecting upland habitats during the inactive season (Sprague 2017).

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions that are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Description of the Action Area

A “river of green” is formed in the SPNRCA by the cottonwood (*Populus fremontii*)/Goodding’s willow (*Salix gooddingii*) gallery forest, which occurs along the entire length of the SPNRCA, but is invaded in increasing numbers by tamarisk (*Tamarisk ramosissima*) from roughly Fairbank north to Land Corral. Mesquite (*Prosopis velutina*) forest or “bosque” occurs in transition from cottonwood gallery forest to terrace vegetation, and these terraces may include netleaf hackberry (*Celtis reticulata*), graythorn (*Ziziphus obtusifolia*), littleleaf sumac (*Rhus microphylla*), four-wing saltbush (*Atriplex canescens*), and golden eye (*Viguiera dentata*). Big sacaton (*Sporobolus wrightii*) grasslands cover large areas of the terraces in areas not previously cleared for agriculture, but is voluntarily returning in many fields where it has not already been seeded. Mesquite and sacaton uplands occur in many locations throughout SPNRCA and occur in combination with each other in many places. Mesquite bosques may have variable amounts of tree canopy cover with corresponding inverse amounts of sacaton in open areas. Chihuahuan desertscrub vegetation covers the largest area within the SPNRCA, and is characterized by long-lived shrubs such as creosote (*Larrea tridentata*), acacia (*Acacia spp.*), and tarbush (*Flourensia cernua*). Semidesert grassland of native perennial grasses such as side-oats grama (*Bouteloua curtipendula*) covers remnant areas as fingers in the uplands where topsoil has not been eroded away. This very diverse habitat mix comes from the transition of the Sonoran Desert to the northwest, the Chihuahuan Desert to the southeast, the Sierra Madre Mountains to the south, and the Rocky Mountains to the north.

Infestations of tamarisk occur throughout the SPNRCA, with the most severe infestations situated adjacent to the San Pedro River north of the historic town of Fairbank, AZ. Isolated populations of tamarisk to the south of Fairbank functionally serve as extended seed sources increasing potential for further spread along the San Pedro River. It has been documented that alterations in the prominence of perennial surface water flow in response to recent drought conditions, alteration to upland/riparian vegetative communities, changes in land use (urbanization), and groundwater pumping may favor the establishment of tamarisk within the riparian corridor (Tamarisk Coalition 2007).

Currently, tamarisk has been eradicated from the International Boundary to approximately 1.5 miles north of Hwy. 82 (almost reaching Willow Wash), or approximately 30 river miles. Tamarisk has also been eradicated in any tributary or spring in this section of the river, including the Babocomari River, Banning Creek, Murray Spring, and Horsethief Spring.

Tamarisk is also eradicated in some disjoint areas of the San Pedro River north of Willow Wash. This includes an area of approximately 1.5 mile between the USGS Tombstone gage and Contention, and a 0.5 mile long oxbow north of Contention. There is a large, dense area of

tamarisk that has not been treated from about the section of the San Pedro River adjacent to the railroad grade “Y” north to just north of Willow Wash (approximately 0.5 mile not treated). Not including this area where tamarisk was not eradicated, tamarisk has been controlled on SPRNCA from the International Boundary to just south of Contention, including Contention and Frog Springs. Additional disjoint areas at St. David Cienega have also received areas of tamarisk control.

Since 2009, a total of approximately 22 acres of tamarisk has been eradicated between the border and approximately Willow Wash, or about 2.4 acres on average per year. The EA allows 40 acres of tamarisk to be treated per year, however, this extent would require the use of heavy equipment and this is unlikely to occur in the portion of SPRNCA remaining for treatment for the reasons discussed above. Only portions of the Fairbank and Cienega units have been treated, and the majority of tamarisk acres in these units remain to be controlled. However, it is unlikely that all infestations of tamarisk in these units will be controlled, due to reasons discussed above. The tamarisk treatment units and acres surveyed/treated is given below in Table 1.

Table 1. Tamarisk treatment unit name, initial years of management, number of acres surveyed, number of point or polygon acres treated, and total acres treated, SPRNCA.

