United States Department of the Interior

Fish and Wildlife Service
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In reply refer to:
AESO/SE
File number 2022-0078130-S7

July 6, 2023

Memorandum

To: Chris Lohrengel, Refuge Manager, Kofa National Wildlife Refuge

From: Field Supervisor

Subject: Biological Opinion on the Kofa National Wildlife Refuge Operations, Yuma and La Paz Counties, Arizona

Thank you for your request for intra-service formal consultation with the Ecological Services Division of the U.S. Fish and Wildlife Service (USFWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. *et seq.*), as amended (Act). We received your July 12, 2022, request for consultation, via electronic mail on July 14, 2022. At issue are the effects of ongoing and future actions and activities carried out and/or authorized by the Kofa National Wildlife Refuge (NWR or refuge) within lands managed by the National Wildlife Refuge Division of the USFWS in Yuma and La Paz Counties, Arizona, to the nonessential experimental population of Sonoran pronghorn (*Antilocapra americana sonoriensis*) and the candidate species, monarch butterfly (*Danaus plexippus*). Kofa NWR is located within the nonessential experimental population (or 10(j)) range of the Sonoran pronghorn, and therefore, for section 7 consultation purposes, Sonoran pronghorn are treated as a threatened species.

The monarch is a candidate species, and it is USFWS policy to treat candidate species as if they are proposed for listing for purposes of conducting internal USFWS section 7 conferencing. You determined that the proposed action is not likely to result in jeopardy of the monarch and we concur with your determination. Because you included conservation measures in your proposed action to minimize impacts to monarch, we have no further recommendations and therefore do not further address monarch herein.

We based this biological opinion on information provided in the July 12, 2022, intra-service section 7 biological evaluation (BE) (U.S. Fish and Wildlife Service 2022 p. entire), telephone conversations, meetings, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern or on

other subjects considered in this opinion. A complete record of this consultation is on file at this office.

Consultation History

- June 2019 – July 2022: Our offices coordinated and communicated regularly regarding section 7 consultation on Kofa NWR's ongoing and future operations and development of the BE. During this coordination process, our office reviewed and provided comments on the draft BE.
- July 14, 2022: We received the Final BE and initiated formal consultation for the Sonoran pronghorn.
- November 23, 2022: We sent you the draft biological opinion for review.
- December 12, 2022: You sent us your edits on the draft biological opinion.
- January 2023: Our offices communicated several times regarding the draft biological opinion to add additional relevant activities and information to the proposed action and effects analysis.
- January 25, 2023: We sent you the draft final biological opinion for review.
- June 28, 2023: You sent us an addendum to your Final BE.
- June 30, 2023: We sent you an updated draft biological opinion for review with incorporated information from the addendum.
- July 5, 2023: You sent us your final minor edits.

BIOLOGICAL OPINION

1 DESCRIPTION OF THE PROPOSED ACTION

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

A complete description of the proposed action is in your July 12, 2022, BE and other supporting information in the administrative record. We include these documents herein by reference, but provide a summary of the proposed action below.

The Kofa NWR proposes to continue to implement its Kofa Wilderness Plan and other ongoing land uses and management actions occurring on Kofa NWR. The Kofa Wilderness Plan contains three objectives and identifies many management actions. The three objectives include the "preservation of wilderness values," "wildlife and habitat management," and "recreation, legal access and public information." The activities and uses listed below, referred to collectively as "Other Kofa Activities", have some level of management discretion and/or are considered USFWS undertakings. Each of these activities summarized here are more completely described below:

- Motorized use of the Kofa road system by the public and USFWS staff
- Non-motorized use of Kofa NWR by the public and USFWS staff
- Habitat, Roads, and Facilities Management
    - Wilderness management/protection
    - Maintenance of refuge roads and facilities
    - Water development monitoring, maintenance, supplementation (if necessary), and development (if necessary)
    - Non-destructive habitat monitoring activities such as vegetation surveys and rain logger data collection, etc.
    - Non-native invasive plant treatments including but not limited to Russian thistle, Malta star-thistle, buffelgrass, African daisy, salt cedar, and others where found by both hand and herbicide where appropriate and approved.
    - Closures of sensitive habitat
    - Land acquisitions/exchanges
- Wildlife Management
    - Non-destructive wildlife monitoring activities such as installation and operation of camera traps, acoustic bat monitoring equipment, mist net captures, pitfall traps, breeding bird surveys, Sonoran desert tortoise (*Gopherus morafkai*) monitoring, ground telemetry, etc.
    - Aerial surveys for wildlife
    - Implementation of recovery actions for Sonoran pronghorn such as captive breeding pen maintenance and monitoring, translocation actions, and water developments.

    - Removal of feral and depredating wildlife
- Issuance of Special Use Permits (Guided hunts, Right-of-Way maintenance, filming, scientific studies, recreation activities requiring a permit)
- Public outreach events led by USFWS Staff
- Fire Management

1.1 Motorized Travel

Many of the management actions and "Other Kofa Activities" require motorized travel. Travel is limited to the existing roads (unpaved) within Kofa NWR and vehicle parking is allowed within 100-foot vehicle pull off zones along open roads provided vegetation is not disturbed. Off-road vehicle travel is strictly prohibited. Speed is limited to 25 MPH, or less as posted, and is enforced. Kofa NWR receives approximately 80,000 public visitors annually. Motorized vehicle use is by far the primary access for the refuge regardless of recreational or land/wildlife management activity.

The intensity of motorized use varies throughout the year (see Figure 6 in the BE). The peak use occurs in the winter and early spring typically between October and March when vehicle use and camping along road sides is common. Agency staff (generally limited to biologist, law enforcement officer, an intern and one or two Arizona Game and Fish Department [AZGFD] personnel) use the refuge roads throughout the year but in relatively low numbers in comparison to public use. Public use nearly ceases in the summer. Across the 360 miles of roads on the refuge, vehicle use peaks in February with approximately 115 total vehicles per day (as calculated by mean monthly average divided by 30 (days per month) divided by two (assumes vehicles counted twice per trip). Vehicle use drops to a low of approximately nine vehicles per day in August. Agency use of roads is often less than four round trips per day throughout the year, with about three trips per day in the summer. As described below, water hauls during the summer may require up to 10 staff.

1.2 Non-motorized Travel

Non-motorized travel occurs by both members of the public and by agency staff. Public non-motorized travel occurs for recreational purposes (e.g., hiking, back country camping, hunting). Agency staff uses non-motorized travel to accomplish some Kofa Wilderness Plan management actions and "Other Kofa Activities" (e.g., habitat/wildlife monitoring, military debris removal including unexploded ordnance removal, and public interpretation on the Kofa NWR). Non-motorized travel includes the use of stock or pack animals such as horses and burros. There are no limitations to non-motorized travel except for the closed area surrounding the Sonoran pronghorn semi-captive breeding pen in the King Valley on the refuge. Non-motorized travel is greatest in the winter months and dominated by public use but actual use is not known. During the summer months, non-motorized travel occurs largely by agency staff. Non-motorized travel by agency staff is relatively consistent throughout the year with approximately four trips per day.

1.3 Habitat, Roads, and Facilities Management

Habitat management actions are identified in the Kofa Wilderness Plan and above as "Other

Kofa Activities." Habitat management actions include the installation and maintenance of signs and fences; maintenance of roads, barriers, and facilities such as water developments; water hauls; development of new water sources; rain gauge data collection; invasive plant treatments; seasonal closures of sensitive habitat; and land acquisitions. Many of these actions are undertaken to provide critical resource needs for wildlife as well as to protect habitat and/or wilderness values within Kofa NWR. Habitat management actions frequently include motorized and non-motorized travel as well as additional components (i.e., installing/maintaining signs, barriers, and facilities).

1.3.1 Traffic control and road maintenance

Installation and maintenance of signs, fences, vehicle/livestock/burro barriers, and facilities may occur throughout the year. Signs, fences, and barriers may be installed throughout the refuge but typically within 100 feet of existing roads. These are installed where resource damage such as wilderness incursions or water depletion by livestock and/or burros occur or are anticipated. Maintenance occurs at existing signs, fences, barriers, and facilities. Hand tools are frequently used for installation and maintenance. Infrequently (less than 10 times per year), heavy equipment such as a backhoe is required to maintain barriers. Maintenance of signs, fences, barriers, and facilities may occur throughout the year.

Road maintenance occurs at sites within the existing road system where erosion or excessive debris have resulted in damage to road integrity. Often, vehicles create new disturbance to get around the obstacle, damage vegetation and create areas highly susceptible to soil erosion. Road maintenance may require the use of backhoe or road grader to fix these localized areas. Road maintenance actions which require the use of backhoe or road grader take less than one day to fix and occur less than 10 times per year. Road maintenance may occur throughout the year.

1.3.2 Water enhancement and construction and supplemental feed

Development of new water sources may occur where there is a net benefit to wildlife, primarily Sonoran pronghorn, deer, and bighorn sheep. Waters for Sonoran pronghorn and deer are placed within Sonoran pronghorn habitat, while those for bighorn sheep are located in mountainous areas outside of pronghorn habitat. Currently there are 7 developed waters for Sonoran pronghorn and other wildlife. It is anticipated that most new water sources may be developed to replace existing problematic or non-functional, but necessary, water sources, but some new waters may also be developed. As of 2023, one water (Scott Well) is undergoing planning for replacement to make it suitable for Sonoran pronghorn; however, more, possible as many as 5, may be planned as necessary to improve pronghorn habitat and as funding and personnel allow.

Construction of wildlife waters is expected to take 3-7 days at each site with 10 – 20 individuals on site. Backhoes and frontend loaders are used for construction and pickup trucks are used to haul personnel. While the exact design of future waters may vary slightly, the design of some existing waters includes a catchment with the capacity to store up to 16,000 gallons of water and a walk-in trough (4' wide x 7' long x 30" deep) connected to storage pipes using flexible plumbing. All pipe is buried; the hole for the pipes is approximately 12' wide x 40' long x 3'

deep.

In addition to enhancing and constructing waters for Sonoran pronghorn, when forage conditions are very bad due to drought conditions, AZGFD or Kofa NWR provides supplemental feed to Sonoran pronghorn help them survive until range conditions improve.

1.3.3 Water hauls and maintenance

Water hauls to depleted water sources are accomplished by a variety of methods. All water hauls, regardless of method, are only undertaken when water is about to be, or has been, lost at critical water sources which is typically summer months prior to the monsoon (June – September). Often water is hauled to existing water developments via trailer. Hose lays are used when water sources are in close enough proximity to open roads to successfully pump water but too far from roads to drive trailers. Hose lays are accomplished by temporarily placing fire hose above ground by hand. Filling operations take one day per site. Helicopters may be used to haul water to existing water sources too far from roads to fill via hose lay. Helicopter hauls are typically limited to rugged terrain areas where bighorn sheep are present. Water is hauled via trailer on existing roads to a helicopter staging area. A helicopter sling carries water to water sources approximately 40-50 times during water haul operations which usually takes one or two days per site. Flights are 200 to 500 feet above the ground and use the same ingress and egress for each trip. Ideally, flight routes are chosen to avoid areas used by Sonoran pronghorn as determined by the most recent AZGFD bi-weekly Sonoran pronghorn monitoring flights, but water supplementation may occur despite the presence of Sonoran pronghorn in emergency situations (i.e., loss of critical water source). Regardless of water haul method, up to 10 staff, volunteers or partner agencies participate in these actions that may occur at any of the developed water sources.

To maintain waters, once a month while checking water levels, Kofa staff may conduct minor maintenance activities with the use of hand tools, including digging out collection points and removing debris to ensure water is collected in future rain events.

1.3.4 Invasive plant control

Invasive plant treatments occur in isolated areas within Kofa NWR and are limited to infestations where eradication is feasible or prevention is needed to protect resource values. Often infestations occur along roadsides or water sources. Most often, invasive plant treatments are completed by hand pulling. In rare circumstances, herbicide is applied where hand pulling is not feasible. Herbicide application is limited to spot treatments via hand sprayers. Specific herbicide used varies on target species and treatment goals (post growth or pre-emergent treatments). In total, herbicide application is limited to less than 500 acres per year. Invasive plant treatment activities do not exceed a total of 30 days per year. Non-target/native species are avoided.

1.3.5 Area closures

Closures of sensitive habitat may be needed to benefit wildlife resources. This includes potential closures for Sonoran pronghorn and desert bighorn sheep but may include other wildlife and plant species. Actions undertaken to close sensitive habitat are similar to the installation of signs and educational outreach.

1.3.6 Land acquisition and exchange

Land acquisitions/exchanges may occur within Kofa NWR. Land acquisitions will only be considered if the action has no effect, is neutral, or has a net benefit to the refuge and resources within including Sonoran pronghorn, Sonoran desert tortoise, and/or monarchs.

1.4 Wildlife Management

Wildlife management activities identified in the Kofa Wilderness Plan or that currently occur are undertaken to assess wildlife resources within the Kofa NWR.

1.4.1 Wildlife and Vegetation Monitoring and Surveys

Non-destructive wildlife and habitat monitoring activities such as installation and operation of camera traps, rain loggers, bat monitoring acoustic equipment, mist net captures, pitfall traps, vegetation surveys, breeding bird surveys, Sonoran desert tortoise monitoring, and ground telemetry occur (or are anticipated) within the refuge. Monitoring sites and/or equipment locations are accessed by both motorized and/or non-motorized travel. Camera traps, largely located near existing water sources, are visited approximately between one and three months throughout the year for a total of approximately 100 days. Acoustic equipment is visited twice per year. Mist net captures of bats occur twice per year during the summer months at one water source in mountainous terrain. Pitfall traps are not currently used within the refuge, but if they are used, they may be visited up to 10 times per year throughout the refuge.

Vegetation surveys are not currently conducted within the refuge but may occur up to 10 times per year throughout the refuge. Breeding bird surveys occur once per year along the Pipeline Road at the north end of the refuge during the spring. Sonoran desert tortoise surveys may occur within the refuge in mountainous terrain up to 5 times per year during spring and summer months. Ground telemetry may occur infrequently for collared animals, regardless of species, to determine cause of death, track specific individuals or to investigate clustered GPS locations approximately 10 times per year.

Aerial surveys for bighorn sheep, Sonoran pronghorn, mule deer, javelina and golden eagles occur within Kofa NWR and are accomplished by fixed wing and helicopter use. Aerial surveys for these species except for Sonoran pronghorn and golden eagles occur during the winter months (October – February). Golden eagle surveys occur during nesting season typically between January and June for approximately four days. Bighorn sheep and golden eagle surveys are accomplished via helicopter use in mountainous portions of Kofa NWR. Mule deer and javelina surveys may be accomplished by fixed wing or helicopter flights at an elevation of 150-200 feet above ground level (AGL).

Both rangewide surveys and periodic monitoring for Sonoran pronghorn are conducted on Kofa NWR by AZGFD and Kofa NWR, consistent with recovery permit #s TE676811-0 (Region 2 Regional Director permit) and TE078347-1 (CPNWR's permit). To accurately monitor Sonoran pronghorn population trends, rangewide aerial surveys of Sonoran pronghorn take place on Kofa NWR every two years. These surveys are conducted by two trained observers from a small fixed wing aircraft using the methods described below.

