United States Department of Agriculture

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

Suppression Treatments for Infestations of Rangeland Grasshoppers and Mormon Crickets in Arizona

Environmental Assessment
EA Number: AZ-16-01

March 1, 2016

Site-Specific
Mohave County Hualapai Reservation
Graham and Gila County portion within the San Carlos Apache Reservation
Cochise County portion of Coronado National Forest – Winchester Mountains

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1. Need for Proposed Action

1.1. Purpose and Need Statement

An infestation of grasshoppers and/or Mormon crickets (hereafter referred to collectively as grasshoppers) may occur on rangeland in Mohave County on the Hualapai Indian Reservation; on rangeland in Graham and Gila County, San Carlos Apache Reservation and on rangeland in Cochise County, Coronado National Forest - Winchester Mountains, portion of Arizona. The Animal and Plant Health Inspection Service (APHIS) may, upon request by land managers or State departments of agriculture, conduct treatments to suppress grasshopper infestations.

Populations of grasshoppers that trigger the need for a suppression program are normally considered on a case-by-case basis. Participation is based on potential damage such as stressing and/or causing the mortality of native and planted range plants or adjacent crops due to the feeding habits of large numbers of grasshoppers. The benefits of treatments include the suppressing of over abundant grasshopper populations to lower adverse impacts to range plants and adjacent crops. Treatment would also decrease the economic impact to local agricultural operations and permit normal range plant utilization by wildlife and livestock.

The goal of the proposed suppression program analyzed in this EA is to reduce grasshopper populations below an economic infestation[1] level in order to protect rangeland ecosystems and/or cropland adjacent to rangeland. This environmental assessment (EA) analyzes potential environmental consequences of the proposed action and its alternatives. This EA applies to a proposed suppression program that would take place from 04/01/16 to 09/30/16 on rangeland in Mohave County on the Hualapai Indian Reservation; on rangeland in Graham and Gila County, San Carlos Apache Reservation and on rangeland in Cochise County, Coronado National Forest - Winchester Mountains, portion of Arizona. This EA is prepared in accordance with the requirements under the National Environmental Policy Act of 1969 (NEPA) (42 United States Code § 4321 *et. seq.*) and the NEPA procedural requirements promulgated by the Council on Environmental Quality, United States Department of Agriculture (USDA), and APHIS.

1.2. Background Discussion

In rangeland ecosystem areas of the United States, grasshopper populations can build up to levels of economic infestation despite even the best land management and other efforts to prevent outbreaks. At such a time, a rapid and effective response may be requested and needed to reduce the destruction of rangeland vegetation. In some cases, a response is also needed to prevent grasshopper migration to cropland adjacent to rangeland.

[1] The "economic infestation level" is a measurement of the economic losses caused by a particular population level of grasshoppers to the infested rangeland. This value is determined on a case-by-case basis with knowledge of many factors including, but not limited to, the following: economic use of available forage or crops; grasshopper species, age, and density present; rangeland productivity and composition; accessibility and cost of alternative forage; and weather patterns. In decisionmaking, the level of economic infestation is balanced against the cost of treating to determine an "economic threshold" below which there would not be an overall benefit for the treatment. Short-term economic benefits accrue during the years of treatments, but additional long-term benefit may accrue and be considered in deciding the total value gained by treatment. Additional losses to rangeland habitat and cultural and personal values (e.g., aesthetics and cultural resources), although a part of decisionmaking, are not part of the economic values in determining the necessity of treatment.

APHIS conducts surveys for grasshopper populations on rangeland in the Western United States, provides technical assistance on grasshopper management to land owners/managers, and cooperatively suppresses grasshoppers when direct intervention is requested by a Federal land management agency or a State agriculture department (on behalf of a State or local government, or a private group or individual) and deemed necessary. The need for rapid and effective suppression of grasshoppers when an outbreak occurs limits the options available to APHIS. The application of an insecticide within all or part of the outbreak area is the response available to APHIS to rapidly suppress or reduce (but not eradicate) grasshopper populations and effectively protect rangeland.

In June 2002, APHIS completed an Environmental Impact Statement (EIS) document concerning suppression of grasshopper populations in 17 Western States (Rangeland Grasshopper and Mormon Cricket Suppression Program, Environmental Impact Statement, June 21, 2002). The EIS described the actions available to APHIS to reduce the destruction caused by grasshopper populations in 17 States (Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming).

APHIS has authority under the Plant Protection Act of 2000 (PPA) (7 United States Code (U.S.C.) § 7701) to take actions to control and minimize the economic, ecological, and human health impacts that harmful plant pests can cause. APHIS uses this authority to protect U.S. agriculture, forests, and other natural resources from harmful pest species.

Section 417 of the PPA (7 U.S.C. § 7717) authorizes APHIS' efforts to minimize the economic impacts of grasshoppers. Section 417(a) states that subject to the availability of funds, the Secretary "shall carry out a program to control grasshoppers and Mormon crickets on all Federal lands to protect rangeland."

Section 417(c) (1) states that "Subject to the availability of funds pursuant to this section, on request of the administering agency or the agriculture department of an affected State, the Secretary, to protect rangeland, shall immediately treat Federal, State, or private lands that are infested with grasshoppers or Mormon crickets at levels of economic infestation, unless the Secretary determines that delaying treatment will not cause greater economic damage to adjacent owners of rangeland." Section 417(c)(2) states, "In carrying out this section, the Secretary shall work in conjunction with other Federal, State, and private prevention, control, or suppression efforts to protect rangeland."

APHIS has the authority to implement Section 417 of the PPA through the Rangeland Grasshopper and Mormon Cricket Suppression Program. The priorities of the APHIS program are:

- to conduct surveys for grasshopper and Mormon cricket populations on rangelands in the western United States,

- to provide technical assistance on grasshopper management to land owners/managers, and

- subject to the availability of funds, to suppress grasshoppers and Mormon crickets on rangeland when direct intervention is requested by the land owner/manager.

Additional information regarding technical assistance and other aspects of the program can be obtained from the USDA Agricultural Research Service site at http://www.sidney.ars.usda.gov/grasshopper/index.htm.

On June 14, 2010, APHIS and the Bureau of Indian Affairs (BIA) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on suppression of grasshoppers on BIA managed lands (Document #10-8100-0941-MU, June 10, 2010). This MOU clarifies that APHIS will prepare and issue to the public, site-specific environmental documents that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents will be prepared under the APHIS NEPA implementing procedures with cooperation and input from the BIA.

The MOU further states that the responsible BIA official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on BIA land is necessary. The BIA must also approve a Pesticide Use Proposal for APHIS to treat infestations. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and BIA approves the Pesticide Use Proposal.

On April 22, 2014, APHIS and the Forest Service (FS) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on suppression of grasshoppers on FS managed lands (Document #14-8100-0573-MU, April 22, 2014). This MOU clarifies that APHIS will prepare and issue to the public, site-specific environmental documents that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents will be prepared under the APHIS NEPA implementing procedures with cooperation and input from the FS.

The MOU further states that the responsible FS official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on FS land is necessary. The FS must also approve a Pesticide Use Proposal for APHIS to treat infestations. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and FS approves the Pesticide Use Proposal.

On October 15, 2015, APHIS and the Bureau of Land Management (BLM) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on suppression of grasshoppers on BLM managed lands (Document #15-8100-0870-MU, October 15, 2015). This MOU clarifies that APHIS will prepare and issue to the public, site-specific environmental documents that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents will be prepared under the APHIS NEPA implementing procedures with cooperation and input from the BLM.

The MOU further states that the responsible BLM official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on BLM land is necessary. The BLM must also approve a Pesticide Use Proposal for APHIS to treat infestations. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and BLM approves the Pesticide Use Proposal.

1.3. About This Process

The EA process for grasshopper management is complicated by the fact that there is very little time between requests for treatment and the need for APHIS to take action with respect to those requests. Fall and winter surveys help to determine general areas, among the scores of millions of acres that potentially could be affected, where grasshopper infestations may occur in the spring. There is considerable uncertainty, however, in the forecasts, so that framing specific proposals for analysis under NEPA would waste limited resources. At the same time, the program strives to alert the public in a timely manner to its more concrete treatment plans and avoid or minimize harm to the environment in implementing those plans.

The 2002 EIS provides a solid analytical and regulatory foundation; however, it may not be enough to satisfy NEPA completely for actual treatment proposals, and the "conventional" EA process will seldom, if ever, meet the program's timeframe of need. The following approach to NEPA compliance for anticipated requests to treat for grasshopper infestations will be followed: This EA will analyze aspects of environmental quality that could be affected by grasshopper treatments on rangelands in Mohave County on the Hualapai Indian Reservation; in Graham and Gila County, San Carlos Apache Reservation and Cochise County portion of Coronado National Forest - Winchester Mountains. This EA and an anticipatory finding of no significant impact (FONSI) will be made available to the public with a comment period. When the program receives a treatment request and determines that treatment is necessary, the specific treatment site within rangeland in Mohave County on the Hualapai Indian Reservation; Graham and Gila County, San Carlos Apache Reservation and Cochise County, Coronado National Forest - Winchester Mountains will be extensively examined to determine if environmental issues exist that were not covered in this EA. If no changes to the EA, FONSI, or APHIS' Guidelines for Treatment of Rangelands for Grasshopper and Mormon Crickets (treatment guidelines) (Appendix 1) are warranted, based on the comments received and examination of the treatment site, an addendum to the EA will be prepared stating this. If changes need to be made to the EA, FONSI, or treatment guidelines, the program will prepare a supplement to the EA describing the changes and/or additional site-specific issues that were not covered in the EA. Whether an addendum or supplement is prepared, these documents will be provided to all parties who comment on this EA.

2. Alternatives

The alternatives presented in the 2002 EIS and considered for the proposed action in this EA are: (1) no action; (2) insecticide applications at conventional rates and complete area coverage; (3) reduced agent area treatments (RAATS) and (4) experimental treatments. Each of these alternatives, their control methods, and their potential impacts were described and analyzed in detail in the 2002 EIS. Copies of the complete 2002 EIS document are available for review at 3640 E. Weir Ave. Phoenix AZ 85040. It is also available at the Rangeland Grasshopper and Mormon Cricket Program web site, http://www.aphis.usda.gov/ppd/es/ppqdocs.html.

The 2002 EIS is intended to explore and explain potential environmental effects associated with grasshopper suppression programs that could occur in 17 Western States (Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma,

Oregon, South Dakota, Texas, Utah, Washington, and Wyoming). The 2002 EIS outlines the importance of grasshoppers as a natural part of the rangeland ecosystem. However, grasshopper outbreaks can compete with livestock for rangeland forage and cause devastating damage to crops and rangeland ecosystems. Rather than opting for a specific proposed action from the alternatives presented, the 2002 EIS analyzes in detail the environmental impacts associated with each programmatic action alternative related to grasshopper suppression based on new information and technologies.

All insecticides used by APHIS for grasshopper suppression are used in accordance with applicable product label instructions and restrictions. Representative product specimen labels can be accessed at the Crop Data Management Systems, Inc. web site at www.cdms.net/manuf/manuf.asp. Labels for actual products used in suppression programs will vary, depending on supply issues. All insecticide treatments conducted by APHIS will be implemented in accordance with APHIS' treatment guidelines, included as Appendix 1 to this EA.

2.1. No Action Alternative

Under this alternative, the no action alternative, APHIS would not fund or participate in any program to suppress grasshopper infestations. Under this alternative, APHIS may opt to provide limited technical assistance, but any suppression program would be implemented by a Federal land management agency, a State agriculture department, a local government, or a private group or individual.