Unit Name	Years of Control	Acres Surveyed	Point Acres	Polygon Acres	Total Acres
Palominas	2009-2010	173	0.592	14.2	14.8
Hereford	2010-2012	100	0.553	0.4	1.0
Del Valle	2011-2013	411	0.432	3.7	4.1
Charleston	2012	200	0.51	0.3	0.8
Boquillas	2012-2013	452	0.369	0.4	0.8
Murray Springs	2011	10	0.18	0.0	0.2
Sierra Vista Subwatershed Total	2009-2013	1,346	2.636	19	21.7
Fairbank	2012	526	0.887	250	250.9
Cienega	2013	301	0.296	100	100.3
Contention Springs	2011-2012	10	0.068	0.0	0.1
SPRNCA Total		2,183	3.887	369	373

Active restoration using planting of native trees has not been required on past treatment areas, due to the presence of existing native trees and shrubs. In many cases (approximately 50% or higher), native trees and shrubs are found within the clump of tamarisk removed. Native tree and shrub species observed growing in these removed tamarisk clumps include Fremont cottonwood, Goodding’s willow, hackberry, ash, walnut, seep willow, and mesquite. These native species appear to thrive once the tamarisk is removed and there is less competition for water, nutrients, and sunlight.

Tamarisk evaluation of future treatment sites, and continued monitoring of past treatment sites, during the past few years has indicated recruitment of cottonwood and willow on all reaches of

SPRNCA. This recent recruitment was not observed during the 2012 Proper Functioning Condition assessment of SPRNCA, although older recruitment was noted. The size of the saplings in the last few years seems to indicate that recruitment may be tied to very large monsoonal floods which create erosion and seedbanks for the next year's seeds. While tamarisk eradication on SPRNCA may not have directly resulted in recruitment of cottonwood and willow, removal of tamarisk has probably allowed some niches to develop where native saplings may be able to establish.

The progression of tamarisk eradication on large sections of the upper San Pedro River over many years has allowed native habitat to restore and will provide habitat for many special status species. For example, it may be that SPRNCA will provide important native habitat if the STB defoliates large sections of the Gila River. The continued progression of tamarisk control in the northern end of SPRNCA may allow additional areas of native vegetation restoration.

Since this project began during the fall of 2009, covering approximately 30 river miles, there has been one observation of a Clark's spiny lizard (*Sceloporus clarkii*) and no small mammals or other wildlife in the flood debris (M. Radke pers. obs.). It may be that the flood debris is not deep enough to provide thermal cover for reptiles in the winter, that the river floodplain is not a preferred habitat for reptile hibernation, and/or monsoonal floods change the location, extent, and size of debris piles on a regular basis so that reptiles do not develop any traditional hibernacula in the flood debris. A western diamondback rattlesnake has been observed under woody flood debris during summer, but cut-stump method has not and will not be conducted during summer due to the occurrence of nesting birds and safety issues with flooding.

Status of the Species Within the Action Area

Northern Mexican Gartersnake

Along the Upper San Pedro River, Rosen (2005) noted six museum voucher specimens. Corman's (1988) observation of THEQ on SPRNCA found this species strictly associated with permanent water. Map 36 of Corman's report notes observations of THEQ in the Hereford, Hwy. 90, Charleston, Babocomari River, and St. David Cienega areas of SPRNCA. Corman's observations along the Babocomari River noted THEQ feeding on fish, which was thought to be possibly due to the lack of frogs on SPRNCA. THEQ were observed in 2006 approximately 0.7 mile south of the Babocomari River on the San Pedro River, again in 2007 on the Babocomari River about 0.5 mile upstream of the confluence with the San Pedro River, and on the Babocomari River approximately 0.4 mile downstream of the USGS gage in 2009 (T. Miscione pers. obs. email dated 10/30/2017). Volunteers conducted herpetological surveys on SPRNCA during 2013, and documented 23 of the 41 species (over eight survey days) documented during the 1988 Corman inventory. THEQ were not observed during the 2013 surveys, however, volunteers mostly conducted road surveys where THEQ occurrence would be unlikely. After working on SPRNCA from 2008 to the present time, often in appropriate habitat for THEQ (including the Babocomari River and San Pedro River at the confluence with the Babocomari) and always with the crew members that are working in flood debris piles, no THEQ individuals

have been observed (M. Radke pers. obs.). However, THEQ are known to be secretive and cryptic, and to use dense vegetation where individuals would be difficult to observe.