- Survey Blocks - The survey areas are partitioned into blocks flown by fixed wing aircraft in north/south transects for one to three hours. Transects are flown along every half degree of longitude (i.e. approximately 0.5 miles apart), at 200 feet AGL, and at 148 km/hour (80 knots).
- Observers - Observers are located in the right front and left rear seats of each plane during each survey. Three or four fixed-wing planes are used each day.
- Timing - Surveys are conducted in the early morning and late afternoon to take advantage of optimal light.
- Data Recorded - Pronghorn group size, location, behavior, and direction of movement are recorded for each observation. Group composition is recorded, if possible, without disturbing the pronghorn.

Sonoran pronghorn monitoring via periodic aerial and ground telemetry, as well as by using motion-activated cameras occurs year-round to assess population status, productivity and recruitment, habitat use, mortalities, etc. Monitoring methods are described below.

- Aerial Telemetry - Aerial telemetry from fixed-wing planes occurs at least 1,000 feet AGL to avoid disturbing the pronghorn. It is typically conducted every other week, but frequency is based on a variety of factors (e.g., funds, personnel, weather).
- Ground Telemetry - Occasional ground telemetry is conducted; for example, when a mortality is detected, personnel investigate as soon as possible to attempt to determine the cause of death. Personnel conducting ground telemetry avoid disturbing pronghorn.
- Motion-Activated Cameras - Motion-activated cameras are used to monitor Sonoran pronghorn. Cameras are placed in areas (e.g., at water sources) to obtain photos without disturbing pronghorn. Personnel check/change batteries and camera cards, and maintain the cameras as needed.

1.4.2 Hunting

Regulated hunting within Kofa NWR is permitted for quail, bighorn sheep, mule deer, cottontail rabbit, coyote, and gray fox. Current hunting season dates are as follows:

Quail: October 14 - February 12
Cottontail rabbit: October 14 - February 12
Coyote: October 14 - February 12
Grey fox: October 14 - February 12
Mule Deer: Rifle - November 4-13; Archery - January 1-31
Bighorn sheep: November 18 – December 31

All other wildlife are protected. The refuge encompasses State game management units 45A, 45B, 45C and small portions of 44B. Hunters are allowed to harvest game species consistent with State regulations. Dogs may be off leash when participating in quail and cottontail hunting. State law prohibits anyone from camping within ¼ mile of a wildlife water (A.R.S. 17-203). Hunters are required to follow all other public use regulations, including, but not necessarily limited to the following:

- State hunting licenses (for all hunting) and permits (for deer and desert bighorn sheep) are required.
- Bag limits for predatory animals, quail and cottontail are per State regulations. Hunting and collecting of reptiles and amphibians are prohibited.
- Individuals may not be under the influence of alcohol while hunting. Shooting from a vehicle is prohibited. Discharge of firearms is not permitted within 1/4 mile of an occupied structure.
- Deer and other species may be taken by bow and arrow or rifle depending on the hunting season.
- The use of a game cart to retrieve a harvested animal is permitted only in non-wilderness areas of the refuge.
- Cottontail, coyotes, and gray foxes may only be hunted during the quail season.
- Trapping is not permitted on the refuge.
- Hunting is allowed near water sources. Individuals should respect other hunters' privileges and leave the area if other hunters arrive at a water source first.
- Hunting seasons for the refuge are listed in current Arizona Game and Fish Department hunting regulations.
- Recreational livestock permitted on the refuge include horses, mules, and burros. The use of feeding containers is required, and water must be packed in. All waste must be removed from the refuge and all surface disturbances at campsites must be restored. Use of pelletized feed is highly recommended to reduce potential introduction of invasive species. Livestock may not be tethered directly to trees or other vegetation.
- Unauthorized discharge of firearms or target practice is prohibited.
- Collecting, possessing, molesting, disturbing, injuring, destroying, removing, or transporting any plant or animal or part thereof (alive or dead) is prohibited (except for legally taken game).
- Pets are permitted only if they are confined or leashed. Dogs may be off leash when they are participating in quail and cottontail hunting.

1.4.3 Predator Management

Predator management actions would be triggered if a predator, such as mountain lions, bobcats, and coyotes, have keyed in on priority a management species including bighorn sheep and Sonoran pronghorn.

1.4.4 Feral and Trespass Animal Management

Feral livestock and depredating wildlife may be lethally removed consistent with Refuge Manual

7 RM 6 and 50 CFR 30.12 and the Final Environmental Assessment Limiting Mountain Lion Predation of Desert Bighorn Sheep on the Kofa National Wildlife Refuge. Removal of feral livestock and depredating wildlife may occur throughout Kofa NWR. Travel can be accomplished by both motorized and non-motorized travel. Removal may occur at any time of year and can be accomplished by the use of high-powered rifle and non-lead shot as per USFWS policy. This activity is anticipated to rarely occur within the refuge. Lion removal is not planned on the refuge at this time because the bighorn sheep population is well above 800 individuals which is the threshold for lion removal to be considered. Traps may also be deployed within or near the Kofa semi-captive breeding pen if a predator is found within the pen and threatening or preying upon Sonoran pronghorn. Traps within Sonoran pronghorn habitat may also include foot traps which have a small fence build around the trap to exclude pronghorn.

1.4.5 Sonoran Pronghorn Breeding Pen

Kofa NWR is actively participating in implementing Sonoran pronghorn recovery actions detailed in the Recovery Plan for the Sonoran Pronghorn (U.S. Fish and Wildlife Service 2016) consistent with recovery permit #s TE676811-0 (Region 2 Regional Director permit) and TE078347-1 (CPNWR's permit), and the special rule in the 10(j) rule to establish a nonessential experimental population of Sonoran pronghorn in Arizona (U.S. Fish and Wildlife Service 2011). A semi-captive breeding pen is located centrally within the refuge. Captive breeding pen maintenance, monitoring and translocation actions for Sonoran pronghorn occur under these permits and special rule.

1.4.6 Captures and Translocations

Captures and translocations of bighorn sheep and Sonoran pronghorn may occur. If bighorn sheep capture and translocations occur, activities will occur during the fall/winter months (October – December). Helicopter use for capture efforts will be limited to mountainous terrain typical of bighorn sheep. Flight shuttling between staging area and capture locations will be 500 feet above ground level and may cross areas occupied by Sonoran pronghorn. Staging locations for up to two helicopters, vehicles and staff may occur within 100 feet of existing roads at areas devoid of vegetation. Approximately 20 people may participate during capture and translocation efforts which would take approximately one week. Sonoran pronghorn translocations are ongoing within Kofa NWR.

1.4.7 Mountain Lion and Bobcat Studies

Mountain lion and bobcat captures may be conducted for scientific study. Captured animals may be collared when appropriate. Blood, tissue, fecal, etc. samples may also be collected during health assessment and collar application. Mountain lion and bobcat studies may include the deployment of snare, box, or other trap design in locations where these species are anticipated to travel. Traps are checked daily. Non-target animals are released immediately. Mountain lions and bobcats are processed as described above and then released. Traps are typically deployed between October and April if a target animal is likely to occur in the area of deployment. Traps are most often placed in rugged terrain outside of pronghorn habitat. Both motorized and non-

motorized access as described above would occur to access trap sites.

1.5 Special Use Permits

Special Use Permits (SUPs) are issued on the refuge under the three general types: Commercial Use (commercial filming, guided hunts, fee-based tours, etc.), Research Use (surveys, monitoring, and data collection), and General Use (organized and group activities, one-time events, other special events, and educational activities). Permits, regardless of type are reviewed to ensure compliance with refuge regulations. Stipulations are added to permits to avoid or minimize impacts to wildlife resources and notify permittees of regulations. Location and/or timing of approved activities may be changed when appropriate to avoid conflicts with wildlife including Sonoran pronghorn, Sonoran desert tortoise, and monarchs. Stipulations include conservation measures that will be added when appropriate to minimize impacts to Sonoran pronghorn, Sonoran desert tortoise, monarchs, and other sensitive wildlife species. Permits may be denied if resource conflicts are unavoidable. Permits are demand driven and vary in timing and location.

1.6 Public Outreach

Public outreach events are led by refuge staff and occur most often in winter months. Outreach events typically occur in the Palm Canyon area of the refuge. Often these events require travel via the existing road system and include a hike to a point of interest. Events are planned to avoid disturbance to sensitive wildlife resources including Sonoran pronghorn, Sonoran desert tortoise, and monarchs. Approximately four outreach events occur annually and last for less than one day. Public participation is varied but attendance is approximately 25 people per trip but often less.

1.7 Fire Management

Fire Management may occur within Kofa NWR. Although wildfires are rare on the refuge due to the lack of continuous fuel load (vegetation), above average precipitation may result in relatively high fuel loads which may allow for the development of wildfires. Fires that threaten private property, have other than low potential for spreading beyond the planning area, or present a significant threat to unique natural resources, or health and safety for the public, will be suppressed. Non-motorized hand tools and Minimum Impact Suppression Techniques for suppression activities will be applied to minimize impacts associated with suppression. Fire monitoring will be accomplished by aerial flights 1000 feet above ground level or by foot. Given the emergency nature of wildfire response, emergency consultation will occur if warranted.

The following conservation measures will be implemented as part of the proposed action. Conservation measures apply to USFWS staff and SUP recipients. Conservations measures will be added as terms and conditions to SUPs when relevant.

1.8 Conservation Measures – Sonoran pronghorn

1. Continue to limit motorized travel to existing designated roads.
2. Limit vehicle speed to 25 miles per hour for all refuge users, including the public and USFWS staff.

3. Install signs and/or barriers where necessary to protect habitat.
4. When possible and appropriate, within Sonoran pronghorn habitat, schedule projects outside of the fawning and hot/dry season.
5. Work with USFWS Ecological Services Office to develop and implement a strategy to avoid Sonoran pronghorn collisions if any occur.
6. If a driver sees a Sonoran pronghorn while driving in a motorized vehicle and the Sonoran pronghorn is standing still, the driver will reduce speed to 10 mph or slower, if needed, until at least ¼-mile past the Sonoran pronghorn.
7. If a driver sees a Sonoran pronghorn while driving in a motorized vehicle and the Sonoran pronghorn is running, the driver will stop the vehicle and wait to continue until the Sonoran pronghorn is out of sight.
8. Projects that involve the use of heavy and/or loud equipment will temporarily stop work if Sonoran pronghorn are observed in the vicinity of the project and will not commence work until Sonoran pronghorn vacate the area on their own volition **and** apply Conservation Measure #4 above. If conservation measure #4 cannot be implemented, Kofa NWR Staff with coordinate with the AESO prior to project implementation.
9. Immediately vacate area if Sonoran pronghorn fawn, or doe exhibiting behavior that indicates presence of fawn, is present.
10. Provide water and feed to Sonoran pronghorn in emergency situations.
11. Limit invasive plant treatments to 500 acres per year in occupied Sonoran pronghorn habitat.
12. Stage equipment and personnel outside of occupied Sonoran pronghorn habitat for aerial operation including but not limited to wildlife surveys and water hauls.
13. Avoid conducting bighorn sheep, mule deer, and javelina surveys during pronghorn fawning season.
14. Prohibit helicopter use for equipment recovery in areas occupied by Sonoran pronghorn in fawning season.
15. Prohibit camping within ¼ mile of developed water sources.
16. Consider seasonal closures of sensitive habitat to protect important pronghorn use areas such as waters, forage enhancement plots, preferred fawning areas, etc.
17. Avoid occupied Sonoran pronghorn habitat when conducting formal outreach.
18. Pets, including dogs, must be confined or leashed at all times except when hunting quail or cottontail. When hunting quail and cottontail, dogs must be kept under control at all times by hunters.
19. Notify, via email, Arizona Ecological Services as soon as possible (but no longer than 72 hours) if incidental take has been documented or suspected as a result of the proposed action (this is addition to the reporting requirement under the section “Disposition of Dead or Injured Listed Species”) and the details of the take.
20. Provide an annual report to Arizona Ecological Services including: a) if any incidental take has been documented or suspected (this is addition to the reporting requirement under the section “Disposition of Dead or Injured Listed Species”), b) the most recent Sonoran pronghorn population estimate for the Kofa Subunit and an explanation of if the number of Sonoran pronghorn anticipated to be taken incidentally will change (increase

or decrease) as a result of the most recent population estimate (see the section on Amount or Extent of Take), and c) the implementation of conservations measures, etc.

21. Projects outside of the scope of this biological evaluation will be consulted on separately.
22. Clean heavy equipment prior to entering Kofa NWR to prevent the spread of invasive plants.

1.9 Conservation Measures – Monarch butterfly

23. Continue to limit motorized travel to existing designated roads.
24. Speed limit is 25 miles per hour.
25. Signs and/or barriers will be installed where necessary to protect habitat.

1.10 Action Area

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

The action area is the 666,641-acre Kofa NWR which is located in southwestern Arizona (Figure 1) bounded by Arizona Highway 95 on the west and located in-between Interstates 8 and 10. The refuge is located in the lower Colorado River Valley and Gila/Salt/Verde Rivers Subdivisions of the Sonoran Desert scrub Biome in both Yuma and La Paz Counties, Arizona. Kofa NWR falls within the Volcanic Hills 3-7" precipitation zone Ecological Site (R040XC324AZ) but the site description is provisional and detailed site descriptions have not been developed.

The typical plant species that inhabit the project area include microphyllous trees like velvet mesquite (*Prosopis velutina*), ironwood (*Olneya tesota*), foothills and blue palo verde (*Parkinsonia microphyllum* and *P. floridum*), and smoketree (*Psorothamnus spinosa*). In dryer and more barren areas the more common desert pavement plants are creosotebush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), teddy bear cholla (*Cylindropuntia bigelovii*), and saguaro (*Carnegiea gigantea*). There are four species of milkweed, family Apocynaceae, but they are uncommon on the refuge. Non-native Mediterranean grass (*Schismus barbatus*), red brome (*Bromus rubens*) and Sahara mustard (*Brassica tournefortii*) are common in many areas of the refuge. Salt cedar (*Tamarisk ramosissima*), Russian thistle (*Salsola kali*), buffelgrass (*Cenchrus ciliaris*) and other invasive plant species occur in isolated areas.

The refuge encompasses approximately 360 miles of motorized routes in non-wilderness areas. These roads have a 100-foot vehicle pull off zone on either side. Water sources occur throughout the refuge in low densities. Wells tend to be located near existing roads and tanks occur both near roads and perched on cliffs. Wildlife are found throughout the refuge. Wildlife and habitat monitoring sites occur throughout the refuge. Non-native invasive infestations and treatment areas currently occur in the Red Rock Pass area (northeast portion of the refuge), Big

Eye Mine and Neversweat Ridge areas (southern half of the refuge). However, non-native invasive plant infestations and non-native invasive plant infestations treatments have the potential to occur anywhere within the refuge.