2.2. Insecticide Applications at Conventional Rates and Complete Area Coverage Alternative

Alternative 2, insecticide applications at conventional rates and complete area coverage, is generally the approach that APHIS has used for many years. Under this alternative, carbaryl, diflubenzuron (Dimilin®), or Malathion will be employed. Carbaryl and Malathion are insecticides that have traditionally been used by APHIS. The insect growth regulator, diflubenzuron, is also included in this alternative. Applications would cover all treatable sites within the infested area (total or blanket coverage) per label directions. The application rates under this alternative are as follows:

- 16.0 fluid ounces (0.50 pound active ingredient (lb a.i.)) of carbaryl spray per acre;
- 10.0 pounds (0.50 lb a.i.) of 5 percent carbaryl bait per acre;
- 1.0 fluid ounce (0.016 lb a.i.) of diflubenzuron per acre; or
- 8.0 fluid ounces (0.62 lb a.i.) of Malathion per acre.

In accordance with EPA regulations, these insecticides may be applied at lower rates than those listed above. Additionally, coverage may be reduced to less than the full area coverage, resulting in lesser effects to nontarget organisms.

The potential generalized environmental effects of the application of carbaryl, diflubenzuron, and Malathion, under this alternative are discussed in detail in the 2002 EIS (Environmental

Consequences of Alternative 2: Insecticide Applications at Conventional Rates and Complete Area Coverage, pp. 38–48). A description of anticipated site-specific impacts from this alternative may be found in Part 4 of this document.

2.3. Reduced Agent Area Treatments (RAATs) Alternative

Alternative 3, RAATs, is a recently developed grasshopper suppression method in which the rate of insecticide is reduced from conventional levels, and treated swaths are alternated with swaths that are not directly treated. The RAATs strategy relies on the effects of an insecticide to suppress grasshoppers within treated swaths while conserving grasshopper predators and parasites in swaths not directly treated. Carbaryl, diflubenzuron, or Malathion would be considered under this alternative at the following application rates:

- 8.0 fluid ounces (0.25 lb a.i.) of carbaryl spray per acre;
- 10.0 pounds (0.20 lb a.i.) of 2 percent carbaryl bait per acre;
- 0.75 fluid ounce (0.012 lb a.i.) of diflubenzuron per acre; or
- 4.0 fluid ounces (0.31 lb a.i.) of Malathion per acre.

The area not directly treated (the untreated swath) under the RAATs approach is not standardized. In the past, the area infested with grasshoppers that remains untreated has ranged from 20 to 67 percent. The 2002 EIS analyzed the reduced pesticide application rates associated with the RAATs approach but assumed pesticide coverage on 100 percent of the area as a worst-case assumption. The reason for this is there is no way to predict how much area will actually be left untreated as a result of the specific action requiring this EA. Rather than suppress grasshopper populations to the greatest extent possible, the goal of this alternative is to suppress grasshopper populations to a desired level.

The potential environmental effects of application of carbaryl, diflubenzuron, and Malathion under this alternative are discussed in detail in the 2002 EIS (Environmental Consequences of Alternative 3: Reduced Agent Area Treatments (RAATs), pp. 49–57). A description of anticipated site-specific impacts from this proposed treatment may be found in Part 4 of this document.

2.4 Experimental Treatments: *(applied using air and/or ground equipment)*

APHIS continues to refine its methods of grasshopper control in order to make the program more economically feasible and environmentally acceptable. These refinements can include reduced rates of a currently used pesticides, improved formulations, development of more target specific baits, and development of biological pesticide suppression alternatives or improvements to aerial and ground application equipment. A division of APHIS, the Center of Plant Health Science and Technology (CPHST) located in Phoenix, AZ conducts methods development and evaluations for our agency.

To accomplish this work, experimental plots are used to refine equipment and methods or develop formulations that will possibly be used in future rangeland grasshopper programs. The experimental plot investigations are typically located throughout the western United States, including Arizona.

Stressor tests, mixtures of native pathogens isolates combined with low doses of insecticides, will be conducted on native species of grasshopper in a series of field exposures. Each test will consist of a series of mini-plots to be treated with a simulated aerial application system (FAASSTT). The treated plots, ten for each treatment, will be 14 inches in diameter. They will be followed to determine if the combination enhances field mortality of grasshoppers. Likely insecticides are diflubenzuron, Neem oil and chlorantraniliprole.

A series of experiments using ATVs to apply labeled materials to applied using RAATs and blanket applications to determine expected mortalities associated with barrier or crop protection and hot spot treatments. This may include baits or liquid applications.

A companion non-target study may be conducted if grasshopper populations are expansive and warrant control applications at a location in Arizona. Treatments would not be as large but would follow a similar design with the treatments consisting of Dimilin and Prevathon. Dimilin would be applied at 1.0 fl. oz., 10 fl. oz. crop oil concentrate and 20 fl. oz. water applied in a RAATs application. The Prevathon would be applied at 2 fl. oz. with 0.32 fl. oz. methylated seed oil and water up to a total volume of 32 fl. oz. per acre applied as a RAATs along with 4 fl. oz. Prevathon, 0.32 fl. oz. methylated seed oil up to a total volume of 32 fl. oz. applied as a blanket treatment. These plots would be monitored by APHIS.

During the local informal field level consultation with the appropriate agencies, locations of experimental trials will be made available in order to ensure these activities are not conducted near sensitive species or habitats. Due to the small size of experimental plots, location of plots away from sites with endangered species conflicts, EPA approval and informal field level consultations, no adverse effects to the environment or its components are expected from these research activities.

3. Affected Environment

APHIS conducts adult grasshopper surveys throughout the assessment area in the fall of each year and identifies areas where grasshopper populations could indicate significant infestations in the following year. Appendix 2 illustrates the problem areas which may exist in the 2016 season.

Appendix 3 indicates the boundaries of the proposed action areas covered by this EA. Control programs may occur throughout the assessment area as per program guidelines (Appendix 1) and as agreed to by cooperators (private, State and Federal land managers).

The 2002 programmatic Final Environmental Impact Statement (APHIS FEIS 2002) contains detailed analyses of impacts of selected grasshopper control methods. In addition, APHIS FEIS 2002 contains a hazard, exposure, and risk analysis for grasshopper control chemicals on terrestrial wildlife, aquatic species, and humans. Those analyses serve as the basis for the determination of impacts in this EA, and are here incorporated by reference. The following components of the affected area are identified as being within the scope of this EA.

3.1. Description of Affected Environment

The proposed suppression program could potentially encompass acreage on rangeland in Mohave County on the Hualapai Indian Reservation (appendix 4), in locations on the San Carlos Apache Reservation (appendix 5). The proposed treatment areas are identified as follows; rangeland in all tribal grazing allotments north of US 70, (the northern boundary made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile from the canyon rim of the river), including Anchor -7, Ash Creek, R-100, Slaughter, POP, IDT and the portion of Tonto north of US 70. **Antelope Flat area will exclude** Cottonwood Canyon to the southeast from treatment area with a .5 mile buffer along the canyon extending back to US 70. **Ash Flat will exclude** Bonita Creek from Bonita Springs downstream with a protective buffer being applied 1 mile upstream from Bonita Springs. **Big Prairie area will exclude** all forested areas and will only include rangeland areas. The vegetative communities are; semiarid grasslands; Plains & Great Basin Grasslands; Great Basin Conifer woodland; Interior Chaparral covered in this area. Soil types include basalt and basalt flows, weakly consolidated sandstone and siltstone, unconsolidated alluvial sand, silt, and some gravel.

The proposed suppression program could potentially encompass acreage in locations on the Coronado National Forest within Winchester Mountains (appendix 6).

Elevations range from approximately 3,500 to over 6,000 feet. Potential treatment sites are within watersheds which drain into tributaries of the Gila river; Bonita Creek, Hackberry Creek, Hackberry Draw, Cottonwood Canyon Salt Creek, and San Carlos River. Potential treatment sites are also within watersheds which drain into the Salt River; Ash Creek and Black River. There are stock tanks in the potential treatment area. All potential treatment areas fall within the Arizona Interior Chaparral biome (Brown, 1994), grassland representative species of this biome include:

Plants: Emory oak (*Quercus emoryi*), alligator bark juniper (*Juniperus deppeana*), pinyon pine (*Pinus edulis*), gray oak (*Quercus grisea*), canyon live oak (*Quercus chrysolepis*), Arizona oak (*Quercus arizonica*), western chokecherry (*Prunus virginiana*), shrub live-oak (*Quercus turbinella*), ceanothus (*Ceanothus greggii*), crucifixion thorn (*Canotia holocantha*), penstemon (*Penstemon spp.*), desert verbena (*Verbena wrightii*), Wright buckwheat (*Eriogonum wrightii*), narrowleaf yerbasanta (*Eriodictyon angustifolium*), sideoats grama (*Bouteloua curtipendula*), cane bluestem (*Bothriochloa barbinodis*), plains lovegrass (*Eragrostis intermedia*), Black grama (*Bouteloua eriopoda*), Blue grama, (*Bouteloua gracilis)* Hairy grama, (*Bouteloua hirsuta)* Rothrock's grama, *(Bouteloua rothrockii),* Fendler three-awn (*Aristida spp.*), agave (*Agave parryi*), beargrass (*Nolina microcarpa*), sotol (*Dasylirion wheeleri*), banana yucca (*Yucca baccata*), , squirreltail, *(Elymus elymoides),* Arizona cottontop, *(Digitaria californica),* Green sprangletop (*Leptochloa dubia*), *Junegrass, (Koeleria spp.),* Western wheatgrass (*Pascopyrum smithii),* Tobosagrass, (*Pleuraphis mutica),* Vine Mesquite, *(Panicum obtusum*), curly-mesquite (*Hilaria belangeri),* Cholla (*Opuntia spp.*), Prickly Pear (*Opuntia spp.),*

Mammals: cliff chipmunk (*Eutamias dorsalis*), white-throated woodrat (*Neotoma albigula*), mule deer (*Odocoileus hemionus*), brush mouse (*Peromyscus boylei*), rock mouse (*P. difficilis*), white-footed mouse (*P. leucopus*), eastern cottontail (*Sylvilagus floridanus holzeri*), pronghorn

antelope (*Antilocapra americana*), elk (*Cervus elaphus)* javalina **(***Pecari tajacu),* jackrabbit (*Lepus spp.*), coyote (*Canis latran),* White-tailed deer *(Odocoileus virginianus).*

Birds: rufous-crowned sparrow (*Aimophila ruficeps*), scrub jay (*Aphelocoma coerulescens*), canyon wren (*Catherpes mexicanus*), rufous-sided towhee (*Pipilo erythrophthalmus*), brown towhee (*P. fuscus*), bushtit (*Psaltriparus minimus*), black-chinned sparrow (*Spizella atrogularis*), crissal thrasher (*Toxostoma dorsale*), burrowing owl (*Athene cunicularia*).

Amphibians and reptiles: glossy snake (*Arizona elegans*), Arizona alligator lizard (*Gerrhonotus kingi*), night snake (*Hypsiglena torquata*), Sonoran mountain kingsnake (*Lampropeltis pyromelana*), southwestern blind snake (*Leptotyphlops humilis*), Sonora whipsnake (*Masticophis bilineatus*), desert striped whipsnake (*M. taeniatus*), western fence lizard (*Scleroporus occidentalis*), eastern fence lizard (*S. undulates*), western blackhead snake (*Tantilla planiceps*), Sonoran lyre snake (*Trimorphodon biscutatus lambda*), Texas lyre snake (*T. b. vilkinsoni*), side-blotched lizard (*Uta stansburiana*), Arizona night lizard (*Zantusia arizonae*), Western Diamond-backed Rattlesnake *(Crotalus atrox),* Black-tailed Rattlesnake *(Crotalus molossus),* Arizona Black Rattlesnake *(Crotalus cerberus)*

3.2. Site-Specific Considerations

3.2.1. Human Health

The 2002 EIS contains detailed hazard, exposure, and risk analyses for the chemicals available to APHIS. Impacts to workers and the general public were analyzed for all possible routes of exposure (dermal, oral, inhalation) under a range of conditions designed to overestimate risk. The operational procedures and spraying conditions examined in those analyses conform to those expected for operations. The following discussion summarizes the hazards, potential exposure, and risk to workers and the general public for operations within these treatment areas on the San Carlos. The operational procedures identified in Appendix 1 would be required in all cases and further mitigation measures are identified in this section, as appropriate.