A wide variety of abundant prey items exist on SPRNCA. Prey includes Woodhouse's toad (*Bufo woodhouseii*), often observed in the hundreds to thousands of toadlets during the annual June wet/dry survey of the San Pedro River (M. Radke pers. obs.). Introduced American bullfrogs (*Rana catesbeianus*) of various sizes are also present throughout SPRNCA, which also could provide prey items for THEQ. Present in perennial reaches are native and non-native fish species, including Gila longfin dace (*Agosia chrysogaster chrysogaster*), fathead minnow (*Pimephales promelas*), and mosquitofish (*Gambusia affinis*). Longfin dace quickly disperse into aquatic habitat in intermittent and ephemeral reaches of SPRNCA during floods, and persist as long as surface water is available. Other prey species for THEQ present on SPRNCA include ornate tree lizard (*Urosaurus ornatus*), southwestern fence lizard (*Sceloporus cowlesi*), whiptail lizards (*Aspidoscelis uniparens*, *A. sonora*, and *A. tigris*), other herps, and various small mammals.

Several non-native predators and/or competitors to THEQ occur on SPRNCA. These include (among others) American bullfrog, crayfish (virile crayfish-*Orconectes virilis* and red swamp crayfish-*Procambarus clarkii*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), and spiny softshell turtle (*Apalone spinifera*).

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Northern Mexican Gartersnake

Effects to THEQ from the proposed action may include short-term and localized changes in behavior, habitat modification, habitat fragmentation, changes in extent of habitat, and changes in prey species richness, location, or abundance.

Potential direct impacts to individuals and/or habitat from implementation of the proposed action include:

- 1) Disturbance to animal behavior from human actions from project activities.
- 2) Removal of flood debris and tamarisk plants that may be used as cover, brumation sites, hibernacula, or hunting habitat.
- 3) Changes in species, abundance, availability, or location of prey items.
- 4) Fragmentation and changes in habitat patch size.

If THEQ individuals are active during project activities, individuals may change their behavior in response to presence of humans or equipment and vehicle traffic. Due to difficulty in observing THEQ in thick vegetation, direct effects to individuals of THEQ could include crushing by equipment, or vehicles and OHV in the dry river bed or access road at Contention (or other access roads if permission were obtained from private property owners). Implementation of this project has not used heavy equipment in the past, and it is not planned for the future, although it is allowed in the proposed action. Existing access roads for heavy equipment are few (Contention and through two private properties) and new road construction is not allowed in the EA. Direct crushing of individuals is unlikely in the dry river bed because habitat would not be preferred by THEQ, although the dry bed could be used during hunting or movement. The use of a biologist to survey areas used for access, and using slow speeds, immediately before use of access routes will allow avoidance of individual THEQ.

Dense grasses in the floodplain does not make observation of any THEQ or other small species possible. Therefore, heavy equipment or OHV use in the floodplain above bankfull could result in disturbance, injury, or mortality to any THEQ present.

Removal of woody flood debris in order to cut stumps as low as possible may also disturb, injure, or kill any THEQ that are present in the debris. However, no snakes have been observed in flood debris piles removed for tamarisk control during winter months, so it is unlikely that THEQ use the floodplain debris piles as hibernacula or brumation during winter.

Brush piles created by tamarisk branches could provide habitat for THEQ. Pile burning is not planned for future tamarisk treatments, and has not been used in the past, but is allowed as part of the proposed action. The conservation measure to spread cut tamarisk branches over $\frac{1}{4}$ acre, piling branches after curing, and immediately burning the pile may prevent disturbance, injury, or death to THEQ.

Allowing the cut branches to stay where they fall, and creation of brush piles without burning (the methods commonly used so far during implementation and planned for future treatments) may allow for development of habitat for THEQ through creation of cover sites on the floodplain and eventual increase in organic material in the soil.

Glyphosate has been used in the past, but is no longer used on SPRNCA due to its seemingly lower effectiveness, and probable carcinogenicity to humans (Williams et al. 2016). However, glyphosate is allowed in the proposed action.

The active ingredient for the herbicide used during cut-stump or foliar application of tamarisk is isopropylamine salt of imazapyr. Environmental hazards listed on the label from imazapyr include toxicity to plants, with possibility of oxygen depletion or loss in treated aquatic habitat, and subsequent mortality of fish and other aquatic organisms.