2 STATUS OF THE SPECIES – SONORAN PRONGHORN

2.1 Description, Legal Status, and Recovery Planning

The Sonoran subspecies of pronghorn (*Antilocapra americana sonoriensis*) was first described by 1945 (Goldman 1945 p. 3) and is one of four subspecies of pronghorn (Stephen et al. 2005 p. 782). The subspecies was listed throughout its range as endangered on March 11, 1967 (Office of the Secretary 1967) under the Endangered Species Preservation Act of October 15, 1966 without critical habitat. Five populations (three in the Arizona, U.S. and two in Sonora, Mexico) of the Sonoran pronghorn are extant (Figure 2, Figure 3) and are:

1) **"Cabeza Prieta" population** (status: endangered): a population in southwestern Arizona on Cabeza Prieta National Wildlife Refuge (CPNWR, managed by the USFWS), Organ Pipe Cactus National Monument (OPCNM, managed by the National Park Service), Bureau of Land Management (BLM) – Ajo Block, and Barry M. Goldwater Range (BMGR, managed by Luke Air Force Base [LAFB] and Marine Corps Air Station Yuma [MCAS Yuma]),
2) **"Kofa" population** (status: nonessential experimental 10(j) population, released into the wild in 2013): a population in southwestern Arizona on Kofa NWR, Yuma Proving Ground (YPG, managed by the U.S. Army), and surrounding areas,
3) **"Sauceda" population** (status: nonessential experimental 10(j) population, initiated in December 2015): a population in southwestern Arizona on BMGR-East, east of Highway 85,
4) **"Pinacate" population** (status: endangered): a population in the Pinacate Region of northwestern Sonora, and
5) **"Quitovac"** population (status: endangered): a population on the Gulf of California west and north of Caborca, Sonora.

The five populations are predominantly geographically isolated due to barriers such as roads and fences; however, some animals have crossed highways.

The 1982 Sonoran Pronghorn Recovery Plan (U.S. Fish and Wildlife Service 1982) was revised in 1998 (U.S. Fish and Wildlife Service 1998) and again in 2016 (U.S. Fish and Wildlife Service 2016). The 2016 Final Recovery Plan for the Sonoran Pronghorn, Second Revision. (or 2016 Recovery Plan) (which can be accessed at Sonoran Pronghorn Recovery Plan) addresses Sonoran pronghorn populations both in Mexico and the U.S. and identifies demographic and threats-based recovery criteria. The final recovery plan contains recovery criteria based on maintaining and protecting all current populations in the wild, expanding the size of populations, and managing or eliminating threats to meet the plan's goal of downlisting and delisting the species. To downlist the Sonoran pronghorn to threatened, the following six recovery criteria must be met:

1. At least three free-ranging populations are viable. Two of these must be the Cabeza population and either the Quitovac or Pinacate population. The Recovery Team defines a viable population as one that has less than a 10% probability of extinction over 50 years and a growth rate that is stable or increasing. Furthermore, at least one new population must have been established, in addition to the Kofa subunit (e.g., Sauceda subunit). Established means that the population is stable and is no longer in need of augmentation from a captive breeding program.

A Population Viability Analysis (PVA) estimated abundance targets to meet the Recovery Team's definition of viability, which is different for each management unit due to different environmental conditions. To be considered viable, a population estimate must meet or exceed the abundance targets and demonstrate a population growth rate that is stable or increasing ($r \geq 0$) for at least 10 of 14 years. Abundance targets for each management unit are estimated from the PVA to be: a) 225 in the Cabeza Prieta Management Unit; b) 150 in the Kofa subunit or a new subunit (Sauceda or other future established subunit); c) 150 in the Pinacate Management Unit; and d) 450 in the Quitovac Management Unit. These population sizes must be estimated by monitoring (i.e., aerial surveys).

2. Within the Cabeza Prieta Management Unit, Pinacate Management Unit, Quitovac Management Unit and the Kofa and Sauceda subunits of the Arizona Reintroduction Management Unit, a minimum of 90% of current Sonoran pronghorn habitat within each unit is retained and contiguous. This Sonoran pronghorn habitat is protected through agency policies, land use regulations and plans, landowner agreements, incentives, and/or other programs and agreements. The 90% of retained and contiguous Sonoran pronghorn habitat includes key habitat features such as water sources.
3. Threats to Sonoran pronghorn habitat quality in three units are stabilized or decreasing as measured by indicators described in Appendix E. Threats must be stabilized or decreased in the three management units that correspond to the three populations that meet the population viability criteria in Recovery Criteria number 1. In particular, the threats of overgrazing; unauthorized routes, roads and trails; invasive plant and animal species threatening Sonoran pronghorn habitat; and spread of shrubby vegetation are minimized through agency policies, land use regulations and plans, landowner agreements, incentives, and/or other programs and agreements.
4. Within the Cabeza Prieta Management Unit, Pinacate Management Unit, Quitovac Management Unit, and the Kofa and Sauceda subunits of the Arizona Reintroduction Management Unit, human disturbance is alleviated such that a minimum of 90% of Sonoran pronghorn habitat can be occupied by Sonoran pronghorn.
5. Genetic diversity for three populations, as measured by heterozygosity and allelic richness[1] for nuclear DNA markers, has been retained from levels indicated in Culver and Vaughn (2015). These three populations must meet the threshold of viability as described in

[1] Allelic richness is a measure of the average number of alleles that takes into account rarity and commonness of alleles and provides an additional measure of genetic diversity that complements heterozygosity.

Downlisting Criterion 1. The minimum level of heterozygosity[2] of any of the three populations must be 49% (i.e., within 20% of the average heterozygosity of population segments (10) estimated by Culver and Vaughn (2015)). The minimum level of allelic richness of any of the three populations must be 1.96 (i.e., within 20% of the average allelic richness of population segments (10) estimated by Culver and Vaughn (2015)).

6. Effective federal, state, tribal, and/or local laws are in place in the recovery conservation units that ensure that killing of Sonoran pronghorn is prohibited or regulated such that viable populations of Sonoran pronghorn can be maintained and are highly unlikely to need the protection of the ESA again.

After accomplishing all criteria for downlisting to threatened, Sonoran pronghorn can be considered for delisting when at least three free-ranging populations are viable for at least 10 out of 14 years, and the other downlisting criteria have also been met.

2.2 Life History and Habitat

Life history and habitat is discussed extensively in the 2016 Recovery Plan. In summary, pronghorn live in herds of mixed sexes, with group sizes largest in winter in populations that congregate on distinct winter ranges (Byers 1997). Home range sizes are large. In Arizona, individual home range sizes varied from varied from 43-2,873 km^2 (17-1,109 mi^2), with an average of 511 km^2 (with a standard deviation [SD] of ± 665.3 km^2), which is equal to 197 mi^2 (± 257 mi^2 SD) (Hervert et al. 2005 p. 8).

Sonoran pronghorn are found exclusively in the Sonoran Desertscrub Biome. Pronghorn are prey animals that rely on keen eyesight and swift running to escape from predators. These adaptations are most suited to terrain that is relatively flat and open. Sonoran pronghorn appear to prefer gentle slopes and hills, where the paloverde-chain fruit cholla vegetation association occurs, and use flat slopes in proportion to their availability (Hervert et al. 2005 p. 13). Sonoran pronghorn use wash habitat more than expected under all conditions (i.e., hot, cool, wet, and dry), but washes are particularly important during the hot dry season, when they provide forage and shade (Hervert et al. 2005 pp. 13–14).

Sonoran pronghorn forage on a variety of plant species. Fecal pellets collected from 1994-1998 included 132 different plant taxa, with browse (shrubs and trees) and forb species being the main components of pronghorn diets (Hervert et al. 2000 p. 24). Sonoran pronghorn obtain some water from their forage, but require freestanding water to maintain water balance, particularly in the hot, dry pre-summer and summer months (Morgart et al. 2005 p. 57).

2.3 Distribution and Abundance

The historical range of Sonoran pronghorn is described in the 2016 Recovery Plan and depicted in Figure 2. The approximate reconstructed historical distribution encompasses an area of about

[2] Heterozygosity is a measure of the proportion of individuals in a population having two different alleles of the same gene.

142,450 km^2 (55,000 mi^2). The current range of the Sonoran pronghorn in Arizona and Sonora is described in the 2016 Recovery Plan and depicted in Figure 3. Presently, Sonoran pronghorn only occupy approximately 12% of their historical range. Their current range is limited to approximately 17,224 km^2 (6,660 mi^2), of which 4,057 km^2 (1,566 mi^2) are in Mexico and 13,167 km^2 (5,094 mi^2) are within the U.S.

2.3.1 United States

Cabeza Prieta Population (or Endangered Wild Population)

Abundance and population trends are described in the 2016 Recovery Plan. In summary, however, the endangered population in Arizona declined from an estimated 99 animals in 2000 to 21 animals in 2002, due primarily to severe drought. Since 2002, this population, now known as the Cabeza Prieta Population has increased significantly (Table 1). The aerial survey in November 2021 resulted in an estimated 232 individuals (161 pronghorn observed) (U.S. Fish and Wildlife Service 2021 p. 6). Both the numbers observed and estimated were lower than those of the survey in 2020, when 212 pronghorn were observed and the estimate was 257, likely due to the ongoing drought (U.S. Fish and Wildlife Service 2021 p. 6). The most recent aerial survey in November 2022 resulted in an estimated 211 individuals (177 observed) (Arizona Game and Fish Department 2023). While the estimated number of animals was lower than in 2021, the observed number was higher which was surprising given the low fawn recruitment in 2022 due to poor range conditions in the spring and early summer. A decline in the population was anticipated due to projected annual adult mortality of 10-20% under range conditions exhibited in early 2022 (Arizona Game and Fish Department 2023). Table 1 includes population estimates for this population from 1992 to 2022.

10(j) Wild Population

Kofa Subunit Population

A final 10(j) rule (U.S. Fish and Wildlife Service 2011) was published in May, 2011, to establish a nonessential experimental population of Sonoran pronghorn in Arizona. See Figure 3 for a depiction of 10(j) Nonessential Experimental Population area for Sonoran pronghorn in southwestern Arizona. In 2013, the first wild population was established under the 10(j) rule on Kofa NWR with six captive-bred animals from CPNWR. The population continues to be augmented with captive bred animals and additionally, fawns have been born in the wild population. Based periodic telemetry flights in 2020, the estimated population within the Kofa Subunit was approximately 140 (U.S. Fish and Wildlife Service 2020 p. 5). A partial survey of this population (in the King Valley area on Kofa NWR and south into YPG and east towards the agricultural pivots) was conducted in January 2021, resulting in 107 Sonoran pronghorn observed (U.S. Fish and Wildlife Service 2021 p. 6) (Table 1). A complete rangewide survey was conducted for the Kofa population in January 2023 which resulted in an estimated 212 individuals (172 observed).

Sauceda Subunit Population

To establish a third population in Arizona, in December 2015, 26 Sonoran pronghorn were released on BMGR East, east of Highway 85, under the 10(j) rule. Based periodic telemetry flights in 2020, the estimated population within the Sauceda Subunit was approximately 65 (U.S. Fish and Wildlife Service 2020 p. 6). A rangewide survey was conducted for the Sauceda population in December 2022 which resulted in an estimated 29 individuals (24 observed) (Table 1) (Arizona Game and Fish Department 2023). Due to aircraft issues, one block on the eastern edge of the range was not completed. Evidence of reproduction was documented, as approximately 18 of the observed pronghorn were unmarked wild born pronghorn (Arizona Game and Fish Department 2023).

Semi-captive Breeding Facilities

Cabeza Prieta National Wildlife Refuge

As part of a comprehensive emergency recovery program, a total of 11 adult pronghorn (10 females and one male) were initially captured (from Sonora and Arizona) and placed into a semi-captive breeding pen at CPNWR in 2004. The breeding program has been very successful and as of August 2022 there were 73 pronghorn in the enclosure at CPNWR (note this number changes frequently with births and releases). Since establishing the program, a number of pronghorn have died in the pen due to various causes, including epizootic hemorrhagic disease, malnutrition (prior to the introduction of alfalfa hay in the pen), bobcat predation, entanglement in the fence, and capture operations. Sonoran pronghorn have been released from the pen every year since 2006, many into the endangered population and others to establish the two nonessential experimental populations.

The objective is to produce at least 20 fawns each year to be released into the endangered U.S. population; supplement 10(j) populations at Kofa NWR and BMGR East, east of Highway 85; and establish any additional populations needed for pronghorn recovery.

Kofa National Wildlife Refuge

In December 2011, 13 Sonoran pronghorn were moved from the CPNWR breeding pen to the newly built breeding pen in the King Valley on Kofa NWR to initiate the breeding program on the Refuge. As with the CPNWR pen, the Kofa breeding program has been successful and produced pronghorn for release into the wild. As of August 2022, the Kofa pen contains 33 pronghorn (note this number changes frequently with births and releases).

2.3.2 Mexico

Abundance and population trends are described in the 2016 Recovery Plan. The February 2020 aerial survey resulted in an estimated 736 (393 observed) individuals in the area southeast of Mexico Highway 8 (or the Quitovac population) and 126 (54 observed) to the west of the highway (or the Pinacate population) (U.S. Fish and Wildlife Service 2020 p. 6). The estimates yielded from this survey likely overestimated the populations in Sonora due to a number of

factors, including the timing of the survey in February when pronghorn groups sizes are much smaller than in November and December, when aerial survey are typically conducted (Arizona Game and Fish Department 2020 p. 4). In 2020 a large number of Sonoran pronghorn were seen in both Sonora areas suggesting the two populations remain in good condition relative to historical counts (Arizona Game and Fish Department 2020 p. 4). The January 2022 aerial survey results in an estimated 449 (324 observed) individuals in the area southeast of Mexico Highway 8 (or the Quitovac population) and 102 (80 observed) to the west of the highway (or the Pinacate population). Table 6 includes population estimates from 2000 to 2022.

2.4 Threats

Sonoran pronghorn face numerous threats throughout their range. These threats are discussed in detail in the Reasons for Listing/Threats Assessment of the 2016 Recovery Plan for the Sonoran Pronghorn, Second Revision, and are summarized below.

2.4.1 Barriers that Limit Distribution and Movement

Barriers that limit the distribution and movement of pronghorn, such as highways, fences, railroads, developed areas, and canals, are considered a major threat to the species and are discussed extensively in the 2016 Recovery Plan.

2.4.2 Vehicular Collision with Sonoran Pronghorn

Although vehicle collisions with Sonoran pronghorn are fairly rare, they have been documented, primarily on paved highways. Some of these documented cases are discussed in the 2016 Recovery Plan, however, since reported in the plan, at least 8 more Sonoran pronghorn deaths due to vehicle collisions have been documented, 6 of which occurred on Highway 95, 1 occurred on Highway 85, and 1 occurred on State Route 238.

2.4.3 Drowning in Canals

In addition to posing a barrier to Sonoran pronghorn movement, canals pose a drowning risk to the species. Since 2008, canals have been the cause of at least 8 pronghorn deaths, including four from the Cabeza Prieta population and 4 from the Kofa population (U.S. Fish and Wildlife Service 2016 p. 72).

2.4.4 Human-caused Disturbance

A variety of human activities occur throughout the range of the Sonoran pronghorn that have the potential to disturb pronghorn or its habitat, including livestock grazing in the U.S. and Mexico; military activities; recreation; poaching and hunting; clearing of desert scrub and planting of buffelgrass (*Pennisetum ciliare*) in Sonora; gold mining southeast of Sonoyta, dewatering and development along the Gila River and Río Sonoyta; cross-border violator (CBV) activity across the international border and associated required law enforcement response; and roads, fences, canals, and other artificial barriers. Human disturbance of Sonoran pronghorn is discussed at length in the 2016 Recovery Plan.