The suppression program would be conducted on federally managed rangelands. No treatments will occur over congested or residential areas, recreation areas, and schools. The nearest residential or populated area to potential treatment areas are at least 6 miles away. Refer to the Operational Procedures, Specific Procedures for Aerial and Ground Applications in Appendix 1 for further information.

Groundwater wells are a major source of domestic water supplies. Groundwater and surface water are the major rural and livestock water sources. No impact is anticipated. Strict adherence to label requirements and the USDA treatment guidelines (appendix 1) will be followed in regard to treatments bordering open surface waters.

3.2.2. Nontarget Species

3.2.2.1. Threatened & Endangered Species and Sensitive Species of Concern

The area assessed by this EA includes a variety of organisms i.e.; terrestrial vertebrates and invertebrates, migratory birds, biocontrol agents, pollinators, aquatic organisms, plants (both native and introduced), etc. APHIS will employ measures, such as buffer zones, to protect these species and their habitat. APHIS will also consult with local agency officials to determine appropriate protective measures.

Federally Listed Threatened and Endangered Species:

MAMMALS
Lesser long-nosed bat, *Leptonycteris curasoae yerbabuenae* - Endangered
Mexican gray wolf, *Canis lupus baileyi* - Endangered
Ocelot, *Leopardus pardalis* - Endangered
Black-footed ferret, *Mustela nigripes* -Endangered

BIRDS
Mexican spotted owl, St*rix occidentalis lucida* - Threatened
Southwestern willow flycatcher, *Empidonax traillii extimus* - Endangered
Western yellow-billed cuckoo, *Coccyzus americanus* – Threatened
California condor, *Gymnogyps californianus* - Endangered
Yuma clapper rail, *Rallus longirostris yumanensis* – Endangered

FISH
Apache (Arizona) trout, *Oncorhynchus apache* - Threatened
Desert pupfish, *Cyprinodon macularius* - Endangered
Gila chub, *Gila intermedia* - Endangered
Gila topminnow, *Poeciliopsis occidentalis occidentalis* - Endangered
Loach minnow, *Tiaroga cobitis* - Threatened
Spikedace, *Meda fulgida* - Threatened
Humpback chub, *Gila cypha*
Razorback sucker, *Xyrauchen texanus* – Endangered

AMPHIBIANS
Chiricahua leopard frog, *Rana chiricahuensis* - Threatened

PLANTS
Arizona cliffrose, *Purshia subintegra* - Endangered
Arizona hedgehog cactus, *Echinocereus triglochidiatus* var. *arizonicus* - Endangered

REPTILES
Northern Mexican gartersnake, *Thamnophis eques megalops* - Threatened
Narrow-headed gartersnake, *Thamnophis rufipunctatus* - Threatened

Sensitive Species of Concern:

Sonoran Desert tortoise, *Gopherus morafkai* – Candidate
Headwater chub, *Gila nigra* - Candidate
Roundtail chub, *Gila robusta* – Candidate

3.2.2.2. Bald and Golden Eagle Protection Act (BGEPA)

The Eagle Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal and civil penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturb'' means: "Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

As listed in the National Bald Eagle Management Guidelines (USFWS, May 2007) and adapting recommendations from (Driscoll et al. 2006) the following mitigation measures will be followed.

*Category G Helicopters and fixed-wing aircraft. Except for authorized biologists trained in survey techniques, avoid operating aircraft within **2,000** feet of the nest during the breeding season, except where eagles have demonstrated tolerance for such activity. In addition, Category A (Agriculture) and Category D (Off Road Vehicle Use) both provide the same guidance for use of ATV's or trucks: No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within **1,000** feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 1,000 feet.*

3.2.2.3. Representative wildlife and plant spp.

See Table 1 for list of representative wildlife, and plant spp.

Under the no action alternative, destruction of grasses and forbs by grasshoppers could cause localized disruption of food and cover for a number of wildlife species. Under chemical control there is a possibility of indirect effects on local wildlife populations, particularly insectivorous birds that depend on a readily available supply of insects, including grasshoppers, for their own

food supply and for their young. We have found no valid data which suggests that (absent a spill) any species other than certain mice would be subjected to a dosage in excess of 1/5 of the LD50 for carbaryl (Pg B-37 GH EIS.) Therefore, it is not apparent that any fatalities would be likely to occur as a result of carbaryl intoxication.

Malathion and carbaryl have been shown to reduce brain cholinesterase (ChE) (an enzyme important in nerve cell transmissions) levels in birds. Effects of ChE inhibition are not fully understood but could cause inability to gather food, escape predation, or care for young.

In any given treatment season, only a fraction (less than 1 percent) of the total rangeland in a region is likely to be sprayed for grasshopper control. For species that are wide spread and numerous lowered survival and lowered reproductive success in a small portion of their habitat would not constitute a significant threat to the population.

The wildlife risk assessment in APHIS FEIS 2002 estimated wildlife doses of Malathion and carbaryl to representative rangeland species and compared them with toxicity reference levels.

No dose of Malathion will approach or exceed the reference species LD50. Some individual animals may be at risk of fatality or behavioral alterations that make them more susceptible to predation resulting from ChE level changes in Malathion spraying for grasshopper control. However, most individual animals would not be seriously affected.

Carbaryl also poses a low risk to wildlife, with few fatalities likely to occur and a low risk of behavioral anomalies caused by cholinesterase depression.

There is some chance of adverse effects on bird reproduction through the use of any of these chemicals or diesel oil through direct toxicity to developing embryos in birds' eggs.

Some species of herbivorous mammals and birds may consume wheat bran bait after it has been applied to grasshopper-infested areas. Carbaryl is moderately toxic to mammals and slightly toxic to birds. We have found no valid data which suggests that (absent a spill) any species other than certain mice would be subjected to a dosage in excess of 1/5 of the LD50 for carbaryl (Pg B-37 GH EIS.) Therefore, it is not apparent that any fatalities would be likely to occur as a result of carbaryl intoxication. Additionally, we note that carbaryl 5% bait is labeled at 3 lbs/1000 sq ft in poultry houses when poultry are present. (http://www.cdms.net/manuf/)

Chitin or chitin-like substances are not as important to terrestrial mammals, birds, and other vertebrates as chitin is to insects; therefore, the chitin inhibiting properties of diflubenzuron applications under the conditions of Alternative 2 such as reductions in the food base for insectivorous wildlife species, especially birds. As stated above, diflubenzuron is practically nontoxic to birds, including those birds that ingest moribund grasshoppers resulting from diflubenzuron applications, as described in Alternative 2.

While immature grasshoppers and other immature insects can be reduced up to 98 percent in area covered with diflubenzuron, some grasshoppers and other insects remain in the treatment area. Although the density of grasshoppers and other insects may be low, it is most likely sufficient to sustain birds and other insectivores until insect populations recover. Those rangeland birds that feed primarily on grasshoppers may switch to other diet items. However, in some areas the reduced number of invertebrates necessary for bird survival and development may result in birds

having less available food. In these cases, birds will either have less than optimal diets or travel to untreated areas for suitable prey items, causing a greater foraging effort and a possible increased susceptibility to predation. It also should be noted that suppressing grasshopper populations conserves rangeland vegetation that often is important habitat to rangeland wildlife. Habitat loss is frequently the most important factor leading to the decline of a species, and reducing grasshopper densities can be an aid in reducing habitat loss.

Biological Control agents used for controlling introduced weeds may be encountered within treatment areas. Local mitigation will be determined on a case by case basis in consultation with the local land managers.

3.2.3. Socioeconomic Issues

Livestock grazing and hunting are the main uses of the potential treatment area. These grasslands provide forage for cattle and wildlife. Farming, forestry occupations, agriculture, fishing and hunting, and mining provide 10.6% of the employment on San Carlos Apache Reservation (U.S. Bureau of the Census, Census 2000).

The total population of the Hualapai Reservation is about 1,621 of whom 1,353 are tribal members (2000 U.S. Census). The principal economic activities are tourism, cattle ranching, and arts and crafts. The Hualapai Reservation is rich in hunting, fishing, and river rafting opportunities. The tribe sells guided big-game hunting permits for desert bighorn sheep, trophy elk, antelope, and mountain lion.

The possible treatment areas are subject to reoccurring drought. A combination of drought and grasshopper damage causes economic stress to landowners and permittees. The control of grasshoppers in this area would have beneficial economic impacts to local land owners. The forage not utilized by grasshoppers will be available for livestock consumption, and harvesting. This will allow greater livestock grazing, decreased needs for supplemental feed, and increased monetary returns.

3.2.4. Cultural Resources and Events

To ensure that historical or cultural sites, monuments, buildings or artifacts of special concern are not adversely affected by program treatments, APHIS will confer with BIA, or other appropriate land management agencies on a local level to protect these areas of special concern. APHIS will also confer with the appropriate Tribal Authority and with the BIA office at a local level to ensure that the timing and location of planned program treatments do not coincide or conflict with cultural events or observances, on Tribal and/or allotted lands.

3.2.5. Special Considerations for Certain Populations

3.2.5.1. Executive Order No. 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (E.O.) 12898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, was signed by President Clinton on February 11, 1994 (59 *Federal Register* (FR) 7269). This E.O. requires each Federal agency to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. Consistent with this E.O., APHIS will consider the potential for disproportionately high and adverse human health or environmental effects on minority populations and low-income populations for any of its actions related to grasshopper suppression programs.

The San Carlos Apache Reservation has a population of 9,385, with 96.6% of the population being American Indian. The remaining population consists of 3.9% white, 0.2% African American, 0.3% Asian, 0.1% Native Hawaiian or Other Pacific Islander, 0.7% some other race. The median household income is $16,894 per year, with a per capita income of $5,200. Over 50% of the population lives in poverty status (U.S. Census Bureau 2000).

The total population of the Hualapai Reservation is about 1,621 of whom 1,353 are tribal members (2000 U.S. Census). There are slightly more females (52.8%) than males (47.2%) within the Hualapai Tribe. The percentage of males in the Hualapai Tribe was lower than either the State (49.7%) or the County (50.0%), while females (52.8%) comprised a larger proportion of the population among the Hualapai that either the State (50.3%) or the County (50.0%). The majority of Hualapai tribal members identify themselves as American Indian or Alaska Native alone (95%), while the remaining 5 percent are split between white alone, some other race alone, and multi-race persons. Poverty rates on the Hualapai Tribe (41%) are more than twice as high as the State (15%) and the County (16%). More than half (53%) of all children under 18 years of age are considered to be living in poverty, while one-third (32%) of tribal members between 18 and 64 also live in poverty. One-fourth (26%) of tribal members over 65 years of age live in poverty, three times the State (8%) and the County (7%) rates (U.S. Census Bureau 2000).

3.2.5.2. Executive Order No. 13045, Protection of Children from Environmental Health Risks and Safety Risks

The increased scientific knowledge about the environmental health risks and safety risks associated with hazardous substance exposures to children and recognition of these issues in Congress and Federal agencies brought about legislation and other requirements to protect the health and safety of children. On April 21, 1997, President Clinton signed E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks (62 FR 19885). This E.O. requires each Federal agency, consistent with its mission, to identify and assess environmental health risks and safety risks that may disproportionately affect children and to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. APHIS has developed agency guidance for its programs to follow to ensure the protection of children (USDA, APHIS, 1999).

Approximately 47% of the population on the San Carlos Apache Reservation is under 19 years of age (4,450 of 9,385) (U.S. Census Bureau 2000). Approximately 31% of the population on the Hualapai Reservation is under 17 years of age (418 of 1353) (U.S. Census Bureau 2000). The human health risk assessment for the 2002 EIS analyzed the effects of exposure to children from the three insecticides. Based on review of the insecticides and their use in the grasshopper program, the assessment concluded that the likelihood of children being exposed to insecticides is very slight and that no disproportionate adverse effects to children are anticipated over the negligible effects to the general populations. Treatments are primarily conducted on open rangelands where children would not be expected to be present during treatment or enter should there be any restricted entry period after treatment.