The Safety Data Sheet notes that there are no target organ effects at approximately 1,700 mg/kg/day, no carcinogenicity, no indication of fertility impairing effect, no developmental toxic effect, and no mutagenic effect on various tests with microorganisms and mammals. For fish, the 96-hour LC_{50} was $>100\text{mg/l}$ for bluegill, rainbow trout, and daphnia, the 14-day EC_{50} for

duckweed was 0.024 mg/l and green algae was 71 mg/l. However, the 2009 EA does not allow application of herbicide to aquatic habitat and this has not been done in the past and will not be done in the future. Thus, it is unlikely that imazapyr would cause effects to aquatic invertebrates or fish species used as prey by THEQ.

Destruction of prey by heavy equipment and vehicle use would not occur because the river bed must be dry to be used as an access route, although terrestrial prey could be affected through heavy equipment or OHV use above bankfull.

Temporally, the effects from tamarisk management on SPRNCA are spatially localized and short in duration (approximately two weeks per year using cut-stump method and another two to three weeks per year on foliar application of resprouts). Overall, the long-term effects of tamarisk management on SPRNCA may be beneficial to THEQ and its critical habitat by allowing restoration of native cottonwood and willow, lowering the severity of wildfire, potentially decreasing water use by tamarisk, and allowing natural river function and morphology.

Interrelated activities include the use of SPRNCA recreation sites by thousands of visitors per year, including use of public roads and parking lots by hundreds to thousands of vehicles, and use of the trails by hunters, hikers, birders, equestrians, and mountain bikers. Continuing tamarisk control on the northern end of SPRNCA is not expected to significantly change the current patterns and intensity of recreational use that already occurs, due to public accessibility issues on the north end. Other decisions from the San Pedro River Riparian Management Plan (e.g. use of prescribed fire, watershed improvements, designation of Areas of Critical Environmental Concern) may be long-term interrelated positive actions for listed species on SPRNCA.

CUMULATIVE EFFECTS

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

A large percentage of the land in the San Pedro River watershed is public Federal land, therefore, some of the actions likely to affect listed species or critical habitats on SPRNCA are not considered cumulative effects for this action. Examples of some of these effects that are not considered here also include US Forest Service and Ft. Huachuca consultations. Some local actions do not require section 7 consultation because they occur on Arizona State Trust Land and do not have a Federal nexus.

During the 2010 Census, Arizona grew more than 20 percent between 2000 and 2010, and it is predicted that Arizona will be the second fastest growing state in the country through 2030. If these predictions are true, already severe threats to groundwater that supplies riparian habitat will worsen, primarily due to increased human demand for surface and ground water. Thus, probably the most significant cumulative effect to listed species and critical habitats on SPRNCA includes local and regional groundwater pumping by local and private entities. Groundwater may be

pumped out faster than the aquifer can recharge. Other activities, such as irrigated agriculture and mining, may occur in the upper watershed in Mexico and contribute substantially to cumulative long-term adverse effects to groundwater supply and thus riparian vegetation. The acquisition of private land and the use of conservation easements by non-governmental organizations (e.g. The Nature Conservancy) may somewhat negate the negative effects to riparian vegetation from groundwater depletion.

Increasing recreational use of non-federal lands near or within the contributing watersheds of the riparian areas would likely result in cumulative effects to potential habitat through increased groundwater use and impacts to riparian vegetation, increased movement of nonindigenous species, and increased alteration of stream banks through riparian vegetation suppression, bank trampling, changing flow regimes, and erosion.

Other cumulative effects from state, local or private actions include road maintenance and construction on public roads and highways that cross the SPRNCA riparian area (i.e. SR 92, SR 90, SR 82, Charleston Road), and introduction of non-native competitive or predatory species. Additional cumulative effects include cross-border smuggling and illegal immigration (e.g., human traffic, deposition of trash, creation of trails and routes, increased fire risk from human traffic, and contaminants).

Other non-Federal actions expected to occur include both authorized and unauthorized livestock grazing on state, local, and private land within close proximity to and on SPRNCA. Yellow-billed cuckoos may be nest parasites and lay their eggs in the nests of other species (Yasukawa 2010), but more commonly lay their eggs in nests of the same species. Brown-headed cowbirds may be unlikely nest parasites of yellow-billed cuckoos.

The Intergovernmental Panel on Climate Change stated that warming of the earth's climate system is unequivocal and that warming is very likely due to anthropogenic causes (IPCC 2007). Since the publication of the report, evidence has grown linking human activities to climate change and consequently to extreme weather events (IPCC 2013). Although global precipitation is projected to increase, precipitation amounts in mid-latitude arid and semiarid areas are projected to decline. Precipitation for the mid-latitudes is expected to increase in intensity (IPCC 2013). Exotic invasive species are predicted to continue to proliferate under the current fire regime and under predicted climate change scenarios relating to seasonal precipitation.