Since the Recovery Plan was published, a study on the behavioral and physiological effects of human activities on Sonoran pronghorn was completed (the study was conducted 2013 to 2016). As reported in (Christianson et al. 2017), initial analysis of the data collected during the study showed evidence for several anthropogenic effects on Sonoran pronghorn suggesting the species is sensitive to human activity in the U.S. portion of its range. Responses to sources of disturbance such as roads and vehicles were widespread across the landscape and this study confirms that managers should consider impacts of vehicles on Sonoran pronghorn when resource planning (Christianson et al. 2017). Behavioral observations confirmed that interactions with vehicles occur frequently and elicit strong behavioral responses while interactions with humans on foot occur far less often (Christianson et al. 2017).

For example, of 342 behavioral observations 33-60 minutes in length, 15.2% involved at least one potential interaction with humans (Cabeza Prieta National Wildlife Refuge 2020). In comparison, only 8% of observations involved at least one potential interaction with another species of wildlife (mule deer or coyote). Seventy percent of potential interactions with humans involved a motorized vehicle; 30% involved a human on foot. Approximately 61% of motorized human activity with the potential to affect Sonoran pronghorn was produced by Customs and Border Protection (CBP); 22% was from civilians and 17% was from land managers. Civilians are restricted to three public access roads, while CBP may drive administrative trails, even in designated Wilderness. Thus, in terms of numbers and area, CBP has more potential for widespread impacts associated with motorized human activity than civilians or land managers. Focusing on motorized vehicles, adult female Sonoran pronghorn spend more time vigilant as distance to the nearest road decreases, particularly when a motorized vehicle is present. Adult female pronghorn trade off foraging and walking for vigilance, which could have nutritional costs. Also, stress hormone levels in pronghorn feces increase with off-road vehicle tracks, which suggests pronghorn may exhibit a stress response to off-road vehicle traffic (S. Doerries, unpublished data). Although motorized human activity causes behavioral and physiological changes in adult female Sonoran pronghorn, it is unknown whether these changes significantly affect survival and reproduction. Available demographic data lack the accuracy and/or precision for any relationship with human activity to be assessed. There were not enough potential interactions with humans on foot to examine how non-motorized human activity affects the behavior of adult female Sonoran pronghorn (Cabeza Prieta National Wildlife Refuge 2020).

2.4.5 Habitat Disturbance

A number of threats, including livestock grazing, mining (in particular, La Herradura mine in the range of the Quitovac population in Sonora), and off-road vehicle and pedestrian activity can alter, destroy, and fragment Sonoran pronghorn habitat. These are discussed in the 2016 Recovery Plan.

2.4.6 Fire

Fire, which can be a threat to Sonoran pronghorn and their habitat, is discussed in the 2016 Recovery Plan.

2.4.7 Drought and Climate Change

Drought limits the availability of quality forage and water. Drought may be a major factor in the survival of adults and fawns (Bright & Hervert 2005) as demonstrated by the major decline in 2002, which was driven by drought. Drought and climate change and their effects on Sonoran pronghorn are discussed in the 2016 Recovery Plan. In summary, however, the most significant potential impact of global climate change on Sonoran pronghorn is its potential to increase the frequency and severity of drought. More dry days, warming temperatures, and increased evapotranspiration are expected to result in more severe drought in the Southwestern United States (Gershunov et al. 2013 pp. 137–138). Future droughts are expected to become more frequent and severe, with 100-year droughts common in the second half of this century (Gershunov et al. 2013 p. 138).

2.4.8 Disease

Sonoran pronghorn can potentially be infected by a variety of viral and bacterial diseases, as well as parasites. Epizootic hemorrhagic disease and Bluetongue virus are the most common cause of disease-caused die-offs in wild pronghorn (Brown & Ockenfels 2007). Blood testing has shown pronghorn exposure to these diseases by increases in antibody titers over time. The diseases relevant to pronghorn can be transmitted indirectly through vectors, such as infected midges or ticks, or directly via aerosolized or direct contact of infected fluids or tissues. Diseases that potentially infect pronghorn are all serious diseases of cattle, which can act as vectors. Cattle within the current range of the pronghorn have not been tested for these diseases. See the 2016 Recovery Plan for more information on disease in Sonoran pronghorn.

2.5 Recovery Actions

Many critically important recovery projects have been implemented in an attempt to reverse the decline of the Sonoran pronghorn throughout their range. See the section on Previous and Ongoing Conservation Efforts in 2016 Recovery Plan for the Sonoran Pronghorn for a comprehensive discussion of recovery actions. For example, developed and emergency water sources and forage enhancement plots (developed to irrigate the desert and produce forage for pronghorn) have been constructed in recent years throughout the range of the U.S. endangered population and developed waters have also been constructed in the range of the Kofa population. These projects are designed to increase availability of green forage and water during dry periods and to offset to some extent the effects of drought and barriers that prevent pronghorn from accessing greenbelts and water, such as the Gila River and Río Sonoyta.

Plots and waters located in areas with little human activity and better range conditions appear to be more effective (i.e., contribute to fawn and adult survival to a greater degree) than those located in areas of high human activity and poor range condition (i.e., experiencing drought) (personal communication with John Hervert, Arizona Game and Fish Department [AZGFD], September 16, 2009). Therefore, to ensure success of these measures, it is critical that human activity is avoided or significantly minimized near the plots and waters.

As described above, semi-captive breeding facilities at CPNWR and Kofa NWR were established and are being used to augment and establish new populations. These crucial projects, which are helping pull the U.S. population back from the brink of extinction, have been cooperative efforts among many agencies and organizations, including USFWS, AZGFD, MCAS, LAFB, OPCNM, U.S. CBP, Arizona Desert Bighorn Sheep Society, Arizona Antelope Foundation, the Yuma Rod and Gun Club, the University of Arizona, the Los Angeles and Phoenix Zoos, and others.

Prior to the initiation of intensive recovery efforts, the biennial population growth rate of endangered Sonoran pronghorn population in the U.S. was directly related to biennial precipitation from 1992 to 2002; in other words, the population increased under wetter conditions and decreased under drier conditions (Cabeza Prieta National Wildlife Refuge 2020). After the initiation of these intensive recovery efforts (e.g., captive breeding program, Sonoran pronghorn waters), no relationship was observed between population growth rate and biennial precipitation from 2004-2016. This suggests recovery efforts are reducing the effect of at least one environmental factor (i.e., precipitation) on Sonoran pronghorn survival and thus may be helping to stabilize the population (Cabeza Prieta National Wildlife Refuge 2020).

In Mexico, a recovery plan for pronghorn was developed in 2009 and is currently being implemented. For example, in 2015, the Comisión Nacional de Areas Naturales Protegidas (CONANP; National Commission of Natural Protected Areas) installed waters for Sonoran pronghorn in Sonora, although pronghorn use of these waters has not been documented likely due to cattle exclusion fences around the tanks. CONANP is continuing to experiment with the waters until pronghorn can successfully use them. CONANP is also working with the local communities to educate people about pronghorn and the highway department to improve undercrossings of Highway 2 to encourage pronghorn passage. CONANP and the Comisión de Ecologies y Desarrollo Sustentable del Estado de Sonora (CEDES; Commission of Ecology and Development of the State of Sonora) also conduct Sonoran pronghorn surveys and work with the La Herradura mine and other landowners to reduce their impacts on pronghorn and their habitat.

3 ENVIRONMENTAL BASELINE – SONORAN PRONGHORN

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present effects of all Federal, State, or private actions and other human activities in the action area, the anticipated effects of all proposed Federal projects in the action that have already undergone formal or early section 7 consultation, and the effect of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

3.1 Status of the species within the action area

The distribution and abundance of the Sonoran pronghorn in the action area is the same as that described above in the Status of the Species population of Sonoran pronghorn occurring within the Kofa Subunit. Life history, including demographics, chronology of breeding and movements, diet, and other factors are discussed extensively in the 2016 Recovery Plan.

In the action area, Sonoran pronghorn historically occurred in valleys around the lower Gila river, likely including the King Valley within Kofa NWR until the early 1800's or early 1900's, although little information population size and specific areas used exists (Brown & Ockenfels 2007). As described in detail above in the Status of the Species, as of 2023, based on telemetry flights, there are approximately 212 pronghorn in the Kofa population. Based on telemetry locations, within the Kofa Subunit, Sonoran pronghorn primarily use the valley bottom and lower bajadas within King Valley of Kofa NWR and YPG, the Palomas Plains on the East Arm of YPG and areas to the south and east. There are a number of pronghorn detections in other areas of the Kofa Subunit including the west of Kofa NWR near Highway 95 and King Valley Road and to the north and east of Kofa NWR and YPG.

3.2 Factors affecting the species within the action area

Numerous factors affect the Sonoran pronghorn within the action area. These factors are discussed in detail in the Reasons for Listing/Threats Assessment of the 2016 Recovery Plan and are also summarized in the Threats section above. Many non-Federal activities that have affected the pronghorn are historical in nature, and pronghorn have been all but extirpated from private, state, and Tribal lands. As explained in the 2016 Recovery Plan, highways, fences, railroads, developed areas, and irrigation canals can block access to essential forage or water resources. Highways and railroads can also lead to vehicular and train collisions with Sonoran pronghorn. Additionally, canals can lead to Sonoran pronghorn drowning. Drought and warming exacerbated by climate change affect Sonoran pronghorn by reducing the availability of water, reducing forage quality, increasing thermal stress.

Because the action area is comprised of Federal lands, most activities that affect the Kofa pronghorn population or their habitat are Federal actions. The primary Federal agencies involved in activities in the action area include the Kofa NWR and YPG. For the purposes of section 7 of the Act, we treat a nonessential experimental population as a threatened species when the nonessential experimental is located within a National Wildlife Refuge or unit of the National Park Service. When nonessential experimental populations are located outside a National Wildlife Refuge or National Park Service unit, then for the purposes of section 7, we treat the population as proposed for listing. Because of how a nonessential experimental population is treated under section 7, only one formal section 7 consultation has been completed within the action area, in addition to this formal consultation. We issued a final biological opinion (# 02EAAZ00-2014-F-0161) to YPG on September 9, 2014, for Continued Operations at YPG (U.S. Fish and Wildlife Service 2014 p. All). In this biological opinion we assessed the potential impacts associated with current and future military activities and operations at YPG and anticipated incidental take of four Sonoran pronghorn on Kofa NWR due to fire on Kofa NWR

starting from activities carried out or authorized by YPG that either causes mortality or injury to Sonoran pronghorn or degrades their habitat. To date, YPG has not documented any incidental take of Sonoran pronghorn on Kofa NWR as a result of their activities.

4 EFFECTS OF THE ACTION – SONORAN PRONGHORN

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

Implementation of the Management Actions identified in the Kofa Wilderness Plan and Other Kofa Activities may result in some alteration of Sonoran pronghorn habitat and/or disturbance to Sonoran pronghorn for the duration of the proposed action, which is indefinite. For example, human presence, vehicle access, and gunfire may result in visual and/or auditory disturbance of Sonoran pronghorn and vehicles associated with the project could strike and injure or kill pronghorn. Conservation measures included in the proposed action, however, will help avoid and minimize potential impacts to Sonoran pronghorn. Furthermore, while some proposed activities are likely to result in adverse effects to Sonoran pronghorn, the proposed action will result in significant benefits to Sonoran pronghorn through the long-term protection of Sonoran pronghorn habitat and implementation of critical recovery actions.

4.1 Summary of Effects of Human Activities on Sonoran Pronghorn

The effects of human disturbance on wildlife and Sonoran pronghorn are detailed in the 2016 Recovery Plan (U.S. Fish and Wildlife Service 2016 pp. 68–73). In summary, human disturbance has the potential to affect the physiology, behavior, and ultimately, populations of Sonoran pronghorn. It has been well documented that human presence in wildlands can disturb animals, causing them to expend energy avoiding people that can lead to lowered reproductive success or increased risk of fatal encounters with humans (Kerley et al. 2002 p. 98), abandon all or portions of their ranges (Jorgenson 1988 p. 131; Sawyer et al. 2019 p. 7), and to experience physiological effects such as increased heart rate, blood pressure, and corticosteroid levels (U.S. Fish and Wildlife Service 2016).

A number of studies have specifically investigated the effects of human activities on Sonoran pronghorn (Landon et al. 2003, Krausman et al. 2004 and 2005, OPCNM 2013, Christianson 2017). Landon et al. (2003) evaluated whether Sonoran pronghorn used areas, as defined by noise levels produced by military aircraft, in proportion to their availability on the BMGR. Using 15% of the Arizona Sonoran pronghorn population, they studied pronghorn use of areas with varying sound pressure (ambient sound) levels and found that pronghorn did not use the areas with different ambient sound levels in proportion to their availability. In general, they found that Sonoran pronghorn select areas with the lower noise levels and avoid areas with the higher noise levels; however, they did not consider habitat in their analysis (Landon et al. 2003

p. 725). Whether pronghorn avoid these areas because of the noise or because of some other human-related factor is unknown; however, the various potential factors (i.e., noise levels, human presence, reduced vegetation or cover, disturbance) are interrelated.

Krausman et al. (2004) examined effects of military aircraft and ground-based activities on Sonoran pronghorn at the North and South tactical ranges (TACs) on the BMGR and concluded that military activities, both ground-based and aerial, were associated with some changes in behavior (e.g., from standing to trotting or running, or bedded to standing). On days with stimuli, adult pronghorn bedded more than they foraged. On days without stimuli, adult pronghorn foraged more and bedded less (Krausman et al. 2004 p. 16). Ground stimuli, including the presence of vehicles or people, comprised the majority (65%) of all anthropogenic stimuli. Ground stimuli were associated with 866 instantaneous changes in behavior (39%), with 56 of these changes resulting in trotting or running (2.6%) (Krausman et al. 2004 p. 25). In response to stimuli, Krausman et al. (2004) only considered a change in behavior to trotting or running in response to stimuli as biologically significant. The authors concluded that these changes were not likely to be detrimental to the animals; however, sightings of Sonoran pronghorn were biased towards disturbed habitats on the TACs and other areas of military activities, which also corresponded to areas of favorable ephemeral forage production (Krausman et al. 2005 p. 16). No specific conclusions could be drawn about effects of military activities on fawns during the Krausman et al. (2004) study, but the data suggests that fawns and their mothers may be more sensitive to anthropogenic stimuli than other pronghorn (Krausman et al. 2004 p. 33). In general, the study did not detect differences in the behavior of pronghorn with and without military stimuli; however, Krausman et al. (2004) recommends that all ground stimuli and activities that alerts or startles females and their fawns should be terminated.

Staff at (Organ Pipe Cactus National Monument 2013 pp. 26–27) documented that during their typical morning activity period (post-sunrise), pronghorn on OPCNM experienced some form of potential disturbance once every 4 hours 10 minutes. Actual disturbance responses took place once every 6 hours 15 minutes. Potential disturbance events resulted in the pronghorn running, about once every 8 hours 20 minutes. Helicopter overflights took place once every 6 hours 15 minutes; one out of four overflights resulted in pronghorn running, and one in four resulted in vigilance (standing, alert, watching disturbance source). Vehicles approaching within one mile occurred once every 12 hours 30 minutes. Half of these resulted in pronghorn running, but for the other half, the driver was contacted by radio and advised to drive slowly (<10 mph) past the observation area.