Impacts on children will be minimized by the implementation of the treatment guidelines:

Aerial Broadcast Applications of Liquid Insecticides

- Notify all residents in treatment areas, or their designated representatives, prior to proposed operations. Advise them of the control method to be used, the proposed method of application, and precautions to be taken (e.g., advise parents to keep children and pets indoors during ULV treatments). Refer to label recommendations related to restricted entry period.
- No treatments will occur over congested urban area. For all flights over congested areas, the contractor must submit a plan to the appropriate Federal Aviation Administration District Office and this office must approve of the plan; a letter of authorization signed by city or town authorities must accompany each plan. Whenever possible, plan aerial ferrying and turnaround routes to avoid flights over congested areas, bodies of water and other sensitive areas that are not to be treated.

Aerial Application of Dry Insecticidal Bait

- Do not apply within 500 feet of any school or recreational facility.

Ultra-Low-Volume (ULV) Aerial Application of Liquid Insecticides

- Do not spray while school buses are operating in the treatment area.
- Do not apply within 500 feet of any school or recreational facility.

4. Environmental Consequences

Each alternative described in this EA potentially has adverse environmental effects. The general environmental impacts of each alternative are discussed in detail in the 2002 EIS. The specific impacts of the alternatives are highly dependent upon the particular action and location of infestation. The principal concerns associated with the alternatives are: (1) the potential effects of insecticides on human health (including subpopulations that might be at increased risk); and (2) impacts of insecticides on non-target organisms (including threatened and endangered species). Assessments of the relative risk of each insecticide option are discussed in detail in the 2002 EIS document.

4.1. Environmental Consequences of the Alternatives

Site-specific environmental consequences of the alternatives are discussed in this section.

4.1.1. No Action Alternative

Under this alternative, APHIS would not fund or participate in any program to suppress grasshoppers. If APHIS does not participate in any grasshopper suppression program, Federal land management agencies, State agriculture departments, local governments, or private groups or individuals, may not effectively combat outbreaks in a coordinated effort. In these situations, grasshopper outbreaks could develop and spread unimpeded.

Grasshoppers in unsuppressed outbreaks would consume agricultural and nonagricultural plants. The damage caused by grasshopper outbreaks could also pose a risk to rare, threatened, or endangered plants that often have a low number of individuals and limited distribution. Habitat loss for birds and other wildlife and rangeland susceptibility to invasion by nonnative plants are among the consequences that would likely occur should existing vegetation be removed by grasshoppers. Loss of plant cover due to grasshopper consumption will occur. Plant cover may protect the soil from the drying effects of the sun, and plant root systems hold the soil in place that may otherwise be eroded.

Another potential scenario, if APHIS does not participate in any grasshopper suppression programs, is that some Federal land management agencies, State agriculture departments, local governments, or private groups or individuals may attempt to conduct widespread grasshopper programs. Without the technical assistance and program coordination that APHIS can provide to grasshopper programs, it is possible that a large amount of insecticides, including those APHIS considers too environmentally harsh but labeled for rangeland use, could be applied, reapplied, and perhaps misapplied in an effort to suppress or even locally eradicate grasshopper populations. It is not possible to accurately predict the environmental consequences of the no action alternative because the type and amount of insecticides that could be used in this scenario are unknown.

4.1.2. Insecticide Applications at Conventional Rates and Complete Area Coverage Alternative

Under Alternative 2, APHIS would participate in grasshopper programs with the option of using one of the insecticides carbaryl, diflubenzuron, or Malathion, depending upon the various factors related to the grasshopper outbreak and the site-specific characteristics. The use of an insecticide would occur at the conventional rates. With only rare exceptions, APHIS would apply a single treatment in an outbreak year that would blanket affected rangeland areas in an attempt to suppress grasshopper outbreak populations by a range of 35 to 98 percent, depending upon the insecticide used.

Carbaryl

Carbaryl is of moderate acute oral toxicity to humans. The mode of toxic action of carbaryl occurs through inhibition of acetylcholinesterase (AChE) function in the nervous system. This

inhibition is reversible over time if exposure to carbaryl ceases. The Environmental Protection Agency (EPA) has classified carbaryl as a possible human carcinogen (EPA, 1993). However, it is not considered to pose any mutagenic or genotoxic risk.

Potential exposures to the general public from conventional application rates are infrequent and of low magnitude. These low exposures to the public pose no risk of direct toxicity, carcinogenicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. The potential for adverse effects to workers are negligible if proper safety procedures are followed, including wearing the required protective clothing. Carbaryl has been used routinely in other programs with no reports of adverse health effects. Therefore, routine safety precautions are expected to provide adequate worker health protection.

Carbaryl is of moderate acute oral toxicity to mammals (McEwen *et al*., 1996a). Carbaryl applied at Alternative 2 rates is unlikely to be directly toxic to upland birds, mammals, or reptiles. Field studies have shown that carbaryl applied as either ultra-low-volume (ULV) spray or bait at Alternative 2 rates posed little risk to killdeer (McEwen *et al*., 1996a), vesper sparrows (McEwen *et al*., 1996a; Adam *et al*., 1994), or golden eagles (McEwen *et al*., 1996b) in the treatment areas. AChE inhibition at 40 to 60 percent can affect coordination, behavior, and foraging ability in vertebrates. Multi-year studies conducted at several grasshopper treatment areas have shown AChE inhibition at levels of no more that 40 percent with most at less than 20 percent (McEwen *et al*., 1996a). Carbaryl is not subject to significant bioaccumulation due to its low water solubility and low octanol-water partition coefficient (Dobroski *et al*., 1985).

Carbaryl will most likely affect nontarget insects that are exposed to ULV carbaryl spray or that consume carbaryl bait within the grasshopper treatment area. Field studies have shown that affected insect populations can recover rapidly and generally have suffered no long-term effects, including some insects that are particularly sensitive to carbaryl, such as bees (Catangui *et al*., 1996). The use of carbaryl in bait form generally has considerable environmental advantages over liquid insecticide applications: bait is easier than liquid spray applications to direct toward the target area, bait is more specific to grasshoppers, and bait affects fewer nontarget organisms than sprays (Quinn, 1996).

Should carbaryl enter water, there is the potential to affect the aquatic invertebrate assemblage, especially amphipods. Field studies with carbaryl concluded that there was no biologically significant effect on aquatic resources, although invertebrate downstream drift increased for a short period after treatment due to toxic effects (Beyers *et al*., 1995). Carbaryl is moderately toxic to most fish (Mayer and Ellersieck, 1986).

Diflubenzuron

The acute oral toxicity of diflubenzuron formulations to humans ranges from very slight to slight. The most sensitive indicator of exposure and effects of diflubenzuron in humans is the formation of methemoglobin (a compound in blood responsible for the transport of oxygen) in blood.

Potential exposures to the general public from Alternative 2 rates are infrequent and of low magnitude. These low exposures to the public pose no risk of methemoglobinemia (a condition where the heme iron in blood is chemically oxidized and lacks the ability to properly transport oxygen), direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental

toxicity. Potential worker exposures are higher than the general public but are not expected to pose any risk of adverse health effects.

Because diflubenzuron is a chitin inhibitor that disrupts insects from forming their exoskeleton, organisms without a chitinous exoskeleton, such as mammals, fish, and plants are largely unaffected by diflubenzuron. In addition, adult insects, including wild and cultivated bees, would be mostly unaffected by diflubenzuron applications (Schroeder *et al*., 1980; Emmett and Archer, 1980). Among birds, nestling growth rates, behavior data, and survival of wild American kestrels in diflubenzuron treated areas showed no significant differences among kestrels in treated areas and untreated areas (McEwen *et al*., 1996b). The acute oral toxicity of diflubenzuron to mammals ranges from very slight to slight. Little, if any, bioaccumulation of diflubenzuron would be expected (Opdycke *et al*., 1982).

Diflubenzuron is most likely to affect immature terrestrial insects and early life stages of aquatic invertebrates (Eisler, 2000). While this would reduce the prey base within the treatment area for organisms that feed on insects, adult insects, including grasshoppers, would remain available as prey items. Many of the aquatic organisms most susceptible to diflubenzuron are marine organisms that would not be exposed to rangeland treatments. Freshwater invertebrate populations would be reduced if exposed to diflubenzuron, but these decreases would be expected to be temporary given the rapid regeneration time of many aquatic invertebrates.

Malathion

Malathion is of slight acute oral toxicity to humans. The mode of toxic action of Malathion occurs through inhibition of AChE function in the nervous system. Unlike carbaryl, AChE inhibition from Malathion is not readily reversible over time if exposure ceases. However, strong inhibition of AChE from Malathion occurs only when chemical oxidation results in formation of the metabolite malaoxon. Human metabolism of Malathion favors hydroxylation and seldom produces much malaoxon.

Potential exposures to the general public from conventional application rates are infrequent and of low magnitude. These low exposures to the public pose no risk of direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Potential worker exposures are higher, but still have little potential for adverse health effects except under accidental scenarios. Malathion has been used routinely in other programs with no reports of adverse health effects. Therefore, routine safety precautions are expected to continue to provide adequate protection of worker health.

EPA has recently reviewed the potential for carcinogenic effects from Malathion. EPA=s classification describes Malathion as having Asuggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential@ (EPA, 2000). This indicates that any carcinogenic potential of Malathion cannot be quantified based upon EPA=s weight of evidence determination in this classification. The low exposures to Malathion from program applications would not be expected to pose carcinogenic risks to workers or the general public.

Malathion is of slight acute oral toxicity to mammals. There is little possibility of toxicity-induced mortality of upland birds, mammals, or reptiles, and no direct toxic effects have been observed in field studies. Malathion is not directly toxic to vertebrates at the concentrations used

for grasshopper suppression, but it may be possible that sublethal effects to nervous system functions caused by AChE inhibition may lead directly to decrease survival. AChE inhibition at 40 to 60 percent affects coordination, behavior, and foraging ability in vertebrates. Multi-year studies at several grasshopper treatment areas have shown AChE inhibition at levels of no more than 40 percent with most at less than 20 percent (McEwen *et al*., 1996a). Field studies of birds within Malathion treatment areas showed that, in general, the total number of birds and bird reproduction were not different from untreated areas (McEwen *et al*., 1996a). Malathion does not bioaccumulate HSDB, 1990; Tsuda *et al*., 1989).

Malathion will most likely affect nontarget insects within a treatment area. Large reductions in some insect populations would be expected after a Malathion treatment under Alternative 2. While the number of insects would be diminished, there would be some insects remaining. The remaining insects would be available prey items for insectivorous organisms, and those insects with short generation times may soon increase.

Malathion is highly toxic to some fish and aquatic invertebrates; however, Malathion concentrations in water, as a result of grasshopper treatments, are expected to be low presenting a low risk to aquatic organisms, especially those organisms with short generation times.

The implementation of pesticide label instructions and restrictions and the APHIS treatment guidelines will reduce potential impacts from the program use of insecticides (see Appendix 1 treatment guidelines)

4.1.3. Reduced Area Agent Treatments (RAATs) Alternative

The goal of the grasshopper suppression under the RAATs alternative is to economically and environmentally suppress grasshopper populations to a desired level rather than reduce those populations to the greatest possible extent. The efficacy of the RAATs alternative in reducing grasshoppers is therefore less than conventional treatments. The RAATs efficacy is also variable. Foster et al. (2000) reported that grasshopper treatment mortality using RAATs was reduced 2 to 15 percent from conventional treatments while Lockwood et al. (2000) reported 0 to 26 percent difference in mortality between conventional and RAATs alternatives. During grasshopper outbreaks when grasshopper densities can be 60 or more per square meter (Norelius and Lockwood, 1999), grasshopper treatments that have 90 to 95 percent mortality still leave a number of grasshoppers (3 to 6) that is generally greater than the average number found on rangeland, such as in Wyoming, in a normal year (Schell and Lockwood, 1997).