JEOPARDY AND ADVERSE MODIFICATION ANALYSIS

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

Jeopardy Analysis Framework

Our jeopardy analysis relies on the following:

“Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). The following analysis relies on four components: (1) Status of the Species, which evaluates the range-wide condition of the listed species addressed, the factors responsible for that condition, and the species’ survival and recovery needs; (2) Environmental Baseline, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) Effects of the Action (including those from conservation measures), which determines the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the species; and (4) Cumulative Effects, which evaluates the effects of future, non-federal activities in the action area on the species. The jeopardy analysis in this biological opinion emphasizes the range-wide survival and recovery needs of the listed species and the role of the action area in providing for those needs. We evaluate the significance of the proposed Federal action within this context, taken together with cumulative effects, for the purpose of making the jeopardy determination.

Destruction/Adverse Modification Analysis Framework

Past designations of CH have used the terms PCEs, PBFs or “essential features” to characterize the key components of CH that provide for the conservation of the listed species. The new CH regulations (79 FR 27066) discontinue use of the terms “PCEs” or “essential features,” and rely exclusively on use of the term “PBFs” for that purpose because that term is contained in the statute. However, the shift in terminology does not change the approach used in conducting a destruction or adverse modification analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. For those reasons, references to PCEs or essential features should be viewed as synonymous with PBFs. All of these terms characterize the key components of CH that provide for the conservation of the listed species.

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

Similar to our jeopardy analysis, our adverse modification analysis of critical habitat relies on the following four components: (1) the Status of Critical Habitat, which evaluates the range-wide condition of designated critical habitat in terms of [PCEs/PBFs], the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the Effects of the Action, which determine the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the

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

Conclusion

After reviewing the current status of the northern Mexican gartersnake, the environmental baseline for the action area, the effects of the proposed Tamarisk Management Project, and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of this species. We base these conclusions on the following:

- The implementation of conservation measures, specifically those included to address potential effects on the THEQ, should minimize the occurrence of incidental take and may provide new information about gartersnake distribution and abundance.
- The cumulative size of all the proposed treatment sites where northern Mexican gartersnakes may be adversely affected is extremely small compared to the total acreage of potentially occupied habitat throughout range of the species, as well as to the total amount of potentially occupied habitat within SPRNCA.
- Although a small number of individual gartersnakes may be affected by the proposed action, this project will not result in population level impacts to northern Mexican gartersnakes.

The conclusions of this biological opinion are based on full implementation of the project as presented in the BA and the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

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

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

AMOUNT OR EXTENT OF TAKE

Northern Mexican Gartersnake

Based on the best available information for the northern Mexican gartersnake, the habitat needs of this species, the project description, and information provided by the BLM, incidental take is considered likely as a result of the proposed action. Incidental take of the northern Mexican gartersnake is expected in the form of harm due to disturbance or habitat alteration. However, because of the limited amount of work and the short duration of that work in any given year, and the fact that previous work under this project has been primarily completed without the use of heavy equipment, we do not anticipate the number of gartersnakes to be taken to be more than three (3) individuals. Furthermore, because gartersnakes are small-bodied, secretive, well-camouflaged, use subsurface retreats and protective cover, gartersnakes may be incidentally taken but not observed. Consequently, if gartersnakes are observed, there is a greater likelihood of their presence and incidental take. Therefore, if a total of two live gartersnakes are observed during project activities, the BLM will contact this office as soon as possible to discuss whether take is likely to be exceeded, whether consultation reinitiation is warranted, and/or whether additional conservation measures are necessary.

Effect of the Take

We have determined that the level of anticipated take described above is not likely to jeopardize the continued existence of the northern Mexican gartersnake.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

Because all appropriate measures to reduce and minimize effects and monitoring strategies to assess when the amount or extent of incidental are part of the proposed action's conservation measures, we have not identified any Reasonable and Prudent Measures and Terms and Conditions.