As reported in Christianson (2017), initial analysis of the data collected during the study showed evidence for several anthropogenic effects on Sonoran pronghorn suggesting the species is sensitive to human activity in the U.S. portion of its range. Responses to sources of disturbance such as roads and vehicles were widespread across the landscape and this study confirms that managers should consider impacts of vehicles on Sonoran pronghorn when conducting resource planning (Christianson 2017 p. 50). Behavioral observations confirmed that interactions with vehicles occur frequently and elicit strong behavioral responses (e.g., standing vigilant to

running from stimulus) while interactions with humans on foot occur far less often (Christianson 2017 p. 50). For example, eight Sonoran pronghorn were observed running a short distance and then remaining vigilant towards the utility vehicle noise 3.4 kilometers away. Another eight Sonoran pronghorn were observed running from several trucks traveling fast (> 25 mph). Pronghorn were initially vigilant when the vehicles were 1.3 kilometers away but soon started running, travelling over 3.6 kilometers in under five minutes until they were out of sight of the observers (Doerries 2014). Additionally, Sonoran pronghorn increased vigilance and decreased foraging time in response to proximity to road and human interactions. When interacting with humans (both motorized and non-motorized) Sonoran pronghorn decreased foraging time by approximately 25 percent (Christianson 2017 p. 5). Additionally, the mean proximity of Sonoran pronghorn to roads was many times farther (approximately 3.8 times) than mule deer (Christianson 2017 p. 30)

Human presence may cause Sonoran pronghorn to move from an area, thereby denying pronghorn access to that specific site for what may be crucial behaviors or functions (e.g., foraging, bedding, breeding, fawning, avoiding predators). Causing pronghorn to move also increases their physiological demands by expending calories and metabolic water. These may be critical stressors in seasonal hot-dry periods and in extended periods of low forage availability. Disturbance may also lead to mortality. Causing a pronghorn to be alarmed or agitated, or to flee from a disturbance, may also make it vulnerable to predation. This is especially true for fawns and females during the fawning season.

4.2 Motorized Vehicle Use

The use of motorized vehicles on the existing road system, regardless of operator or purpose, may disturb Sonoran pronghorn as a result of vehicle presence and associated noise and light pollution, degrade their habitat, or result in direct injury or mortality from collisions with vehicles. The potential effects from motorized vehicles may occur along the 360 miles of roads within Kofa NWR, but they are most likely to occur in areas where Sonoran pronghorn regularly occur, such as King Valley or other valley areas.

4.2.1 Disturbance

Roads within the refuge are low use dirt roads which do not impede Sonoran pronghorn movements. However, the presence of vehicles may result in disturbance to Sonoran pronghorn and avoidance of areas near roads. Disturbance from vehicles can cause pronghorn to startle and/or flee, travel farther distances to find suitable foraging, watering, and resting areas, and result in stress and short-term denial of access to habitat, all of which can result in adverse physiological effects or injury to pronghorn. Fleeing behavior can cause fawns to be abandoned or separated from their mothers, which can leave them vulnerable to predator attack or cause physiological stress that results in death. Sonoran pronghorn are especially susceptible to stress caused by disturbance during the fawning season due to increased energetic demands during this period. Particularly during drought years, due to the lower availability of forage and water resources and consequent decreased fitness of adults and fawns, disturbance may result in fawn and adult mortality.

The highest intensity of motorized use of the network of roads on Kofa is November through March (see Figure 6 in the BE) when winter public use of the refuge is at its peak. Therefore, disturbance to Sonoran pronghorn from public vehicle use is most likely during this period. The high public use period overlaps with the peak of Sonoran pronghorn fawning activities which occur in March and April. Disturbance from vehicle use to Sonoran pronghorn in fawning areas, such as the King Valley, during the fawning season may not only result in adverse effects of physiological stress to does and fawns but may cause fawns to be separated from their mothers which can result in death.

Motorized use decreases in April and is low (less than 1,000 vehicles per month or approximately 33 vehicles per day across the entire 360 miles of roads within Kofa) in the hot dry season of June and July and begins to increase in October. However, the hot/dry season, prior to monsoons, is very stressful to Sonoran pronghorn, especially to does and fawns, due to the high temperatures and poor forage conditions. This stressful situation can be intensified if monsoon storms fail to materialize. Therefore, even the lower levels of vehicle use in the summer may result in adverse effects to Sonoran pronghorn resulting in both physiological stress and potential mortality.

Agency use of roads in the summer (and winter) is to conduct patrols, care for the Sonoran pronghorn captive breeding population, ensure water availability for wildlife including Sonoran pronghorn, maintain wildlife monitoring equipment, and to inventory and treat non-native invasive plant species. While agency use of roads in the summer may lead to some disturbance of Sonoran pronghorn, the purpose of the road use is to maintain or improve Sonoran pronghorn populations and their habitat; therefore, we anticipate these activities will have beneficial effects on Sonoran pronghorn. Furthermore, Kofa NWR staff will implement conservation measures (e.g., scheduling projects outside of the fawning and hot/dry season when possible, staging equipment and personnel outside of occupied Sonoran pronghorn habitat for aerial operation) to avoid and minimize disturbance to Sonoran pronghorn from their vehicular use of refuge roads. Use of roads outside of suitable Sonoran pronghorn habitat will not have an effect to the species in these areas.

4.2.2 Vehicle Collisions

Vehicles associated with the proposed action have the potential to collide with pronghorn causing injury and/or death, but the risk of such collisions is very low under the existing speed limits on the Refuge (i.e., 25 mph). The greatest risk of collision is on King Valley Road near the semi-captive breeding pen due to the higher relative abundance of pronghorn in the area. While Sonoran pronghorn mortalities due to vehicle strikes have been documented numerous times on highways, no mortality associated with a vehicle collision has ever been documented on the Refuge. Refuge roads are unpaved, poorly maintained, and of native material therefore highway speeds are not attainable. Evidence suggests that one Sonoran pronghorn was struck and killed by a vehicle dirt road north of the BMGR, but this dirt road was a high speed, two-lane well maintained dirt road. Conservation measures #6 (slower vehicle speeds if Sonoran

pronghorn are encountered), #1 (vehicle use of authorized roads only), and #2 (speed limit of 25 mph), will further minimize the risk of vehicle collisions with Sonoran pronghorn. The duration of the proposed project is indefinite, and we anticipate the Kofa pronghorn population may grow beyond the current estimated size. Therefore, the likelihood of a pronghorn being struck by a vehicle could increase over time as the population increases.

4.2.3 Habitat disturbance

In addition to disturbing pronghorn, vehicle use of roads can degrade habitat which can adversely affect Sonoran pronghorn. Vegetation trampling by vehicles within portions of the 100-foot travel pull-off zone along all Kofa NWR road is anticipated to reduce Sonoran pronghorn forage. However, this impact is limited by the requirement that hardened/compacted sites free of vegetation should be used for parking and/or camping. Motorized vehicle use of roads within Kofa NWR may also serve as a vector for non-native invasive plant species which negatively impact Sonoran pronghorn habitat by outcompeting native forage species. Small infestations of Russian thistle (*Salsola tragus*), African daisy (*Osteospermum* sp.), and Malta star-thistle (*Centaurea melitensis*) are likely caused or facilitated by vehicles.

4.3 Non-motorized Use

Non-motorized recreational use (e.g., hiking, back country camping, hunting) and agency actions (e.g., habitat/wildlife monitoring, military debris removal including unexploded ordnance removal, and public interpretation on the Kofa NWR) are likely to adversely affect Sonoran pronghorn through continued disturbance to and degradation of their habitat. Similar to motorized travel, non-motorized travel within Kofa NWR may serve as a vector for non-native invasive plant species which negatively impact Sonoran pronghorn habitat by outcompeting native forage species. Because many of these activities largely occur outside of Sonoran pronghorn habitat, we anticipate they will result in occasional but ongoing adverse effects to Sonoran pronghorn. Non-motorized public use is greatest in the winter months, typically between October and March, when Sonoran pronghorn are less stressed due to cooler weather and better range foraging conditions.

4.3.1 Agency management activities

Some non-motorized agency management actions (e.g., caring for Sonoran pronghorn in the captive breeding pen, hiking to check on water resources, conducting wildlife and habitat surveys, and monitoring equipment) regularly occur within Sonoran pronghorn habitat and as such may result in adverse effects by disturbing Sonoran pronghorn. Many of these activities occur in the summer, when Sonoran pronghorn are most stressed; however, agency staff will implement conservation measures to avoid and minimize adverse effects to Sonoran pronghorn. Furthermore, many of these actions will have a beneficial effect to the Sonoran pronghorn by furthering recovery of the species. The effects of agency actions are further discussed in sections 4.4 and 4.5 below.

4.3.2 Hiking and camping

Hiking and camping are greatest in the high public use period between October and March and nearly ceases in the summer months. These activities may result in adverse effects by disturbing Sonoran pronghorn and temporarily displacing them from areas being used by recreationists. Because camping is not permitted within ¼ mile of water sources (conservation measure #16), the risk of displacing Sonoran pronghorn from camping activities should be minimized. Also, because camping nearly ceases in summer months, Sonoran pronghorn are anticipated to have unencumbered access to developed water sources during the hot/dry season, when such access is most critical to the health and survival of Sonoran pronghorn.

Kofa NWR staff periodically host interpretive hikes, approximately two annually, for the public. These hikes occur in the winter months and most often occur outside of Sonoran pronghorn habitat. Interpretive hikes generally benefit Sonoran pronghorn by heightening public awareness of and sensitivity toward Sonoran pronghorn. Although these hikes most often occur outside of Sonoran pronghorn habitat, motorized vehicle travel is used to access meeting areas and may adversely affect Sonoran pronghorn as described in the Motorized Vehicle Use section. Although not anticipated, hikes occurring within Sonoran pronghorn habitat may impact Sonoran pronghorn and their habitat as described in section 4.3.

4.3.3 Stock animals

Stock animals used for recreation (i.e., horseback riding) may adversely affect Sonoran pronghorn through disturbing them and degrading their habitat by introducing invasive plant species and consuming small quantities of forage for Sonoran pronghorn. The use of pelletized feed is recommended which may lessen the probability of invasive plant introductions and reduce the consumption of native forage by stock animals. Displacement of Sonoran pronghorn at water sources by stock animals is not anticipated because recreationists are required to pack water. Overall, stock animals are anticipated to adversely affect Sonoran pronghorn but the effect should be minimized because the amount of forage consumed by stock animals is relatively small given the scale of the refuge, pelletized feed is recommended, invasive plants are removed where found by refuge staff, and there is no effect to water resources given the requirement to provide water.

4.3.4 Military debris removal

Removal of military debris including unexploded ordinance may have similar adverse effects on Sonoran pronghorn as other non-motorized (and motorized) travel described above (e.g., disturbance, habitat degradation) but may also have a beneficial effect on pronghorn by removing these hazards.

4.4 Habitat, Road, and Facilities Management Actions

4.4.1 Traffic control

The installation of traffic control signs, fences and barriers are undertaken when needed to limit motorized travel to designated routes. Although many of these vehicle traffic controls are already in place, periodic replacement and maintenance is needed to ensure functionality. The

presence of staff/volunteers and noise associated with the use of hand tools while installing or maintaining traffic control signs, fences and barriers, and checking rain gauges (and other scientific data collection equipment) may adversely affect Sonoran pronghorn by disturbing or temporarily displacing them. This disturbance is typically less than one day, but often less than one hour. Vegetation trampling and removal may occur during installation, maintenance and/or data collection but this impact is insignificant due to the small amount (a few plants) of vegetation removed at sites. Installation of motorized vehicle control materials may result in minor and infrequent disturbance to Sonoran pronghorn and their habitat but overall, they are anticipated to benefit the species because these actions protect Sonoran pronghorn habitat. Additionally, conservation measures, such as will be implemented to avoid impacts to Sonoran pronghorn.

4.4.2 Road maintenance

Road maintenance may adversely affect Sonoran pronghorn through disturbance and habitat degradation. Backhoes and road graders required to fix badly damaged roads may cause Sonoran pronghorn to flee or avoid the area of repair during work, which typically take less than one day. Road maintenance occurs less than 10 times a year, but not all of the maintenance is in Sonoran pronghorn habitat. Because road maintenance may occur any time of the year, Sonoran pronghorn may be particularly susceptible to the stress of disturbance during the hot/dry season. However, conservation measures (e.g., conservation measure #s 4, 6, 7, 8, 9) should minimize impacts to Sonoran pronghorn from such work.

Road maintenance may degrade a small amount of Sonoran pronghorn habitat, however, maintaining the roads also helps prevent further habitat degradation by facilitating safe travel on designated roadways. Without proper maintenance, vehicles drive around damaged roads or obstacles in the road, crushing vegetation and forage, causing further erosion, and disrupting the natural hydrology of the area.

4.4.3 Water enhancement and construction and supplemental feed

Future water infrastructure/sources may be enhanced or constructed within Kofa NWR to benefit wildlife species, including Sonoran pronghorn. While providing water to Sonoran pronghorn is highly beneficial, pedestrian, vehicle, and helicopter activity associated with construction or enhancement of waters will likely adversely affect Sonoran pronghorn through disturbance and minor habitat degradation. Construction may occur at any time of the year and if the waters are constructed during the fawning and hot/dry summer months, disturbance could result in severe stress to Sonoran pronghorn. However, conservation measure #4 requires projects be scheduled outside of the fawning and hot/dry season when possible; therefore, the risk of disturbing Sonoran pronghorn during this stressful period should be minimized but not eliminated. Potential disturbance to Sonoran pronghorn due to construction activities will be relatively short term in duration as each water site takes approximately 3 – 7 days to complete and should be infrequent, as waters will be constructed occasionally as needed to support Sonoran pronghorn and as funding and personnel resources allow. Additionally, implementation of conservation measures (e.g., #s 6, 7, 8, 9, 12), will help minimize disturbance to Sonoran pronghorn from

water construction and enhancement. Construction of the waters will result in some disturbance to vegetation (potential forage resources) and soil, but the size of the disturbance is relatively small (less than one acre per site).

Providing supplemental feed during drought conditions may adversely affect Sonoran pronghorn by disturbing them as staff drive and walk to sites to deliver the feed. However, such disturbance will be short-lived because it only takes minutes to deliver the feed and will only occur occasionally when forage conditions are very bad.

Although construction and enhancement of waters may result in short-term adverse effects to Sonoran pronghorn, continuing to provide perennial water through enhancing and constructing new waters and providing supplemental feed should benefit the pronghorn population by increasing adult and fawn survival and fawn recruitment (the survival of fawns to breeding age) during periods of drought and poor forage production (Hervert et al. 2000; Bright & Hervert 2005). Historically, Sonoran pronghorn had much greater access to greenbelts and perennial water sources, such as the Gila and Sonoyta rivers. Currently, however, lack of access to these areas, drought conditions, and significant amounts of human activities throughout the pronghorn range make it necessary to augment the natural supply of water and forage to avoid extirpation of pronghorn in the U.S. Given that fawns, pregnant does, and lactating does have greater water and energy requirements than the species on average (Krausman et al. 2004), the need for perennial water and enhanced forage to maintain population recruitment is apparent. A study suggested that selective foraging on chainfruit cholla cactus by pronghorn during droughts (due to its high water content) may reduce recruitment in the population as this plant has little nutritional value, and, while it may keep pronghorn alive longer in drought, it is probably not sufficient for growing fawns (Bright & Hervert 2005). Supplemental feed should provide nutritious forage and aid in fawn growth and survival. Access to water is also essential for digestion of food and for keeping the body cool.