Refer to the 2002 EIS Chapter V. Environmental Consequences. The impacts identified for this alternative will be reduced compared to Alternative 2. The impacts to these resources will be minimized by implementation of the guidelines described in Appendix 1.

Under Alternative 3, the insecticide carbaryl, diflubenzuron, or Malathion would be used at a reduced rate and over reduced areas of coverage. Rarely would APHIS apply more than a single treatment to an area per year. The maximum insecticide application rate under the RAATs strategy is reduced 50 percent from the conventional rates for carbaryl and Malathion and 25 percent from the Alternative 2 rate for diflubenzuron. Although this strategy involves leaving variable amounts of land not directly treated, the risk assessment conducted for the 2002 EIS assumed 100 percent area coverage because not all possible scenarios could be analyzed. However, when utilized in grasshopper suppression, the amount of untreated area in RAATs

often ranges from 20 to 67 percent of the total infested area but can be adjusted to meet site-specific needs.

Carbaryl

Potential exposures to the general public and workers from RAATs application rates are lower than those from conventional application rates, and adverse effects decrease commensurately with decreased magnitude of exposure. These low exposures to the public pose no risk of direct toxicity, carcinogenicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. The potential for adverse effects to workers is negligible if proper safety procedures are followed, including wearing the required protective clothing. Routine safety precautions are expected to provide adequate protection of worker health at the lower application rates under RAATs.

Carbaryl will most likely affect nontarget insects that are exposed to liquid carbaryl or that consume carbaryl bait. While carbaryl applied at a RAATs rate will reduce susceptible insect populations, the decrease will be less than under Alternative 2 rates. Carbaryl ULV applications applied in alternate swaths have been shown to affect terrestrial arthropods less than Malathion applied in a similar fashion.

Direct toxicity of carbaryl to birds, mammals, and reptiles is unlikely in swaths treated with carbaryl under a RAATs approach. Carbaryl bait also has minimal potential for direct effects on birds and mammals. Field studies indicated that bee populations did not decline after carbaryl bait treatments, (Catangui *et al*., 1996) and American kestrels were unaffected by bait applications made at a RAATs rate (McEwen *et al*., 1996a). Using alternating swaths will furthermore reduce adverse effects because organisms that are in untreated swaths will be mostly unexposed to carbaryl.

Carbaryl applied at a RAATs rate has the potential to affect invertebrates in aquatic ecosystems. However, these affects would be less than effects expected under Alternative 2. Fish are not likely to be affected at any concentrations that could be expected under Alternative 3.

Diflubenzuron

Potential exposures and adverse effects to the general public and workers from RAATs application rates are commensurately less than conventional application rates. These low exposures to the public pose no risk of methemoglobinemia, direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Potential worker exposures pose negligible risk of adverse health effects.

Because diflubenzuron is a chitin inhibitor that disrupts insects from forming their exoskeleton, organisms without a chitinous exoskeleton, such as mammals, fish, and plants are largely unaffected by diflubenzuron. Diflubenzuron exposures at Alternative 3 rates are not hazardous to terrestrial mammals, birds, and other vertebrates. Insects in untreated swaths would have little to no exposure, and adult insects in the treated swaths are not susceptible to diflubenzuron's mode of action. The indirect effects to insectivores would be negligible as not all insects in the treatment area will be affected by diflubenzuron.

Diflubenzuron is most likely to affect immature terrestrial insects and, if it enters water, will affect early life stages of aquatic invertebrates. While diflubenzuron would reduce insects within the treatment area, insects in untreated swaths would have little to no exposure. Many of the aquatic organisms most susceptible to diflubenzuron are marine organisms that would not be exposed to rangeland treatments. Freshwater invertebrate populations would be reduced if exposed to diflubenzuron, but these decreases may be temporary given the rapid regeneration time of many aquatic invertebrates.

The insecticide Dimilin® (diflubenzuron) and In-Place adjuvant will be evaluated to reduce the currently standard 10 and 20 oz of oil and water diluent applied respectively per acre. This research would involve small replicated 40-160 acre plots.

APHIS continues to refine its methods of grasshopper control in order to make the program more economically feasible and environmentally acceptable. These refinements can include reduced rates of a currently used pesticides, improved formulations, development of more target specific baits, and development of biological suppression alternatives or improvements to aerial application equipment. A division of APHIS, the Center of Plant Health Science and Technology (CPHST) located in Phoenix, AZ conducts these evaluations for our agency.

To accomplish this work, experimental plots are used to refine material or develop formulations that will possibly be used in future rangeland grasshopper programs. The experimental plot investigations are typically located throughout the western United States, including Arizona.

When new materials or formulations are investigated, Experimental Use Permits (EUP) is issued by the Environmental Protection Agency (EPA) to the company developing the product. The necessary experiments may then be carried out under the guidelines or the limitations outlined in the EUP.

During the local informal field level consultation with the appropriate agencies locations of experimental trials will be made available in order to ensure these activities are not conducted near sensitive species or habitats. Due to the small size of experimental plots, location of plots away from sites with ESA conflicts, EPA approval and informal field level consultations, no adverse effects to the environment or its components are expected from research activities.

Malathion

Potential exposures to the general public and workers from RAATs application rates are of a commensurately lower magnitude than conventional rates. These low exposures to the public pose no risk of direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity.

Potential risks to workers are negligible if proper safety procedures are adhered to, including the use of required protective clothing. Malathion has been used routinely in other programs with no reports of adverse health effects. The low exposures to Malathion from program applications are not expected to pose any carcinogenic risks to workers or the general public.

Malathion applied at a RAATs rate will cause mortalities to susceptible insects. Organisms in untreated areas will be mostly unaffected. Field applications of Malathion at a RAATs rate and applied in alternate swaths resulted in less reduction in nontarget organisms than would occur in

blanket treatments. Birds in RAATs areas were not substantially affected. Should Malathion applied at RAATs rates enter water, it is most likely to affect aquatic invertebrates. However, these effects would soon be compensated for by the surviving organisms given the rapid generation time of most aquatic invertebrates and the rapid degradation of Malathion in most water bodies.

The implementation of pesticide label instructions and restrictions and the APHIS treatment guidelines will reduce potential impacts from the program use of insecticides (see Appendix 1 treatment guidelines).

4.2. Other Environmental Considerations

4.2.1. Cumulative Impacts

Cumulative impact, as defined in the CEQ NEPA implementing regulations (40 CFR § 1508.7) "is the impact on the environment which results from the incremental impact of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

APHIS does not anticipate cumulative impacts and does not expect overlapping grasshopper treatments. Herbicides do not have a known cumulative effect with Carbaryl, Diflubenzuron, and Malathion. If at the time of treatment other chemical treatment programs are discovered within the site specific area and addendum will be added explaining the synergistic effects that may occur.

4.2.2. Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

In accordance with various environmental statutes, APHIS routinely conducts programs in a manner that minimizes impact to the environment, including any impact to migratory birds. In January 2001, President Clinton signed E.O. 13186 to ensure that all government programs protect migratory birds to the extent practicable. To further its purposes, the E.O. requires each agency with a potential to impact migratory birds to enter into a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service (FWS). In compliance with the E.O., APHIS is currently working with FWS to develop such an MOU.

4.2.3. Endangered Species Act

Under the Endangered Species Act of 1973, Section 7, federal agencies are required to consult with the U.S. Fish and Wildlife Service regarding the degree of impact to federally proposed and listed species and critical habitat from the program action and the necessary protective measures to avoid or minimize adverse effects. Local consultations are being conducted between APHIS and FWS regarding section 7 of the Endangered Species Act. Species consulted on are outlined in the assessment section of this document. The FWS Letter of Concurrence is located in Appendix 7.

5. ASSESSMENTS

5.1 MAMMALS

5.1.1 Lesser (=Sanborn's) long-nosed bat, *Leptonycteris curasoae yerbabuenae*

Status: Endangered (53 FR 38456; September 30, 1988) without critical habitat.

Habitat and Distribution: Mainly desert scrub habitat in the U.S. portion of its range. In Mexico, the species occurs up into high elevation pine-oak and ponderosa pine forests. Altitudinal range is from 480-3,450 meters. Roosting is in caves, abandoned mines, and unoccupied buildings at the base of mountains where agave, saguaro, and organ pipe cacti are present. Forages at night on nectar, pollen, and fruit of paniculate agaves. The proposed treatment areas contain no saguaro and organ pipe cacti. There are no mines and buildings in the treatment areas. The roosting sites are very limited making the habitat in the treatment area less than ideal for the lesser long-nosed bat.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting the lesser long-nosed bat.

Protective measures: Maintain a .25 mile buffer for the use of aerially applied ULV pesticides around known roosting areas. Only carbaryl bait will be used within the .25 mile buffer.

Determination: **May affect, not likely to adversely affect** the lesser long-nosed bat. Based on the APHIS treatment rates the prey base is not expected to be significantly affected. The insecticides APHIS uses are non-persistent in water; APHIS applies only a single application of a single insecticide to a grasshopper treatment area only one time a year – there are no multiple treatments. Treatments will not affect food-source plants and human activity in the treatment area will be of limited duration and will not occur near any known roost sites.

5.1.2 Mexican gray wolf, *Canis lupus baileyi*

Status: Endangered (32 FR 4001, March 11, 1967; 41 FR 17736, April 28, 1976; 43 FR 1912, March 9, 1978) without critical habitat. Experimental, nonessential designation for Southwest (63 FR 1763, January 12, 1998).

Habitat and Distribution: Inhabits oak and pine/juniper savannahs in the foothills and mix conifer woodlands above 1,200 m (4,000 feet) elevation. The Mexican wolf is the southernmost occurring and most endangered subspecies of gray wolf in North America. The Mexican wolf is the last subspecies of gray wolf known to occur in the Arizona-New Mexico area. The last known naturally occurring U.S. specimen was found dead in New Mexico in 1970.

Historical range occurred in southeastern Arizona, southwestern New Mexico, southwestern Texas, and south through the Sierra Madre of Mexico.

Present range: In March 1998, the first 11 Mexican wolves from captive stock were reintroduced into the wild as an experimental nonessential population in the Apache National Forest in southeastern Arizona under a program to re-establish the subspecies to a portion of its historic

range. These wolves are allowed to disperse into and colonize the entire Apache National Forest and adjacent Gila National Forest in western New Mexico, an area of about 7,000 square miles (18,130 square kilometers).

Assessment: "No effect" or "No Jeopardy" determination given in the 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch.

Protective measures: None

Determination: Based on the proposed pesticides and the fact that they do not bio-accumulate in significant amounts, the occurrence of the wolf in low numbers, rarely occur on rangeland, the proposed rates of application, and the limited amount of time people will be present during treatments, grasshopper treatments on rangeland **may affect, not likely to adversely affect** the Mexican gray wolf.

5.1.3 Ocelot, *Leopardus pardalis*

Status: Endangered (37 FR 6176; March 30, 1972; 47 FR 31670; July 21, 1982) without critical habitat.

Habitat and Distribution: Desert scrub communities in Arizona; dense, almost impenetrable thickets in Texas; and humid tropical forests, coastal mangroves, and swampy savannahs in areas south of the U.S. Prey includes rabbits, small rodents, and birds. Universal component is presence of dense cover.
Historic Range: Ranged over much of Texas, southeastern Arizona, the west and east coasts of Mexico, and Central and South America, with individuals found as far south as northern Argentina.
Current Range: Individuals are still found in southern Texas, Mexico, and South and Central America in suitable habitat. Several unconfirmed sighting of ocelots have been made in Arizona in recent years. Four confirmed reports of ocelots have been received from Gila (one) and Cochise (three) counties since 2009. Based on photographic evidence, two of the reports from Cochise County were most likely of the same ocelot.

Assessment: Due to the fact that the Ocelot is nocturnal and is associated with dense cover, treatments for grasshoppers will occur only in open rangeland areas, reducing the likelihood of encounters. Treatments will not occur in dense covered habitat or thickets.

Protective measures: Treatments will not occur after dusk, or in dense covered habitat or thickets.