CONSERVATION RECOMMENDATIONS

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

1. We recommend the BLM work with FWS to implement recovery actions as described within the northern Mexican gartersnake recovery plan when it is completed.
2. We recommend the BLM work with FWS and AGFD to conduct surveys to better determine the distribution, abundance, and trends of northern Mexican gartersnakes on the SPRNCA.
3. We recommend the BLM participate in the Gartersnake Conservation Working Group, by ensuring biologists and other appropriate staff attend meetings and coordinate in monitoring and recovery planning.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

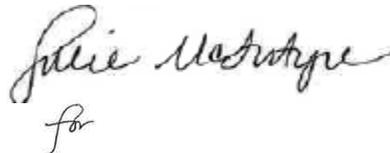
This concludes formal consultation on the northern Mexican gartersnake for the ongoing SPNRCA tamarisk management project. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized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

Certain project activities may also affect species protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712) and/or bald and golden eagles protected under the Bald and Golden Eagle Protection Act (Eagle Act). The MBTA prohibits the intentional taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the FWS. The Eagle Act prohibits anyone, without a FWS permit, from taking (including disturbing) eagles, and including their parts, nests, or eggs. If you think migratory birds and/or eagles will be affected by this project, we recommend seeking our Technical Assistance to identify available conservation measures that you may be able to incorporate into your project.

For more information regarding the MBTA and Eagle Act, please visit the following websites. More information on the MBTA and available permits can be retrieved from [FWS Migratory Bird Program web page](#) and [FWS Permits Application Forms](#). For information on protections for bald eagles, please refer to the FWS's National Bald Eagle Management Guidelines (72 FR 31156) and regulatory definition of the term "disturb" (72 FR 31132) published in the Federal Register on June 5, 2007, as well at the Conservation Assessment and Strategy for the Bald Eagle in Arizona ([Southwestern Bald Eagle Management Committee website](#)).

In keeping with our trust responsibilities to American Indian Tribes, we encourage you to continue to coordinate with the Bureau of Indian Affairs in the implementation of this consultation and, by copy of this biological opinion, are notifying the following Tribes of its completion [list Tribes]. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

We appreciate the Bureau of Land Management's efforts to identify and minimize effects to listed species from this project. Please refer to the consultation number, 02EAAZ00-2018-F-1018 in future correspondence concerning this project. Should you require further assistance or if you have any questions, please contact Scott Richardson (520-670-6150 x 242) or Julie McIntyre (x 223).



for
Jeff Humphrey

cc (electronic):

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APPENDIX A: CONCURRENCES/CONFERENCE

This appendix contains our concurrences with your “may affect, not likely to adversely affect” determinations for the threatened yellow-billed cuckoo (*Coccyzus americanus*) and our conference reports for proposed critical habitat for the yellow-billed cuckoo and the threatened northern Mexican gartersnake (*Thamnophis eques megalops*).

Yellow-Billed Cuckoo and Proposed Critical Habitat

Based on the best scientific and commercial data available on distribution as well as behavioral and morphological characteristics of the western yellow-billed cuckoo, USFWS concluded the western population segment of the yellow-billed cuckoo to be a distinct population segment in 2013 (78 FR 61630) and the Western Distinct Population Segment of the yellow-billed cuckoo was listed as threatened on 11/03/2014, and critical habitat was proposed on 11/12/2014 (Map 2, 79 FR 67154-67155).

Historical accounts consider the western yellow-billed cuckoo to be widespread and locally common in Arizona (Hughes 1999). However, a range-wide loss of habitat has occurred over the last 100 years, with corresponding extirpation of the western yellow-billed cuckoos from some of its historic range (Grinnell and Miller 1944). A summary of factors affecting the yellow-billed cuckoo are given in 78 FR 61643. Factors include the present or threatened destruction, modification, or curtailment of its habitat or range through riparian habitat loss and degradation. Also of concern is habitat loss from dams and alteration of hydrology. Other concerns include surface and ground water diversion, encroachment of levees, flood control, and bank stabilization structures into river channels and floodplain, transportation systems, gravel mining, habitat loss and degradation from agricultural activities, habitat loss from conversion to nonnative vegetation, wildfire, cross border foot traffic, and climate change.