4.4.4 Water hauls and maintenance

Water hauls and maintenance of water facilities may adversely affect Sonoran pronghorn through disturbance if present at the waters or along ingress and egress routes during implementation of the activity. Given the high priority of providing water for wildlife including Sonoran pronghorn, implementation of all conservation measures (e.g., #4) may not be feasible. Water hauling and maintenance operations undertaken during the summer months, when Sonoran pronghorn are most susceptible to mortality induced by stress, may result in severe adverse effects. Sonoran pronghorn may be displaced when staff are present as described in the motorized and non-motorized sections because water is hauled via truck and trailer to staging areas along the existing roads and pumped via hose lay or hauled via helicopter from a staging area to the water facility. Sonoran pronghorn also be disturbed by helicopters that are sometimes used to haul water. When flight routes can be chosen to avoid areas used by Sonoran pronghorn, potential disturbance will be greatly minimized; however, this cannot always be achieved. Given the short-term duration of each water haul event, potential disturbance to or displacement of Sonoran pronghorn will be relatively short-lived (one to two days per site) but could still

result in adverse effects given the critical time of year (hot, dry summer months) when water hauls occur.

Checking water levels and conducting minor maintenance activities may result in adverse effects to Sonoran pronghorn through disturbance consistent with motorized vehicle and non-motorized use. Such potential disturbance will be ongoing but intermittent (monthly) and short-lived, as checking water levels and conducting minor maintenance is completed within minutes to hours. Importantly, maintenance of water facilities and water hauls within Sonoran pronghorn habitat will have a long-term beneficial effect to the species by providing water, as described in the section above.

4.4.5 Invasive plant control

Invasive plant treatments will be accomplished by hand removal and, in situations where hand removal is not feasible, herbicide application. The adverse effects of staff presence associated with this activity are consistent with the motorized and non-motorized impacts, as inventory for and treatment of invasive plants involves hiking and the use of vehicles, including temporary disturbance to Sonoran pronghorn if they occur in or near the treatment area. Additionally, herbicide application may result in some adverse effects to Sonoran pronghorn if they consume glyphosate herbicides, as evidence suggests that glyphosate can cause health problems in vertebrates ranging from endocrine disruption to neurotoxicity (Myers et al. 2016 p. 7). While some adverse effects may occur, overall, we anticipate Sonoran pronghorn habitat will benefit from removal of invasive plants because they threaten pronghorn habitat by outcompeting native plants that pronghorn rely on as forage and cover and can lead to increased fire frequency.

The Environmental Protection Agency (EPA) released an interim decision (ID) in 2020 that found there are no risks of concern to human health when glyphosate is used in accordance with its current label but identified potential ecological risks to non-target organisms, primarily non-target plants through spray drift (Environmental Protection Agency 2022). However, the EPA is currently revisiting the decision in response to a legal challenge. Overall, the risk to Sonoran pronghorn from herbicide application on the refuge is considered to be low because herbicides will be applied as directed by the label. The possibility of Sonoran pronghorn ingesting glyphosates is very low because herbicides will be applied only to target species and in small areas (up to 500 acres per year) relative to the size of Kofa and in many cases. The risk of ingestion is further reduced because herbicides are applied at the lowest rate necessary primarily using spot treatments to individual plants. Therefore, due to the very small areas being treated and because application is usually in the form of spot treatments, we conclude the effect of herbicide exposure to Sonoran pronghorn is insignificant. Because habitat conditions for the species will be maintained or improved by the removal of invasive plant species, invasive plant treatments will have a benefit to Sonoran pronghorn.

4.4.6 Area closures

Closures of sensitive habitat may be implemented to protect animals and plants. Installations of signs, fences, and barriers required to close an area will have similar adverse effects as the

installation of traffic control signs, fences, and barriers discussed above in this subsection. However, if closures are implemented to protect Sonoran pronghorn, they will have a long-term beneficial effect by protecting habitat by eliminating public access throughout the duration of the closure. For example, public access is restricted at the Kofa Sonoran pronghorn captive breeding pen located centrally within the refuge to reduce disturbance to pronghorn in the pen.

4.4.7 Land acquisition and exchange

Land acquisitions and exchanges may occur within boundaries of the refuge. Although largely administrative, these actions may benefit Sonoran pronghorn by putting acquired lands into conservation status. This beneficial effect is limited to inholdings with potential Sonoran pronghorn habitat. Land acquisitions outside of Sonoran pronghorn habitat will not affect the species or habitat.

4.5 Wildlife Management

4.5.1 Wildlife and Vegetation Monitoring and Surveys

Wildlife monitoring includes both motorized vehicle and non-motorized travel, the effects of which are described in the motorized and non-motorized use sections above regardless of monitoring activity (camera trapping, audio surveys, pedestrian and auto surveys, and mist netting). These ongoing activities are anticipated to last a few minutes to a few hours.

Sonoran pronghorn monitoring is covered under recovery permit #s TE676811-10 (Region 2 Regional Director permit) and TE078347-1 (CPNWR's permit) and is also addressed here. Biennial surveys conducted by fixed-wing planes may adversely affect Sonoran pronghorn through disturbance due the low altitude at which they fly (200 ft AGL). Because, however, these surveys only occur every two years and take seven to eight days to complete, this potential disturbance will be relatively short-lived and occasional.

Monitoring via periodic aerial and ground telemetry, as well as by using motion-activated cameras, may also adversely affect Sonoran pronghorn through disturbance. Aerial telemetry is conducted much more frequently than aerial surveys (i.e., about every other week). However, because aerial telemetry is conducted from fixed-wing planes at least 1,000 ft AGL to avoid disturbance to pronghorn, we anticipate this activity will have minimal effects on the species. As described above in the Motorized Vehicle Use Section, vehicle use and personnel on the ground associated with ground telemetry and the use of motion-activated cameras may disturb pronghorn during ingress and egress to monitoring sites or during monitoring itself. That said, ground telemetry is only conducted occasionally, therefore potential disturbance from this activity will be infrequent. Setting and checking cameras is normally done in conjunction with other pronghorn management activities (checking waters, irrigating forage plots, and adding alfalfa hay) and therefore should add only a nominal amount disturbance to baseline conditions.

As described above in the Motorized Vehicle Use Section, vehicles used for monitoring activities could also collide with pronghorn causing injury and/or death. However, adherence to speed

limits should reduce this risk. Vehicular activity associated with monitoring will be along authorized roads; therefore, habitat disturbance from vehicles should be minimal.

Some aspects of bighorn sheep survey flights, which occur every two or three years but may occur annually if warranted, may adversely affect Sonoran pronghorn through disturbance. Surveys are conducted outside of Sonoran pronghorn fawning season and are completed by helicopters. While low-flying and hovering helicopters are known to elicit behavioral responses in Sonoran pronghorn, because bighorn sheep surveys are focused in mountainous areas not typically used by Sonoran pronghorn, we do not anticipate that these flights will disturb Sonoran pronghorn. Helicopter staging, however, may occur in potential Sonoran pronghorn habitat. If it does, helicopter and other human activity at the staging site may displace Sonoran pronghorn within three miles of the staging area for up to one week at each site (three weeks total). Staging areas are currently chosen outside of the current Sonoran pronghorn distribution, but if Sonoran pronghorn expand their range into or near staging areas, disturbance is more likely to occur. Flights between bighorn sheep habitat and staging areas, which are above 500 feet AGL, may result in a disturbance to Sonoran pronghorn for a few seconds. However, given the short duration of flights over Sonoran pronghorn habitat, minimal flight elevation, and occasional nature of such flights (approximately every two to three years), such disturbance should be infrequent and very short-lived.

Mule deer and javelina aerial surveys occur every other year and take less than one week to complete. Because these surveys are conducted at 150-200 AGL, they may disturb Sonoran pronghorn. To minimize the effects of such disturbance, these survey are conducted outside of the Sonoran pronghorn fawning season

4.5.2 Hunting

Hunting has similar impacts to Sonoran pronghorn as other non-motorized recreation because it largely occurs in the winter months (October through February) and is similar to hiking with the additive effects of noise associated with gunshots and dog presence. Quail, cottontail rabbit, coyote, and fox hunting season overlaps with the Sonoran pronghorn fawning season in early February for two weeks and therefore may result in the disturbance of Sonoran pronghorn including fawns. Hunting of coyotes could benefit Sonoran pronghorn by reducing predator abundance, but this activity is thought to occur infrequently and therefore likely has a negligible beneficial effect to the species.

Noise associated with gunshots may result in adverse effects by disturbing Sonoran pronghorn. This disturbance can cause pronghorn to startle and/or flee, travel farther distances to find suitable foraging, watering, and resting areas, and result in stress and short-term denial of access to habitat, all of which can result in adverse physiological effects or injury to pronghorn. Fleeing behavior can cause fawns to be abandoned or separated from their mothers, which can leave them vulnerable to predator attack or cause physiological stress that results in death. Sonoran pronghorn are particularly susceptible to stress caused by disturbance during the fawning season due to increased energetic demands during this period. The prohibition of target shooting is

anticipated to minimize the adverse effects of noise disturbance associated with gunshots than if allowed.

The use of dogs for quail and cottontail rabbits may result in adverse effects by disturbing Sonoran pronghorn. Quail and cottontail season will overlap with about the first two weeks of Sonoran pronghorn fawning season, therefore dogs associated with this hunt will have the greatest chance of affecting does with fawns or fawns. Very young fawns could not flee from a dog and could be vulnerable to being injured or killed by a dog. Because refuge regulations require that dogs be under the control of owners/hunters at all times, the risk of a dog harming a fawn will be minimized but not eliminated. Even if dogs are under control of hunters, the presence of dogs with hunters during quail and cottontail season could lead to general disturbance (e.g., increased vigilance, fleeing) of all Sonoran pronghorn (not just does with fawns and fawns as discussed above). Because the majority of hunting will occur during the cooler fall and winter months, disturbance from hunting dogs will mostly occur when Sonoran pronghorn are less physiologically stressed. Should severe, prolonged drought pose a threat to Sonoran pronghorn recovery, even during the cooler fall or winter months, the option of seasonal closures of select critically important pronghorn areas on the refuge to public use (Conservation Measure #17) can minimize the risk of hunting dog disturbance to Sonoran pronghorn in those areas during this stressful period, if this option is implemented. In conclusion, we anticipate the use of dogs for quail and cottontail hunting may adversely affect Sonoran pronghorn.

Because hunters are allowed to hunt at Sonoran pronghorn waters, hunters may affect Sonoran pronghorn using waters by disturbing them or could exclude them from waters due to hunter presence. Disturbance is expected to be greatest when hunters are scouting for quail and deer. Hunter disturbance of Sonoran pronghorn at waters could cause severe physiological stress (e.g., dehydration) to Sonoran pronghorn, particularly during times of extended drought. We anticipate, however, that this will rarely occur for the following reasons:

- The most popular game species, mule deer and quail, reduce use of developed waters during hunting seasons (October to February) (Kofa NWR 2022; personal observation P. Sitzmann).
- Sonoran pronghorn use of waters is also generally low during these hunts (October through February).
- Sonoran pronghorn typically use waters from April through September when hunting is not permitted on Kofa NWR.

In conclusion, disturbance to or displacement of Sonoran pronghorn by hunters should be rare, but we anticipate it is likely to occur over the indefinite duration of the action. Therefore, we anticipate that use of waters by hunters to hunt game may adversely affect Sonoran pronghorn.

There is a slight possibility Sonoran pronghorn may be mistakenly killed during hunting activities, but this is expected to be very rare. According to AZGFD, very rarely do hunters shoot the wrong species and there have been no documented accidental shootings of a Sonoran

pronghorn since the subspecies' reintroduction to Kofa NWR in January 2013 (Cabeza Prieta National Wildlife Refuge 2020). Accidental shooting of a Sonoran pronghorn by a bighorn sheep hunter is very unlikely to occur because Sonoran pronghorn and bighorn sheep habitat typically do not overlap (most impacts from bighorn sheep hunters will be in the mountains away from suitable pronghorn habitat). In conclusion, accidental shooting should be rare, but we anticipate it could occur over the indefinite duration of the action. Therefore, we anticipate that accidental shooting may adversely affect Sonoran pronghorn.

4.5.3 Predator Management

Predator management actions would be triggered if a predator, such as mountain lions, bobcats, and coyotes, have keyed in on priority a management species including bighorn sheep and Sonoran pronghorn. Predator monitoring and removal operations, particularly if done using a vehicle or aircraft, may adversely affect Sonoran pronghorn by disturbing them and degrading their habitat as described in the motorized vehicle section and wildlife monitoring subsection above. Because this type of predator control should occur infrequently, potential adverse effects through disturbance to Sonoran pronghorn would be occasional and short-lived. Additionally, the select removal of predators that have keyed in on Sonoran pronghorn would be beneficial to Sonoran pronghorn.

4.5.4 Feral and Trespass Animal Management

The management of feral and trespass animals on Kofa NWR may adversely affect Sonoran pronghorn through disturbance and habitat degradation, consistent with motorized vehicle and non-motorized vehicle use. If the removal must occur during the Sonoran pronghorn fawning and hot/dry season, such disturbance may result in severe physiological stress if conducted within Sonoran pronghorn habitat. However, prompt removal of feral and trespass animals will have an overwhelmingly beneficial effect on Sonoran pronghorn by reducing the risk of disease transmission from cattle to pronghorn and minimizing impacts to Sonoran pronghorn forage and water resources. As explained in the 2016 Recovery Plan, feral livestock can damage Sonoran pronghorn habitat by spreading invasive plants, overgrazing forage, causing erosion, and compacting soil. Given the relatively small and isolated water sources on Kofa NWR, feral animals and trespass livestock could quickly deplete water sources important to Sonoran pronghorn. Additionally, burros are known to exclude native wildlife species from water sources (Weaver 1974). Cattle may also transmit diseases such as bluetongue and epizootic hemorrhagic disease to Sonoran pronghorn (U.S. Fish and Wildlife Service 2016).

4.5.5 Sonoran Pronghorn Breeding Pen

Sonoran pronghorn breeding pen activities at the Kofa NWR pen and translocation activities are covered under recovery permit #s TE676811-0 (Region 2 Regional Director permit) and TE078347-1 (CPNWR's permit), and the special rule in the 10(j) rule to establish a nonessential experimental population of Sonoran pronghorn in Arizona and therefore not addressed here.

4.5.6 Captures and Translocations

Captures and translocations of Sonoran pronghorn and bighorn sheep may adversely affect Sonoran pronghorn; however, capture and translocation of pen-raised pronghorn is covered under recovery permit #s TE676811-0 (Region 2 Regional Director permit) and TE078347-1 (CPNWR's permit) and the special rule in the 10(j) rule to establish a nonessential experimental population of Sonoran pronghorn in Arizona (U.S. Fish and Wildlife Service 2011), and therefore not further addressed here. Aerial operations associated with bighorn sheep captures and translocations may adversely affect Sonoran pronghorn through disturbance as described below in this paragraph and above in the effects of wildlife monitoring subsection of this biological opinion. Sonoran pronghorn may be temporarily displaced from staging areas for helicopters and staff needed for the captures for up to one week per year. If shuttle flights for captures occur over occupied Sonoran pronghorn habitat, Sonoran pronghorn may be disturbed for a short duration while the aircraft is nearby. Low level flights and landings for the purpose of capturing bighorn sheep will occur in mountainous terrain not anticipated to be occupied by Sonoran pronghorn, therefore, Sonoran pronghorn should not be affected from this aspect of bighorn sheep captures. While some aspects of bighorn sheep captures and translocations may adversely affect Sonoran pronghorn through disturbance, these potential adverse effects to Sonoran pronghorn will be reduced because captures occur in the winter which is outside of Sonoran pronghorn fawning and hot/dry season and a less physiologically stressful.