Determination: Based on the proposed pesticides and the fact that they do not bio-accumulate in significant amounts, the occurrence of the Ocelot in low numbers, rarely occur on rangeland, the proposed rates of application, and the limited amount of time people will be present during treatments, grasshopper treatments on rangeland **may affect, not likely to adversely affect** the Ocelot.

5.1.4 Black-footed ferret, *Mustela nigripes*

Status: Endangered (32 FR 4001; March 11, 1967) without critical habitat. Experimental nonessential population designated (61 FR 11320; March 20, 1996).

Habitat and Distribution: Grassland plains on mountain basins to 3,150 m (10,500ft.) elevation. Usually found in association with prairie dogs, which serve as their primary food source while also providing the ferrets with abandoned burrows for shelter.

Historical ranges included all or portions of the States of Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Oklahoma, Texas, Utah, Wyoming, and the Provinces of Alberta and Saskatchewan, Canada.
Current range includes reintroduced populations which are known to exist in the wild in Wyoming, Montana, South Dakota and now Aubrey Valley in Coconino County, Arizona. Undiscovered wild populations may still exist where prairie dogs persist, including in Arizona.

Assessment: The BFF is a nocturnal and fossorial species that relies solely on prairie dogs for food (FWS, 2013). Prairie dog diet consists almost exclusively of plant material which would not be impacted during program applications other than to provide protection from grasshopper outbreaks and therefore the primary food source for the BFF would be unaffected (Fagerstone, 1981, Uresk, 1986). Plague is a flea-transmitted disease of rodents caused by the bacterium *Yersinia pestis*. Management of Plague and the epizootic rodent - flea complexes is controlled using insecticides, carbaryl dust formulations is one method used. This has been applied on the burrows of prairie dogs and Black-footed ferret. There have been no adverse effects to the Black-footed ferret (FWS 1993). The bait formulation which APHIS uses is in the form of small pellets. Dust does accumulate at the bottom of the hopper toward the end of a load. There is a possibility that an application at the end of a load, if a burrow was encountered could get dusted. This may have some effect on flea populations in connection with Prairie dogs. These applications would be applied during daylight hours. The potential effects of diflubenzuron being a growth regulator, applied at application rates 1oz/acre would have no effect on mammals.

Protective Measures: Treatment applications would be using RAAT's alternative only. Applications will occur only during daylight hours. No liquid formulations of Carbaryl will be used. APHIS will use only Carbaryl bait applications in the area of known Prairie dog habitats. The application rate of 5lbs/acre or less would be used. This is less than the normal APHIS rate of 10lbs/acre.

Determination: Based on the proposed pesticides and the fact that they do not bio-accumulate in significant amounts, no buffers would be necessary. The occurrence of Black-footed ferret in low numbers, occurring on rangeland, the proposed rates of application, and the limited amount of time people will be present during grasshopper treatments on rangeland **may affect, not likely to adversely affect** the Black-footed ferret.

5.2 BIRDS

5.2.1 **Mexican spotted owl**, *Strix occidentalis lucida*

Status: Threatened (58 FR 14248, March 16, 1993). Critical habitat designated (69 FR 53182, August 31, 2004).

Habitat and Distribution: Occurs in varied habitat, consisting of mature montane forest and woodland, shady wooded canyons, and steep canyons. In forested habitat, uneven-aged stands with a high canopy closure, high tree density, and a sloped terrain appear to be key habitat components. They can also be found in mixed conifer and pine-oak vegetation types. Generally nests in older forests of mixed conifer or ponderosa pine/Gambel oak. Nests are found in live trees in natural platforms (e.g., dwarf mistletoe brooms), snags, and on canyon walls. Elevation ranges from 1,249 to 2,743 m (4,100 to 9,000 ft).

Historical Range extended from the southern Rocky mountains in Colorado and the Colorado Plateau in southern Utah southward through Arizona, New Mexico, and far western Texas, through the Sierra Madre Occidental and Oriental, to the mountains at the southern end of the Mexican Plateau.

Current range is thought to be similar to the historical range. Populations in Arizona are patchily distributed and occur where appropriate habitat is present throughout all but the arid southwestern portion of the state.

The San Carlos Apache Reservation is excluded from critical habitat designation under section 4(b) 2 of CFR 50 Part 17.

Assessment: No aerial treatments will occur in areas designated to be critical habitat. Ground treatments that may occur near areas where MSO are known to forage (e.g., Brolliar Park area) will use the RAAT's methodology. The potential effects would likely be disturbance with ground equipment for a few hours a day over a 2 day period of time in potential foraging areas.

Protective measures: APHIS will confer with the local Service at least 5 days prior to grasshopper control activities to determine if protective measures are needed.

Determination: APHIS will exclude the use of aerial treatments occurring in any forested areas where nesting may occur or critical habitat. All ground RAAT's treatments will occur on rangeland, based on proposed pesticides and the proposed rates of application, grasshopper treatments, **may affect not likely to adversely affect** the Mexican Spotted owl. Based on the potential disturbance from ground equipment which may occur in potential foraging areas, the duration of time as foreseen by APHIS would not exceed a few hours over a maximum of 2 days, **may affect not likely to adversely affect the critical habitat** of the Mexican spotted owl. APHIS will confer with FWS 5 days before applications and implementation of any protective measures recommended by the local Service.

5.2.2 **Southwestern willow flycatcher**, *Empidonax traillii extimus*

Status: Endangered (60 FR 10694, February 27, 1995) with critical habitat (50 CFR 60886, October 19, 2005). Designation of Revised Critical Habitat for Southwestern Willow Flycatcher (76 FR 50542, August 15, 2011).

Habitat and Distribution: Nests and forages in dense riparian habitats along streams, rivers, lakesides, and other wetlands. Some of the more common plant species used for nesting is: willow, box elder, tamarisk, Russian olive, buttonbush, cottonwood, and mesquite. Nests are found in dense thickets of these and other plant species that are about 4-7 m (13-23 ft) in height. Migration habitat is believed to primarily occur along riparian corridors. Habitat occurs at elevations below 8,500 ft (2,590 m).

Historical range includes southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico.

Current range: In Arizona, since the listing, territories have been detected on the Agua Fria, Gila, Little Colorado, Salt, San Pedro, Colorado, San Francisco, Hassayampa, Verde, Big Sandy, Santa Maria, Virgin, and Bill Williams rivers, and Pinal, Tonto and Cienega creeks. This species likely overwinters in Mexico, Central America, and possibly northern South America.

Assessment: No riparian areas are in the boundaries of proposed treatments. The common species of trees for nesting are not present in the proposed treatment areas. The proposed treatments are not likely to adversely affect the southwest willow flycatcher.

Protective measures: No treatments will occur within 5 miles of the Agua Fria, Gila, Little Colorado, Salt, San Pedro, Colorado, San Francisco, Hassayampa, Verde, Big Sandy, Santa Maria, Virgin, and Bill Williams's rivers, and Pinal, Tonto and Cienega creeks. No treatments will occur within 5 miles Gila River known nesting or habitat of Southwestern willow flycatcher. Treatments that may occur near the San Carlos River, a buffer of a .25 mile will be placed on nesting or habitat of this species.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, are not likely to adversely affect** the Southwestern willow flycatcher.

5.2.3 **Western Yellow-billed cuckoo**, *Coccyzus americanus*

Status: Proposed to be listed as Threatened with critical habitat. (78FR 61622, October 3, 2013). (Proposal to List the Western Yellow-billed Cuckoo as a Threatened Species - Comments Accepted through February 24, 2014.) (78 FR 61633)

Habitat: The western yellow-billed cuckoo currently nests almost exclusively in low to moderate elevation riparian woodlands that cover 50 acres (ac) (20 hectares (ha)) or more within arid to semiarid landscapes. Occupied habitat in Arizona may also contain box elder (*Acer negundo*), Arizona alder (*Alnus oblongifolia*), Arizona walnut (*Juglans major*), Arizona sycamore (*Platanus wrightii*), oak (*Quercus* spp.), netleaf hackberry (*Celtis reticulata*), velvet ash (*Fraxinus velutina*), Mexican elderberry (*Sambuccus mexicanus*), tamarisk (*Tamarix* spp.; also

called salt cedar), and seepwillow (*Baccharis glutinosa*). Surveys conducted by the Arizona Breeding Bird Atlas reported 68 percent of the yellow-billed cuckoo observations were in lowland riparian woodlands, often containing a variable combination of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk.

Western yellow-billed cuckoos require large blocks of riparian habitat for breeding. Home ranges are large; vary in size depending on seasonal food abundance, and overlap greatly both between members of a pair and between neighboring pairs. At the landscape level, the amount of cottonwood–willow-dominated vegetation cover and the width of riparian habitat influences western yellow-billed cuckoo distribution and abundance. On the lower Colorado River, in a comparison of occupied versus unoccupied habitat, yellow-billed cuckoos were found at sites with denser riparian vegetation and more variation in vegetation density, and less tamarisk and shrubby vegetation, compared to unoccupied sites.

Recent radio telemetry studies on the Rio Grande in New Mexico, the San Pedro River in Arizona, and the Colorado River in Arizona and California have shown that yellow-billed cuckoos use large home ranges of 204 ac (82 ha), 125 ac (51 ha), and 95 ac (38 ha), respectively. Breeding densities on the South Fork Kern River, where intensive surveys for yellow-billed cuckoos were conducted for 17 years, averaged 0.81 pairs per 100 ac (40 ha) which means they had home ranges of about 123 ac (50 ha) on average. On the Verde River in Arizona, sites occupied by yellow-billed cuckoos were composed of deciduous riparian habitat at least 325 ft. (100 m) in width, dominated by Fremont cottonwood, Goodding's willow (*Salix gooddingii*), Arizona alder, and Arizona sycamore, often adjacent to patches of mesquite.

Assessment: No riparian areas are in the boundaries of proposed treatments. The common species of trees for nesting are not present in the proposed treatment areas. The proposed treatments are not likely to adversely affect the yellow-billed cuckoo.

Protective measures: No treatments will occur within 5 miles of the Gila River known nesting habitat of yellow-billed cuckoo. Treatments that may occur near the San Carlos River, a buffer of a .25 mile will be placed on nesting or habitat of this species. No treatments will occur within 5 miles of the Virgin and Colorado River known nesting or habitat of the yellow-billed cuckoo.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments will have **may affect, not likely to adversely effect** on the yellow-billed cuckoo.

5.2.4 California Condor, *Gymnogyps californianus*

Status: Endangered (32 FR 4001, March 11, 1967) with critical habitat in California (41 FR 187, September 24, 1976). Experimental nonessential population designated for Southwest reintroduction (61 FR 54044, October 16, 1996).

Habitat and Distribution: Nesting sites are in various rock formations, including caves, crevices, and potholes in isolated regions of the southwestern U.S. Foraging for carrion occurs over long distances, as a condor can travel 80-160 km (48-96 miles) per day in search of food. Flights

follow routes over foothills and mountains. Roosting is usually on rock cliffs, snags, or in live conifer stands. These areas are important for resting, preening, and socializing.
RANGE: Historic**:** Isolated regions of the California Coast, Sierra Nevada, and Transverse Ranges, western Texas, Arizona, Utah, New Mexico, and Baja California Norte, Mexico.
CURRENT: Captive-reared condors have been reintroduced to Hopper Mountain and Bitter Creek National Wildlife Refuges, and Los Padres National Forest in Kern, Ventura, San Luis Obispo, and Santa Barbara Counties, California, and further north in Ventana Wilderness Sanctuary in Monterey County in California. USFWS began reintroducing an experimental nonessential population of California condors in the Vermilion Cliffs area in northern Arizona (Coconino County) and southern Utah in December 1996 and Hurricane Cliffs on the Arizona Strip in December 1998. California condors may be found in Mohave, Coconino, Navajo, and Apache counties, Arizona.

Assessment: Roosting is usually on rock cliffs, snags, or in live conifer stands. These areas are important for resting, preening, and socializing. No treatments will occur in any forested areas or over terrain considered habitat for nesting, roosting and release sites.