During 1998, BLM conducted yellow-billed cuckoo surveys on SPRNCA, for a total of 44 yellow-billed cuckoos over 7.5 miles or 5.9 yellow-billed cuckoos per survey mile. Extrapolating to the five areas not sampled, SPRNCA may support 250+ yellow-billed cuckoos (Krueper 1999). Additional yellow-billed cuckoo surveys occurred at ten routes on SPRNCA during 2001, with a total of 152 yellow-billed cuckoos representing 40 to 52 pairs, 20 single birds, 12 whose breeding status could not be determined, and two juveniles (Halterman 2002). Yellow-billed cuckoo surveys have been conducted by Ft. Huachuca contractors (Engineering and Environmental Consultants or Vernadero Group) from 2001 to 2006 and 2009, incidental to SWFL surveys. Surveys contracted by Ft. Huachuca on SPRNCA indicate that the number of yellow-billed cuckoos per survey hour range from 0.18 to 0.36 with a mean of 0.3. During 2009, 2010, 2012, 2015, and 2016, BLM noted incidental yellow-billed cuckoo detections (without playback) from the Lewis Springs to Charleston Bridge reach of four miles of the San Pedro River during the annual June wet-dry survey. For all years, yellow-billed cuckoos occupied habitat in this stretch of the river, and mean number of yellow-billed cuckoos detected was 6.6, mean number of yellow-billed cuckoos per mile was 7.1, and mean number of yellow-billed cuckoos per hour was 1.1. Yellow-billed cuckoo surveys of three transects of the Babocomari River on SPRNCA were conducted by BLM staff and volunteers from 2014-2016. For all years

and all three transects, mean number of yellow-billed cuckoos per survey mile was 1.6 and mean number of yellow-billed cuckoos per survey hour was 0.8.

Information from eBird indicates that number of yellow-billed cuckoo individuals per party hour on SPRNCA ranges from approximately 0.5 to 1.3 during June through September from 2000-2016

(http://ebird.org/ebird/GuideMe?src=changeDate&speciesCodes=yebcuc&getLocations=ibas&ibas=US-AZ_901&parentState=US-AZ&reportType=species&monthRadio=on&bMonth=06&eMonth=10&bYear=2000&eYear=2016&continue.x=45&continue.y=15; accessed 10/25/16).

In addition to yellow-billed cuckoo detections documented by BLM, researchers, Ft. Huachuca contractors, and eBird, banding stations have been operated on SPRNCA with a total of 18 yellow-billed cuckoos banded from 1996-2015. Many of the banded birds were locally-hatched (L), indicating the importance of SPRNCA as a nesting and recruitment site.

Effects from the proposed action may include short-term and localized changes in behavior, habitat modification, habitat fragmentation, changes in extent of habitat, and changes in food richness or abundance. Potential direct impacts to individuals and/or habitat from implementation of the proposed action include:

- 1) Disturbance to animal behavior from human actions from project activities.
- 2) Removal of tamarisk trees that may be used as nesting, foraging, cover, or migratory habitat.
- 3) Changes in species, abundance, availability, or location of prey items.
- 4) Fragmentation and changes in habitat patch size.

Direct effects to yellow-billed cuckoos usually involve behavioral modification through disturbance of any individuals that may be present in the area of disturbance. Yellow-billed cuckoos are breeders throughout SPRNCA, including the areas remaining for tamarisk control. However, yellow-billed cuckoos are present on SPRNCA only from late May through October. Avoiding project disturbances during the nesting season would likely result in no direct impacts to individuals. If any yellow-billed cuckoos are still present in the project area in October after the nesting avoidance date of September 30, nesting is probably completed and any individuals would likely avoid the area of disturbance.

Temporally, the effects from tamarisk management on SPRNCA are spatially localized and short in duration (approximately two weeks per year using cut-stump method during the time of year when yellow-billed cuckoos are not present, and another two to three weeks per year on foliar application of resprouts).

Proposed critical habitat for the yellow-billed cuckoo exists on the SPRNCA along the San Pedro River and the lower approximately 2.5 miles of the Babocomari River (Map2). COAM proposed critical habitat consists of the following Primary Constituent Elements (PCEs, 79 FR 48554):

(1) Primary Constituent Element 1—*Riparian woodlands*. Riparian woodlands with mixed willow cottonwood vegetation, mesquite-thornforest vegetation, or a combination of these that

contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are greater than 325 ft (100 m) in width and 200 ac (81 ha) or more in extent. These habitat patches contain one or more nesting groves, which are generally willow dominated, have above average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats.

(2) Primary Constituent Element 2—*Adequate prey base*. Presence of a prey base consisting of large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies) and tree frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas.

(3) Primary Constituent Element 3—*Dynamic riverine processes*. River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor (e.g. lower gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). This allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old.