4.5.7 Mountain Lion, and Bobcat Studies

Capture efforts of mountain lion and bobcat for scientific study may adversely affect Sonoran pronghorn through disturbance. The effects of staff travel to trap location(s) are consistent with the effects described in the Motorized and Non-Motorized Use sections above. Traps within Sonoran pronghorn habitat will include a fence to exclude the species, therefore, the risk of unintentional capture of Sonoran pronghorn is very low to the point of being discountable. Although some adverse effects to Sonoran pronghorn may occur, the study of depredating wildlife species could increase our knowledge of predator interactions with Sonoran pronghorn which may aid in the management and recovery of the species.

For effects of hunting on Sonoran pronghorn, see the "Non-motorized Use" section above.

4.6 Special Use Permits

The effect of activities requiring Special Use Permits to Sonoran pronghorn depend upon the specific action. We anticipate that guided hunts, scientific studies, filming, and recreational activities requiring a permit will have a similar effect as described in the motorized and non-motorized sections. To minimize effects to Sonoran pronghorn and their habitat from these activities, each application will be reviewed to ensure the approved activities are consistent with current management and stipulations and conservation measures will be mandated where appropriate. Where changes are not feasible, the Special Use Permit may be denied or require additional Section 7 consultation. Right-of-Way maintenance activities will be reviewed for Section 7 compliance and if necessary, additional Section 7 consultation may be required.

4.7 Public Outreach

Public outreach events carried out by USFWS staff are not likely to disturb Sonoran pronghorn or their habitat because most outreach events occur outside of Sonoran pronghorn habitat. Additionally, public outreach about Sonoran pronghorn is provided to participants which may have a beneficial effect to the species.

4.8 Fire Management

Wildfires will be allowed to burn naturally unless they threaten private property, have other than low potential for spreading beyond the planning area, or present a significant threat to unique natural resources (i.e., native palms, the Kofa Sonoran pronghorn captive breeding pen, etc.), or health and safety for the public. Wildfires that necessitate a suppression response will be consulted on under emergency consultation. Given the wilderness status of most of Kofa NWR and the presence of Sonoran pronghorn in some areas, Minimum Impact Suppression Technique guidelines will be applied, which should reduce impacts to Sonoran pronghorn and their habitat.

Unmanaged wildfires, if decided to remain unmanaged consistent with the Kofa NWR Wilderness Plan, are anticipated to be rare and small in size given the low amount and discontinuous fuel loads typically present on the refuge. Wildfire may destroy or damage vegetation, resulting in a temporary loss of forage resources and/or thermal cover for Sonoran pronghorn over multiple years. Reduced cover could lead to increased predation of fawns. Additionally, wildfire may temporarily displace Sonoran pronghorn and could injure or kill fawns if they are too young to flee the oncoming fire. Although fire can cause many temporary adverse effects to Sonoran pronghorn habitat, over a longer time period, fire can cause increases in annual forbs and lengthen the green-up period which is beneficial to Sonoran pronghorn. Therefore, unmanaged wildfire may have variable effects on Sonoran pronghorn.

On very rare occasions large fires may occur on Kofa NWR. For example, the King Valley Fire, ignited due to munitions impact on YPG, is the only major documented fire originating on YPG in over 70 years of military testing and training activities. In addition to burning 3,000 acres on YPG, it burned 26,000 acres on Kofa NWR for a total of about 29,000 acres. This type of fire event is only made possible by exceptional amounts of precipitation and resulting vegetation growth. YPG consulted on the effects of munitions firing that results in fire spreading to Kofa NWR (see biological opinion # 02EAAZ00-2014-F-0161, issued on September 9, 2014), therefore, this will not be analyzed in this biological opinion.

4.9 Conservation Measures

As described throughout the effects analysis, conservation measures included in the proposed action will minimize adverse effects to Sonoran pronghorn. For example, conservation measure numbers 1 (limiting motorized travel to existing designated roads) and 3 (installing signs and/or barriers where necessary to protect habitat) will protect Sonoran pronghorn habitat. Conservation measure numbers 1 (limiting motorized travel to existing designated roads), 2 (limiting vehicle speed to 25 miles per hour for all refuge users), 6 (reducing vehicle speed to 10 mph or slower if a driver sees a Sonoran pronghorn), and 7 (stopping a vehicle and waiting to

continue until a running Sonoran pronghorn is out of sight) will minimize the risk of vehicle strikes with Sonoran pronghorn. Other conservation measures, such as number 4 (scheduling projects outside of the fawning and hot/dry season when possible) and number 12 (staging equipment and personnel outside of occupied Sonoran pronghorn habitat for aerial operation) will minimize disturbance to Sonoran pronghorn. In addition to these conservation measures, importantly, Kofa NWR provides large expanses of protected habitat for Sonoran pronghorn and is committed to the recovery of Sonoran pronghorn, as evidenced by their ongoing implementation of critical recovery actions such as operating a Sonoran pronghorn breeding program, installing and maintaining Sonoran pronghorn waters, and monitoring Sonoran pronghorn.

5 CUMULATIVE EFFECTS – SONORAN PRONGHORN

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

Most lands within the action area (Kofa NWR) are managed by the U.S. Fish and Wildlife Service; thus, most activities that could potentially affect Sonoran pronghorn are Federal activities that are subject to section 7 consultation. The effects of these Federal activities are not considered cumulative effects. Therefore, no cumulative effects are anticipated.

6 JEOPARDY ANALYSIS – SONORAN PRONGHORN

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.

6.1 Jeopardy Analysis Framework

Our jeopardy analysis relies on the following:

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

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

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

survival and recovery of the species;

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

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

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

6.2 Conclusion

We determined that the activities described in the proposed action could adversely affect Sonoran pronghorn resulting in lethal and non-lethal take. However, after reviewing the current status of the Sonoran pronghorn, the environmental baseline for the action area, the effects of the action, as proposed, and the cumulative effects, it is our biological opinion that Kofa NWR ongoing and future operations, as proposed, is not likely to jeopardize the continued existence of the Sonoran pronghorn. No critical habitat has been designated for this species; therefore, none will be affected. We base this conclusion on the following:

1) Most of the activities described in the proposed action have been ongoing since before Sonoran pronghorn were reintroduced to Kofa NWR. Since 2013, the Kofa Sonoran pronghorn population has grown to an estimated 212 animals with, and partially because of (e.g., developing and maintaining waters), the proposed action. Continued implementation of the proposed action, therefore, is not anticipated to significantly affect the distribution, numbers, and reproduction numbers of Sonoran pronghorn in the wild.
2) The proposed action will not result in the loss of or further fragmentation of Sonoran pronghorn habitat beyond baseline levels. Thus, the proposed action is not expected to significantly affect the distribution of Sonoran pronghorn in the wild.
3) There is a risk that activities associated with Kofa NWR ongoing operations may disturb, injure, or kill Sonoran pronghorn on Kofa NWR. However, conservation measures included in the proposed action help reduce disturbance to Sonoran pronghorn and their habitat, as well as the risk of injury or death of Sonoran pronghorn on Kofa NWR from ongoing and future operations. Among these measures are prohibiting camping within ¼ mile of developed water sources, limiting motorized travel to existing roads, limiting vehicle speeds to 25 miles per hour, avoiding conducting wildlife surveys during the pronghorn fawning season, etc. Many of the conservation measures were identified to have beneficial effects. Importantly, many activities associated with the proposed action are designed to advance the recovery of Sonoran pronghorn. Thus, the project is not expected to significantly affect the distribution, numbers, and reproduction of Sonoran pronghorn in the wild.

4) The proposed action will occur within the range of the Kofa population of Sonoran pronghorn in Arizona, one of two nonessential experimental populations of Sonoran pronghorn in the United States and one of five total populations of Sonoran pronghorn within the United States and Mexico. The Kofa population occurs primarily on federally managed lands in Arizona, including Kofa NWR, YPG, and BLM lands, and represents approximately 21% of all Sonoran pronghorn in the United States and Mexico. As explained above, conservation measures will minimize effects of the proposed action on this population of Sonoran pronghorn. Therefore, the proposed action will not have an appreciable impact on the population at the rangewide scale. Thus, the proposed action is not expected to reduce appreciably the likelihood of both survival and recovery of the Sonoran pronghorn in the wild by reducing the reproduction, numbers, or distribution of the species.
5) Any action that significantly reduces the likelihood of achieving the recovery criteria (see the Description, Legal Status, and Recovery Planning section under Status of the Species) is likely to cause Sonoran pronghorn to pass the tipping point for recovery. The proposed action will not preclude the achievement of these six recovery criteria, and therefore not likely to cause Sonoran pronghorn to reach the tipping point for recovery, for the reasons described below. In contrast, the proposed action will further the recovery of the species.
    a) The adverse effects of the activities in the proposed action will not appreciably reduce the likelihood and ability of the Kofa subunit (i.e., the action area) to sustain a viable population of 150 Sonoran pronghorn. While the proposed action is likely to adversely affect Sonoran pronghorn in the action area, including disturbing and possibly injuring or killing pronghorn, conservation measures will help to significantly minimize the risk of these potential impacts. Importantly, Kofa NWR continues to implement recovery actions for the Kofa population of Sonoran pronghorn thus aiding in the achievement of recovery criterion number 1. Since the reintroduction of Sonoran pronghorn to the Kofa subunit in 2013, the population has grown, through augmentation and reproduction in the wild, from 9 to approximately 212 animals.

    b) The proposed action does not include new construction, roads, or other barriers in Sonoran pronghorn habitat; therefore, it will not reduce the amount of, nor fragment current Sonoran pronghorn habitat. In contrast, ongoing management of Kofa NWR helps achieve recovery criterion number 2 through protecting contiguous Sonoran pronghorn habitat, including key habitat features such as water sources.

    c) The proposed action does not include activities that will adversely affect Sonoran pronghorn habitat quality beyond baseline levels (i.e., threats to habitat quality with the project would be considered stable). Some proposed activities (e.g., control of invasive species, removal of feral animals) will reduce threats to Sonoran pronghorn habitat and therefore aid in the achievement of recovery criterion number 3.

    d) Implementation of the proposed action will result in continued human activity in the Kofa subunit at baseline levels. However, many public use activities (e.g., hiking, hunting) predominantly occur in areas outside of Sonoran pronghorn habitat and many activities that occur within Sonoran pronghorn habitat (e.g., monitoring,

operating the captive breeding pen, maintaining waters) are designed to aid in the recovery of the species. Conservation measures (e.g., staging equipment and personnel outside of occupied Sonoran pronghorn habitat for aerial operations, conducting wildlife surveys outside of the Sonoran pronghorn fawning season) will minimize the risk of disturbance, particularly during more stressful times of the year (i.e., fawning season, hot/dry season). Therefore, human activity associated with the proposed action is not anticipated to permanently preclude or appreciably reduce Sonoran pronghorn use of any portion of the refuge.

e) The proposed action will not adversely affect the retention of genetic diversity of the Kofa population of Sonoran pronghorn, as it will not fragment the population or reduce population size. Recovery actions implemented by Kofa NWR (e.g., operating the captive breeding program) will help retain and improve genetic diversity of Sonoran pronghorn and therefore aid in the achievement of recovery criterion number 5.

f) The proposed action will have no effect on laws that prohibit the killing of Sonoran pronghorn.

g) In conclusion, while the proposed action may result in some adverse effects, including possible mortality, to Sonoran pronghorn, the proposed action is not anticipated to appreciably reduce the likelihood of recovery of the Sonoran pronghorn for the reasons explained above. Kofa NWR is committed to the recovery of Sonoran pronghorn and their efforts will continue to contribute to the achievement of the recovery criteria.

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

7 INCIDENTAL TAKE STATEMENT – SONORAN PRONGHORN

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

8 AMOUNT OR EXTENT OF TAKE – SONORAN PRONGHORN

The USFWS anticipates four (4) Sonoran pronghorn every 20 years may be taken as result of this proposed action (the length of the action is indefinite). Four pronghorn represent approximately 2% of the total estimated number (212) of Sonoran pronghorn in the action area as of January 2023 (i.e., 2% of the Kofa population) or approximately 0.4% of the total estimated number (1,003) of Sonoran pronghorn in the U.S. and Mexico. The incidental take is expected to be in the form of direct mortality or injury (e.g., from strikes with vehicles) and in the form of harm from activities that may disturb Sonoran pronghorn (e.g., vehicle, human, and dog presence). The following amounts of incidental take are anticipated:

1. Two (2) Sonoran pronghorn every 20 years may be in the form of direct mortality or injury; and

2. Two (2) Sonoran pronghorn every 20 years may be in the form of harm due to the effects of human disturbance associated with the proposed action.

In addition, if incidental take for mortality or injury does not occur as described in item #1 of this subparagraph, then incidental take for harm may be increased to four (4) Sonoran pronghorn every 20 years.

Because we anticipate the Kofa population of Sonoran pronghorn will fluctuate over time, we authorize take commensurate with the population size as follows:

Estimated Size of the Kofa Sonoran Pronghorn Population	**Authorized Total Amount of Take (Amount of Take per Form – Lethal/Harm)**
50-100	1 (or)
100-150	2 (1/1)
150-200	3 (1/2)
200-250	4 (2/2)
250-300	5 (2/3)

If either of these two forms of incidental take are exceeded, or if the total incidental take exceeds four (4) Sonoran pronghorn as of January 2023, or the number specified in the table above corresponding with the estimated population size at a future date, then this consultation must be reinitiated in accordance the reinitiation criteria and requirements under 50 CFR 402.16 (which are summarized below).

EFFECT OF THE TAKE – SONORAN PRONGHORN

In thisbiological opinion, we have determined that the level of anticipated take is not likely to result in jeopardy to the Sonoran pronghorn.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

All conservation measures including avoidance and minimization measures, status surveys, biological and compliance monitoring, and reporting measures are incorporated herein by reference as reasonable and prudent measures and terms and conditions to address the incidental take of the Sonoran pronghorn. We did not identify additional reasonable and prudent measures during the consultation that would further minimize the effects of the proposed action beyond the avoidance and minimization measures identified in the conservation measures.

8.1 Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 4901 Paseo del Norte NE, Suite D, Albuquerque, NM 87113: 505-248-7889) within three working days of its finding. Provide written notification within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. Send the notification to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

9 CONSERVATION RECOMMENDATIONS - SONORAN PRONGHORN

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

1. We recommend that Kofa NWR continue to implement Sonoran Pronghorn recovery.

9.1 Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the USFWS's Law Enforcement Office, 4901 Paseo del Norte NE, Suite D, Albuquerque, NM 87113; 505-248-7889) within three working days of its finding. Provide written notification within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. Send the notification to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

10 REINITIATION NOTICE

This concludes formal consultation and conference for ongoing and future actions and activities carried out and/or authorized by the Kofa NWR within lands managed by the USFWS. As

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

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

We appreciate Kofa NWR's efforts to conserve and recover the Sonoran pronghorn and monarch butterfly.