Protective measures: Treatments that may occur near Vermillon Cliffs on the Arizona Strip District of BLM, APHIS will observe the following buffers from currently occupied nests, roosts or release sites, for ground applications a .25 mile buffer will be observed, for high aerial applications 1.5 mile buffer will be applied. If flight over a nest is necessary, applicators should maintain a minimal altitude of 3,000 feet and make sure the shutoff of pesticide sprayers or spreaders has occurred. APHIS will confer with the local Service at least 5 days prior to grasshopper control activities to determine if any other protective measures are needed.

Determination: Based on the implementation of protective measures and the fact that no treatments will occur in any forested areas or terrain where nesting may occur. All treatments will occur on open rangeland. APHIS has determined based on proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the California condor.

5.2.5 Yuma clapper rail, *Rallus longirostris yumanensis*

Status: Endangered (32 FR 4001, March 11, 1967).

Habitat and Distribution: Inhabits freshwater or brackish stream-sides and marshlands under 1,372 m (4,500 ft) elevation. It is associated with dense riparian and marsh vegetation. It requires a wet substrate, such as a mudflat, sandbar, or slough bottom that supports cattail and bulrush stands of moderate to high density adjacent to shorelines.

Historical Range: Uncertain. This species may have occurred in the marshes of the Lower Colorado River and its tributaries in Mexico and the United States. No records in U.S. before 1902 (Yuma County); type specimen taken near Laguna Dam in 1921.
Current Range: Occurs along the Colorado River (Yuma, La Paz, and Mohave counties, Arizona), from Lake Mead to Mexico; on the Gila and Salt rivers upstream to the area of the Verde confluence (Maricopa and Pinal counties, Arizona); at Picacho Reservoir (Pinal County, Arizona); and on the Tonto Creek arm of Roosevelt Lake (Gila County). This species may be expanding into other suitable marsh habitats in western and central Arizona.

Assessment: All riparian areas will be buffered out of any proposed treatments. The Colorado River riparian and marsh lands associated with the Yuma clapper rail will be buffered out of treatment areas so as not to disrupt habitat and nesting of this endangered species.
Protective measures: All aerial treatment areas will maintain protective buffers of 1 mile upstream and downstream of the Colorado River and tributaries which may be considered habitat. Ground applications using diflubenzuron or carbaryl bait will adhere to a 500 foot buffer. Malathion ULV applications will be excluded. Due to the terrain along the rim of the Grand Canyon it is very unlikely that ground application equipment will safely transverse steep slopes. Thus the ground buffer will likely be greater in most action areas.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, are not likely to adversely affect** the Yuma clapper rail.

5.3 AMPHIBIANS

5.3.1 Chiricahua leopard frog, *Rana chiricahuensis*

The Chiricahua leopard frog was not listed at the time of the 1995 Biological Opinion.
Status: Threatened (67 FR 40790, June 13, 2002) with critical habitat. (77 FR 16324, March 20, 2012).

Habitat and Distribution: The Chiricahua leopard frog was historically an inhabitant of cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 ft in central, east-central, and southeastern Arizona (Santa Cruz, Apache, Gila, Pima, Cochise, Greenlee, Graham, Yavapai, Coconino, and Navajo counties); west-central and southwestern New Mexico; and in Mexico, northeastern Sonora and the Sierra Madre Occidental of northwestern Chihuahua. The Chiricahua leopard frog is now often restricted to springs, livestock tanks, and streams in the upper portions of watersheds where non-native predators either have yet to invade or habitats are marginal for them.

Historical range includes 182 localities known for the species in Arizona and New Mexico, respectively. An additional 13 localities are known from Sonora and Chihuahua, Mexico.

Current range is similar to its historical range, but the frog is not well-represented in many areas now, and has apparently disappeared from some drainages and mountain ranges. At the time of listing (2002) the frog was likely extant at an estimated 87 and 41 localities in Arizona and New Mexico, respectively. As of December 2005, FWS estimate the frog is likely extant at 58 and 30-35 localities in Arizona and New Mexico, respectively; which represents extirpation from 77-79 percent of historical U.S. localities. Current status and trends in Mexico are unknown.

Assessment: APHIS grasshopper and Mormon cricket program activities may adversely affect the Chiricahua leopard frog. Direct toxic effects could occur to the Chiricahua leopard frog and indirect effects through loss of prey items could also occur should it be exposed to program

insecticides. However, in order to remove the potential adverse effects to the Chiricahua leopard frog and its prey, APHIS will implement the following measures.

Protective measures: To protect the Chiricahua leopard frog and its prey from ULV application of carbaryl only RAATs application will be used. A 500 ft. ground buffer and a 0.25 mile high aerial buffer will be used for livestock tanks and other bodies of water which may be used as habitat of the Chiricahua leopard frog. In addition, the first swath adjacent to the buffer around the known location will be a skipped swath. For carbaryl baits, only RAATs application will be used. A 500 ft. buffer (ground or aerial) will be used from known locations of the Chiricahua leopard frog. For ULV application of diflubenzuron, a 500 ft. ground buffer and a 0.25 mile aerial buffer will be implemented for suitable habitat of the Chiricahua leopard frog. Buffers applied will extend 0.5 mile upstream from drainages to bodies of water and 300 ft downstream to protect habitat. The label will be followed to reduce environmental hazards and will not be applied where runoff is likely to occur.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, are not likely to adversely affect** Chiricahua leopard frog. No treatments will occur within or near critical habitat for this species; therefore the proposed action will have **no effect on critical habitat** for the Chiricahua leopard frog.

5.4 FISH

5.4.1 Apache trout, *Oncorhynchus apache*

Status: Threatened (40 FR 29864, July 19, 1975) without critical habitat.
Habitat and Distribution: Occurs in small, cold, high-gradient streams above 1,524 m (5,000 ft) elevation. These streams have substrates consisting of boulders, rocks, and gravel, with some sand or silt, and flow through mixed conifer forests and mountain meadows.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting the Apache trout.

Protective measures: The northern boundary of action area made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile out from the canyon rim of the river. All other locations will maintain protective buffers along occupied habitat will be applied 1 mile upstream. No aerial ULV application of Malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl also should be adhered too. Ground applications using diflubenzuron a 400 foot buffer will be adhered too. Low aerial applications will adhere to a 1/8 mile buffer. All protective buffers along Bonita creek will be applied 1 mile upstream.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the Apache trout.

5.4.2 **Desert pupfish**, *Cyprinodon macularius*

Status: Endangered (51 FR 10842, March 31, 1986) with critical habitat.

Habitat and Distribution: Found in shallow water of desert springs, small streams and marshes below 1,515m (5,000 ft.) elevation. The species tolerates high salinities and high water temperatures.

Historic range: Once common in desert springs, marshes, backwaters and tributaries of the Rio Sonoyta, San Pedro River, Santa Cruz River, Lower Gila River, and Lower Colorado River drainages in Arizona, California and Mexico.

Current range: Restricted to one population in Quitobaquito Spring and pond in Pima County and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai counties, Arizona. New introductions continue.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting the Desert pupfish.

Protective measures: The northern boundary of action area made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile out from the canyon rim of the river. All other locations will maintain protective buffers along occupied habitat will be applied 1 mile upstream. No aerial ULV application of Malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl also should be adhered too. Ground applications using diflubenzuron a 400 foot buffer will be adhered too. Low aerial applications will adhere to a 1/8 mile buffer. All protective buffers along Bonita creek will be applied 1 mile upstream.

Determination: Based on proposed treatment areas excluding critical habitat; Salt River, Black River and Bonita Creek from action area, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the Desert pupfish or critical habitat of the Desert pupfish.

5.4.3 **Gila chub**, *Gila intermedia*

The Gila chub was not listed at the time of the 1995 Biological Opinion.

Status: Endangered with critical habitat (70 FR 66664, November 2, 2005).

Habitat and Distribution: Gila chub commonly inhabit pools in smaller streams, cienegas, and artificial impoundments ranging in elevation from 609 to 1,676 m (2,000 to 5,500 ft). Common riparian plants associated with these populations include willow (*Salix* spp.), tamarisk (*Tamarix* spp.), cottonwoods (*Populus* spp.), seep-willow (*Baccharis glutinosa*), and ash (*Fraxinus* spp.). Typical aquatic vegetation includes watercress (*Nasturtium officianale*), horsetail (*Equisetum* spp.), rushes (*Juncus* spp.), and speedwell (*Veronica anagallis-aquatica*). Gila chub are highly secretive, preferring quiet deeper waters, especially pools, or remaining near cover including terrestrial vegetation, boulders, and fallen logs. Adults are often found in deep pools and eddy

below areas with swift currents. Young-of-the-year inhabits shallow water among plants or debris, while older juveniles use higher velocity stream areas. No streams or rivers are located within proposed treatment area.

Historic range: Gila chub likely occurred in suitable habitat throughout the entire Gila River basin, with the possible exception of the Salt River drainage above Roosevelt Lake.

Current range: Gila chub have been recorded from approximately 43 rivers, streams, and spring-fed tributaries throughout the Gila River basin in northern Sonora, Mexico, central and southeastern Arizona, and western New Mexico. However, since 2000, only 29 of these populations remain occupied, and all of these are all small, isolated, and threatened. These 29 populations occur in tributaries of the Agua Fria, Babocomari, Gila, San Francisco, San Pedro, Santa Cruz, and upper Verde rivers in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties, Arizona, and in Grant County, New Mexico.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting *Gila boraxobius, Gila nigrescens, Gila bicolor, Gila robusta jordani*. APHIS feels that these protective measures will also be suitable for the Gila chub.

Protective measures: The northern boundary of action area made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile out from the canyon rim of the river. All other locations will maintain protective buffers along occupied habitat will be applied 1 mile upstream. No aerial ULV application of Malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl also should be adhered too. Ground applications using diflubenzuron a 400 foot buffer will be adhered too. Low aerial applications will adhere to a 1/8 mile buffer. All protective buffers along Bonita creek will be applied 1 mile upstream.

Determination: Based on proposed treatment areas excluding critical habitat; Salt River, Black River and Bonita Creek from action area, the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the Gila chub or critical habitat of the Gila chub.

5.4.4 Gila topminnow, *Poeciliopsis occidentalis occidentalis*

Status: Endangered (32 FR 4001, March 11, 1967) without critical habitat.

Habitat and Distribution: Occurs in small streams, springs, and cienegas below 1,350 m (4,500 ft) elevation, primarily in shallow areas with aquatic vegetation and debris for cover. Gila topminnow can tolerate relatively high water temperatures and low dissolved oxygen.

Historic range was commonly found throughout the Gila River drainage in Arizona and extended into Mexico and New Mexico.

Current range is only in Mexico and Arizona. In Arizona, most of the remaining native populations are in the Santa Cruz River system. Species occurs in small streams, springs, and cienegas in Gila, Pinal, and Graham, Yavapai, Santa Cruz, Pima, Maricopa, and La Paz counties.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting the Gila topminnow.

Protective measures: The northern boundary of action area made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile out from the canyon rim of the river. All other locations will maintain protective buffers along occupied habitat will be applied 1 mile upstream. No aerial ULV application of Malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl also should be adhered too. Ground applications using diflubenzuron a 400 foot buffer will be adhered too. Low aerial applications will adhere to a 1/8 mile buffer. All protective buffers along Bonita creek will be applied 1 mile upstream.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** Gila topminnow.

5.4.5 Loach minnow, *Tiaroga cobitis*

Status: Endangered (51 FR 39468, October 28, 1986) with critical habitat (77 FR 10810, February 23, 2012).

Habitat and Distribution: Bottom dweller of small to large perennial creeks and rivers, typically in shallow turbulent riffles with cobble substrate, swift currents, and filamentous algae. Found below 8,000 feet (2,438 m) elevation. Recurrent flooding is instrumental in maintenance of quality habitat.