We concur that the proposed action is not likely to adversely affect the yellow-billed cuckoo for the following reasons:

- Effects to breeding yellow-billed cuckoos will be avoided by conducting mechanical treatments outside of the yellow-billed cuckoo breeding season. No vehicles will be used in the dry river bed during the breeding season. Effects to breeding yellow-billed cuckoos will be insignificant.
- Disturbing activities associated with heavy equipment, new access points, and pile burning have not been used to date for the proposed action and are unlikely to be used in future treatments. Therefore, such effects are discountable.
- Other activities such as treating resprouts do not typically result in disturbing activities that would exceed baseline disturbance from other uses in SPRNCA. Therefore, such effects are insignificant.

In conference, we concur that the proposed action is not likely to adversely affect proposed critical habitat for the yellow-billed cuckoo for the following reasons:

- Overall, the effects of tamarisk management on SPRNCA may allow maintenance and restoration of native cottonwood and willow woodlands, conservation and improvement of high canopy closure of native cottonwood and willow through potential decrease in wildfire severity, maintenance of the tent caterpillar prey base through conservation of cottonwoods, and allowing natural river function and morphology for recruitment of cottonwood and willow through necessary large woody debris. Therefore, much of the effect from the proposed action will be beneficial.
- Effects related to removal of tamarisk, may result in some short-term effects to cuckoo habitat and PCE's, but such effects will be temporary and will be offset by the natural expansion or planting of native species beneficial to the yellow-billed cuckoo. Therefore, effects to the PCE's of proposed critical habitat will be insignificant.

Northern Mexican Gartersnake Proposed Critical Habitat

The PCEs of THEQ proposed critical habitat include the following (78 FR 41549-41608):

- (1) Aquatic or riparian habitat that includes: a. Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in channel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; or b. Lentic wetlands such as livestock tanks, springs, and cienegas; and c. Shoreline habitat with adequate organic and inorganic structural complexity to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (e.g., boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter); and d. Aquatic habitat with characteristics that support a native amphibian prey base, such as salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present at levels that do not affect survival of any age class of the northern Mexican gartersnake or the maintenance of prey populations.
- (2) Adequate terrestrial space (600 ft (182.9 m) lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation (extended inactivity).
- (3) A prey base consisting of viable populations of native amphibian and native fish species.
- (4) An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis*, *Procambarus clarki*, etc.), or occurrence of these nonnative species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

Proposed critical habitat for THEQ occurs along the entire main-stem San Pedro and Babocomari Rivers on SPRNCA (see Map 2 of the BA). PCEs for THEQ exist on SPRNCA, such as lentic and lotic aquatic and riparian habitats, structural complexity along shorelines, a native prey base, and adequate terrestrial space on each side of bankfull. However, nonnative fish species, bullfrogs, and crayfish are abundant throughout perennial reaches. Some of these species, as do longfin dace, quickly invade any intermittent or ephemeral reaches when the rivers flood.

Effects to the PCEs of THEQ proposed critical habitat include potential positive impacts such as maintenance and restoration of floodplain function, maintenance of salinities below 5 parts per thousand (due to removal of halophytic tamarisk), and potential increase of structural complexity in the form of woody debris and piles from cut tamarisk branches.

In conference, we concur that the proposed action is not likely to adversely affect proposed critical habitat for the northern Mexican gartersnake for the following reasons:

- The proposed action will not negatively affect any of the PCE's of proposed critical habitat for the northern Mexican gartersnake. Any such effects will be insignificant due to the conservation measures included as part of the proposed action.
- Removed tamarisk has not been, nor is it anticipated to be piled and burned. Removed tamarisk will remain on the ground in the area where it was removed and create areas of woody debris and cover. Therefore, effects from burning piles of removed tamarisk will be discountable and beneficial effects will result from increased cover and woody debris within the treated areas.
- Conservation measures will reduce the potential for gartersnakes to become entangled in erosion control structures. Therefore, such effects are discountable.

This concludes the conference for proposed critical habitat for the western yellow-billed cuckoo and the northern Mexican gartersnake related to effects from the tamarisk management project in the SPRNCA. You may ask us to confirm these conference reports as a concurrence issued through informal consultation if critical habitat for either of these species is designated. The request must be in writing. If we review the proposed action and find there have been no significant changes in the action as planned or in the information used during the conference, we will confirm the conference report as the concurrence for the project and no further section 7 consultation will be necessary.