Please refer to the consultation number, 2022-0078130-S7 in future correspondence concerning this project. Should you require further assistance or if you have any questions, please contact Erin Fernandez (erin_fernandez@fws.gov) and Julie McIntyre (Julie_mcintyre@fws.gov).

MARK LAMB
Digitally signed by MARK LAMB
Date: 2023.07.06 13:13:13 -07'00' *for*

Heather Whitlaw
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cc (electronic):
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Director, Cultural Resources Department, Salt River Pima-Maricopa Indian Community, Scottsdale, AZ (Attn: Kelly Washington)
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Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ, pep@azgfd.gov
Regional Supervisor, Arizona Game and Fish Department, Yuma, AZ

11 TABLES AND FIGURES

Table 1. Wild and captive Sonoran pronghorn numbers. From 1992 to 2016, wild Sonoran pronghorn population estimates are provided after adoption of standard field surveys and sightability model for wild population estimations (numbers in parentheses are 95% confidence intervals) (U.S. Fish and Wildlife Service 2016). From 2017 to 2022, Sonoran pronghorn observed and estimated are provided, however, the numbers for February 2020 for the Cabeza Prieta, Kofa, and Sauceda populations are based on data collected during telemetry flights instead of the standard field survey and sightability model.

Year	Sonora, Mexico (Pinacate)	Sonora, Mexico (Quitovac)	Arizona, U.S. (Cabeza wild)	Arizona, U.S. (Nonessential Experimental Population wild, Kofa)	Arizona, U.S. (Nonessential Experimental Population wild, Sauceda)
1992	-	-	179 (147-234)	-	-
1994	-	-	282 (205-489)	-	-
1996	-	-	130 (114-154)	-	-
1998	-	-	142 (125-167)	-	-
2000	34 (27-48)	311 (261-397)	99 (69-392)	-	-
2001	-	-	-	-	-
2002	25 (21-33)	260 (216-335)	21 (18-33)	-	-
2003	-	-	-	-	-
2004	59 (32-171)	624 (454-2079)	58 (40-175)	-	-
2005	-	-	-	-	-
2006	67 (54-195)	567 (445-1530)	68 (52-117)	-	-
2007	50 (36-162)	354 (327-852)	-	-	-
2008	-	-	68	-	-
2009	101 (57-321)	381 (268-1158)	-	-	-
2010	-	-	76 (58-210)	-	-

2011	52 (32-183)	189 (168-435)	-	-	-
2012	-	-	159 (111-432)	-	-
2013	No survey	434 (376-1105)	-	9	-
2014	122 (79-464)		202 (171-334)	30	-
2015	117 (98-224)	862 (759-2129)			-
2016			228 (196-616)	70	41
2017	72 estimated; 52 observed	683 estimated; 559 observed			
2018			215 estimated; 160 observed	80 estimated; 71 observed	50 estimated; 46 observed
February 2020	126 estimated; 54 observed	737 estimated; 393 observed	225 estimated	140 estimated	65 estimated
November 2020			257 estimated; 212 observed		
January 2021				Partial survey only 144 estimated; 107 observed	
November 2021			232 estimated; 161 observed		
January 2022	102 estimated; 80 observed	449 estimated; 324 observed			
November 2022			211 estimated; 177 observed		
December 2022					29 estimated; 24 observed
January 2023				212 estimated; 172 observed	

Figure 1. Action Area: Overview map of Kofa National Wildlife Refuge with roads and boundary identified, Yuma and La Paz Counties, Arizona (U.S. Fish and Wildlife Service 2022).

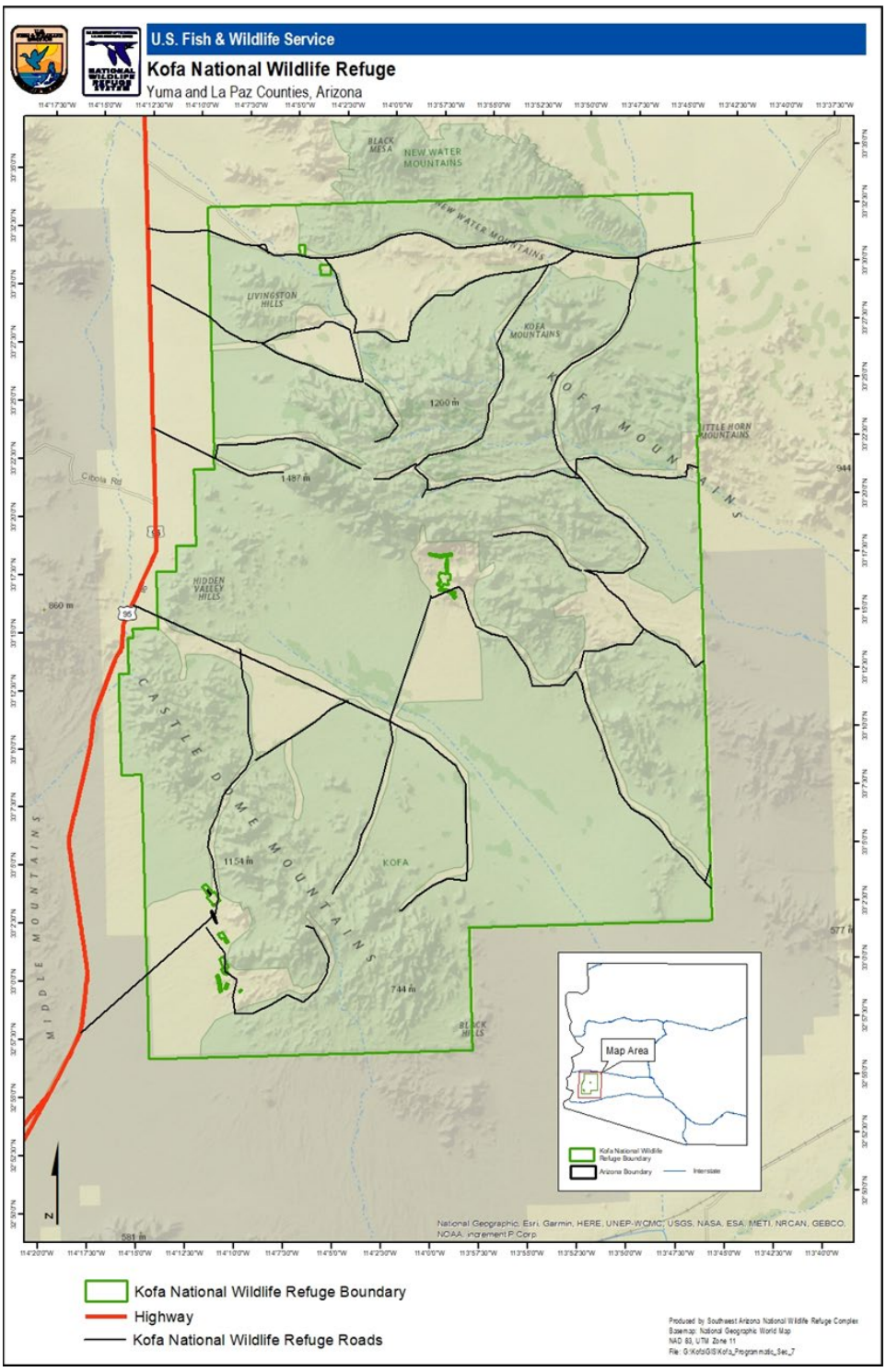


Figure 2. Historical and current ranges of Sonoran pronghorn in the United States and Mexico (U.S. Fish and Wildlife Service 2016).

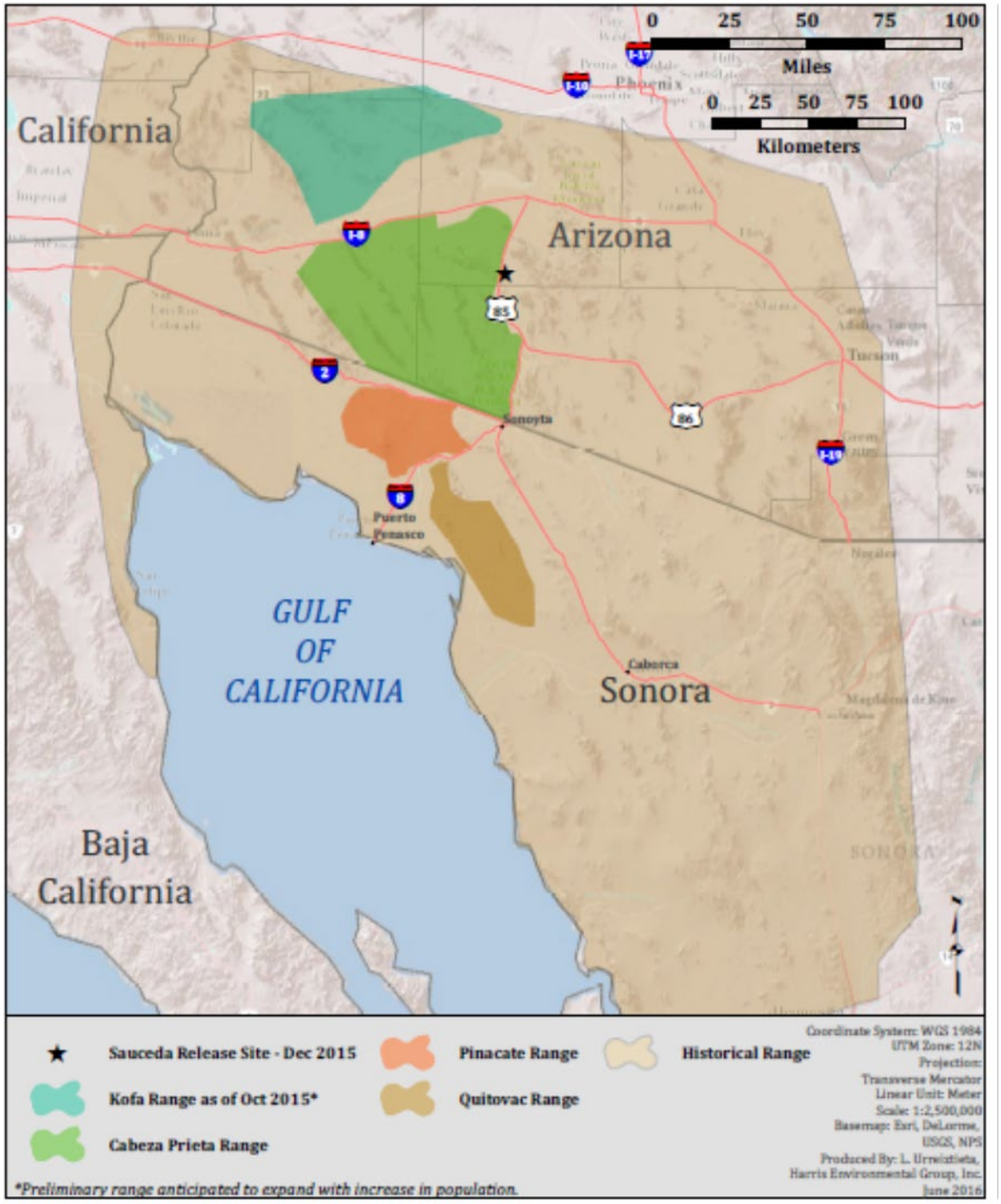
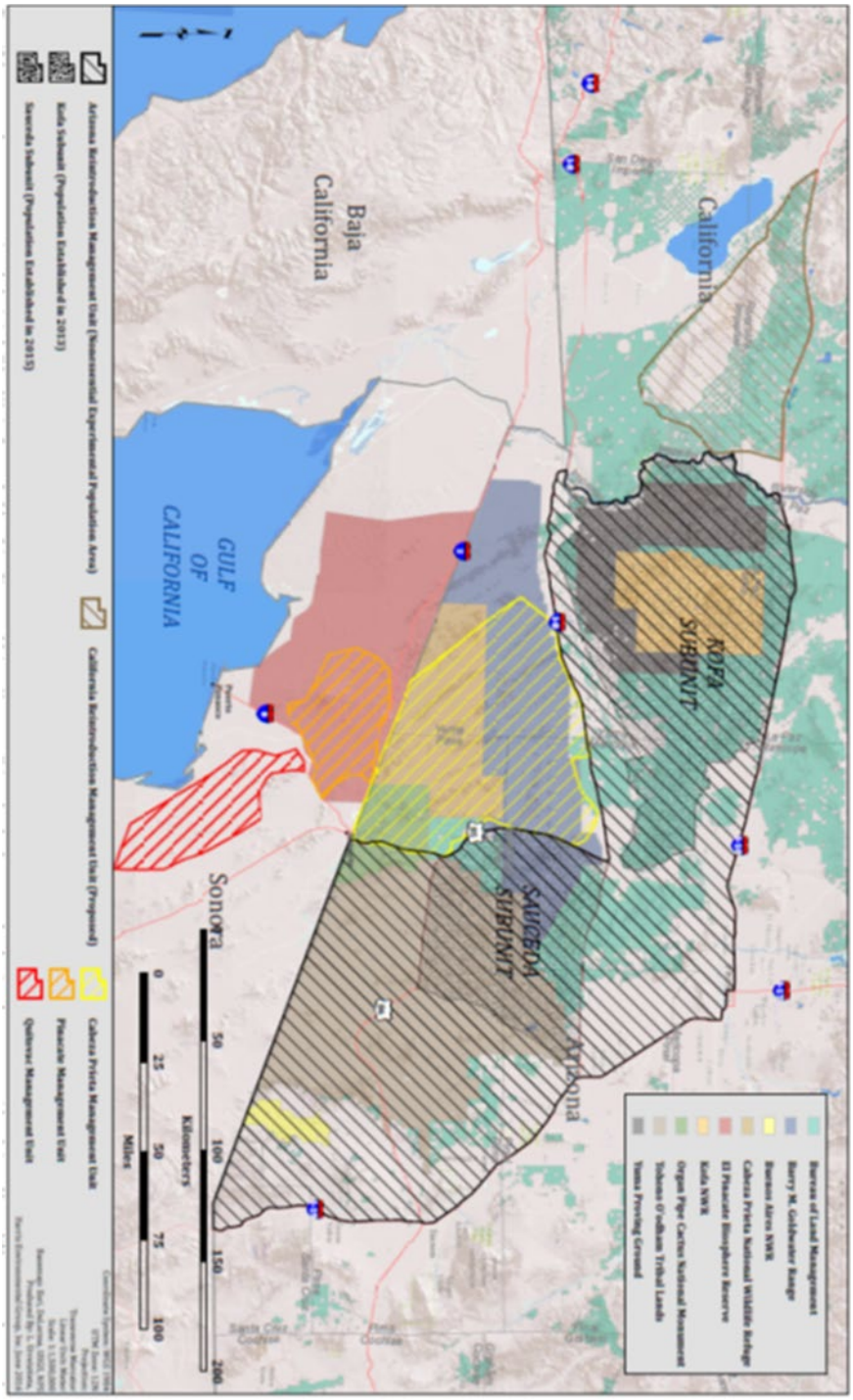


Figure 3. Sonoran pronghorn range in the United States and Mexico. The endangered Sonoran pronghorn range in southwestern Arizona, United States, is depicted in yellow cross-hatching (U.S. Fish and Wildlife Service 2016). The nonessential experimental population area, Arizona, is depicted in black cross-hatching. The endangered Sonoran pronghorn range in Sonora, Mexico, is depicted in orange and red cross-hatching.



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