Historical range: Once common throughout much of the Gila River system north of Phoenix, Arizona, including the Gila, Blue, Tularosa, White, Verde, Salt, San Pedro, and San Francisco rivers in Arizona and New Mexico, as well as some of their tributaries.

Current range: Present populations are geographically isolated and inhabit the upstream ends of their historical range. The species persists in Arizona in limited reaches in the East Fork of the White River (Navajo County), Aravaipa Creek, Deer Creek, and Turkey Creek (Graham and Pinal counties), San Francisco and Blue Rivers and Eagle, Campbell Blue, and Little Blue creeks (Greenlee County). This species is also found in Bass Canyon in (Cochise, Graham Counties) and Redfield Canyon in (Pima, Graham and Cochise Counties). These canyons are over 4 miles from action areas and would be excluded from action areas. In New Mexico, the species is found in the Gila and San Francisco rivers and some of their tributaries, including the West, Middle, and East forks of the Gila River, the Tularosa River, and Dry Blue, Pace, Frieborn, and Negrito creeks in Catron, Grant, and Hidalgo counties. A population was recently found in Bear Creek, a tributary to the Gila River.

Potential range: Undiscovered populations may exist in un-sampled Gila basin streams.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting the loach minnow.

Protective measures: The northern boundary of action area made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile out from the canyon rim of the river. All other locations will maintain protective buffers along occupied habitat will be applied 1 mile upstream. No aerial ULV application of Malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl also should be adhered too. Ground applications using diflubenzuron a 400 foot buffer will be adhered too. Low aerial applications will adhere to a 1/8 mile buffer. All protective buffers along Bonita creek will be applied 1 mile upstream.

Determination: Based on proposed treatment areas excluding critical habitat; Salt River, Black River and Bonita Creek from action area, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the loach minnow or the critical habitat of the loach minnow.

5.4.6 Spikedace, *Meda fulgida*

Status: Endangered (51 FR 23769, July 1, 1986) with critical habitat (77 FR 10810, February 23, 2012).

Habitat and Distribution: Found in moderate to large perennial streams, where it inhabits moderate to fast velocity waters over gravel and rubble substrates. Specific habitat consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges. Recurrent flooding helps the spikedace maintain its competitive edge over invading exotic species. Typically occupied streams are found less than 6,000 feet (1,829 m) in elevation.

Historical range was once common throughout much of the Gila River drainage above Phoenix, Arizona, including the Gila, Verde, Agua Fria, Salt, San Pedro, and San Francisco rivers.

Current range: In Arizona, populations are found in Aravaipa Creek, and are believed to be present in the Verde River, Eagle Creek, and the middle Gila River within Graham, Pinal, Greenlee, and Yavapai counties. This species is also found in Bass Canyon in (Cochise, Graham Counties) and Redfield Canyon in (Pima, Graham and Cochise Counties) would be excluded from action areas. These canyons are over 4 miles from action areas. In New Mexico, the spikedace is found in the mainstream Gila River, as well as in the lower end of the West, Middle, and East forks of the Gila River within Hidalgo, Grant, and Catron counties. Undiscovered populations may exist in un-sampled Gila basin streams.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting the Spikedace.

Protective measures: The northern boundary of action area made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile out from the canyon rim of the river. All other locations will maintain protective buffers along occupied habitat will be applied 1 mile upstream. No aerial ULV application of Malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl also should be adhered too. Ground applications using diflubenzuron a 400 foot buffer will be adhered too. Low aerial

applications will adhere to a 1/8 mile buffer. All protective buffers along Bonita creek will be applied 1 mile upstream.

Determination: Based on proposed treatment areas excluding critical habitat; Salt River, Black River and Bonita Creek from action area, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the Spikedace or the critical habitat if the Spikedace.

5.4.7 Humpback chub, *Gila cypha*

Status: Endangered with critical habitat (59 FR 13374 13400, March 21, 1994).

Habitat and Distribution: Humpback chub habitat preferences are not well understood. The humpback chub have been associated with a variety of habitats ranging from pools with turbulent to little or no current; substrates of silt, sand, boulder, or bedrock; and depth ranging from 1 meter to as deep as 15 meters. Occurs in a variety of riverine habitats, especially canyon areas with fast current, deep pools, and boulder habitat. Generally found in habitats below 1,219 m (4,000 ft.) in elevation.
Historic range: Endemic to the Colorado River Basin from below Lake Mead to Flaming Gorge on the Green River, Wyoming, and the Yampa River, Colorado. Their historic distribution in the Colorado River Basin is uncertain. Current range of the species occurs in the Grand Canyon and Marble Canyon (Coconino County, Arizona) portions of the mainstream of the Colorado River (Mohave County, Arizona) and in the lower Little Colorado River.

Assessment: Critical habitat would include the mainstream of the Colorado River from Marble Canyon downstream to Lake Mead. All stream tributaries along this stretch of the Colorado River will also be considered critical habitat and thus will be buffered 1 mile for any aerial applications.

Protective measures: All aerial treatment areas will maintain protective buffers of 1 mile upstream and downstream of the Colorado River and tributaries which may be critical habitat. Ground applications using diflubenzuron or carbaryl bait will adhere to a 500 foot buffer. Malathion ULV applications will be excluded. Due to the terrain along the rim of the Grand Canyon it is very unlikely that ground application equipment will safely transverse steep slopes. Thus the ground buffer will likely be greater in most action areas.

Determination: Based on excluded critical habitat; suitable and safe terrain for ground application equipment and personnel, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the Humpback chub or the critical habitat.

5.4.8 Razorback sucker, *Xyrauchen texanus*

Status: Endangered with critical habitat (59 FR 13374 13400, March 21, 1994).

Habitat and Distribution: Found in backwaters, flooded bottomlands, pools, side channels and other slower moving habitats under 1,829 m (6,000 ft) elevation. Historically found in areas near

strong currents. Razorback suckers are named for the bony keel on their backs. They are the largest species of suckers that live in the Colorado River and reach a maximum length of 36 inches. They may live 40 years or more, feeding on a variety of insects and crustaceans.
Historical range: Endemic to the Colorado River Basin. Formerly occurred in all major rivers and larger streams in the Basin and was once the most widespread and abundant of the Basin's big-river fishes.
Current range: In the Lower Basin, populations isolated to Lakes Mohave, Mead, and the lower Colorado River below Havasu. In the Upper Basin, small remnant populations are found in the Green, Yampa, and mainstream Colorado rivers. Also found in the San Juan River near the New Mexico-Utah border. The species is found in parts of Greenlee, Mohave, Pinal, Yavapai, Yuma, La Paz, Maricopa, Gila, Coconino, and Graham counties, Arizona.

Assessment: Critical habitat includes parts of the Yampa, Greene, Duchesne, White, Colorado, San Juan, Gila, Salt, and Verde rivers. Also includes Lake Mohave, Lake Mead, and Colorado River below Parker Dam. Currently, populations are being reared at Willow Beach and Dexter National Fish Hatcheries, and Bubbling Ponds State Fish Hatchery. Reintroductions continue in the Verde River and in the Colorado River from Lake Mead to Imperial Reservoir. On June 17, 2014 in a release from Dept. of Interior, this species was discovered upstream from Lake Mead within the Grand Canyon National Park boundaries.

Protective measures: All aerial treatment areas will maintain protective buffers of 1 mile upstream and downstream of the Colorado River and tributaries which may be critical habitat. Ground applications using diflubenzuron or carbaryl bait will adhere to a 500 foot buffer. Malathion ULV applications will be excluded. Due to the terrain along the rim of the Grand Canyon it is very unlikely that ground application equipment will safely transverse steep slopes. Thus the ground buffer will likely be greater in most action areas.
4.4.10.5 Determination: Based on excluded critical habitat; suitable and safe terrain for ground application equipment and personnel, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the Razorback sucker or the critical habitat.

5.4.9 Headwater chub, *Gila nigra*

Status: Candidate for listing.

Habitat and Distribution: Headwater chubs occupy middle to headwater reaches of medium-sized streams of the Gila River basin at elevations of 925 to 2,000 m (3,035 to 6,651 ft). Headwater chubs are usually found in large pools and are usually associated with cover such as undercut banks, large pools, or deep places created by obstructions like trees or rocks. Typical adult microhabitat consists of deep, near shore pools adjacent to swifter riffles and runs.

RANGE: Historical: The historical range of the headwater chub in Arizona was small and was limited to several headwater areas within the Gila River basin. Those included the Tonto Creek sub-basin within the Salt River drainage, east-side tributaries in the middle Verde River basin, the upper Gila River and its forks, and the San Carlos River basin.

Current: The known present range of headwater chub includes 13 streams in the Verde River

basin, Tonto Creek sub-basin, and San Carlos River basin in Yavapai, Gila, and Graham counties, Arizona.

Assessment: APHIS feels the protective measures outlined in the 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting *Gila boraxobius, Gila nigrescens, Gila bicolor, Gila robusta jordani*, would be sufficient for this candidate species.

Protective measures: The northern boundary of action area made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile out from the canyon rim of the river. All other locations will maintain protective buffers along occupied habitat will be applied 1 mile upstream. No aerial ULV application of Malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl also should be adhered too. Ground applications using diflubenzuron a 400 foot buffer will be adhered too. Low aerial applications will adhere to a 1/8 mile buffer.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the Headwater chub.

5.4.10 Roundtail chub, *Gila robusta*

Status: Candidate for listing.

Habitat and Distribution: The Roundtail chub is a member of the minnow family Cyprinidae. Roundtail chub are streamlined, similar to trout in appearance, and characterized by a robust body and tail, are olive gray in color, with silvery sides and a white belly. The Roundtail chub matures at about 2-3 years of age and likely lives about 7 years or more. Breeding males develop red or orange coloration on the lower half of the cheek and at the bases of paired fins. Individuals may reach 49.0 cm (19.3 in) but usually average 25-30 cm (9.8 - 11.8 in). Spawning occurs in the late spring; females broadcast about 2,000 tiny sticky eggs over gravel and cobble bottom. Transparent larvae 25 mm in length (.3 inches) hatch in 5 days and grow to about 76 mm (3 inches) in one year. They are omnivores, feeding mostly on aquatic insects, and to a lesser extent on fishes and other vertebrates.

HABITAT: Roundtail chub occur in cool to warm water over a wide range of elevations in rivers and streams throughout the Colorado River basin, often occupying open areas of the deepest pools and eddies of mid-sized to larger streams. Roundtail chubs are often associated with areas of cover in the form of boulders, overhanging cliffs, undercut banks, or vegetation.

RANGE: Historical: Found throughout the Colorado River basin from Wyoming to Arizona and likely into Mexico, and in the mainstem and most large tributaries. Roundtail chub of the lower Colorado River Basin DPS were historically found in the mainstem and many perennial tributaries of the Colorado, Little Colorado, Bill Williams, Gila, Verde, Salt, San Francisco, San Pedro, and Zuni rivers in Arizona, New Mexico and also possibly in Mexico.

Current: The species is common to rare in the mainstem Colorado River and its larger tributaries in the upper Colorado River basin in Wyoming, Utah and Colorado; and is common to rare in the

lower Colorado River basin (constituting the DPS) in approximately 31 localities in tributaries of the Little Colorado and Bill Williams rivers, and in the mainstem and tributaries of the Gila, Salt, and Verde rivers (Apache, Coconino, Gila, Graham, Greenlee, LaPaz, Maricopa, Mohave, Navajo, Pinal, and Yavapai counties, Arizona, and Grant County, New Mexico).

Assessment: APHIS feels the protective measures outlined in the 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting *Gila boraxobius, Gila nigrescens, Gila bicolor, Gila robusta jordani*, would be sufficient for this candidate species.

Protective measures: The northern boundary of action area made by the Salt and Black River and tributaries will be excluded from treatments and buffered by 1 mile out from the canyon rim of the river. All other locations will maintain protective buffers along occupied habitat will be applied 1 mile upstream. No aerial ULV application of Malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl also should be adhered too. Ground applications using diflubenzuron a 400 foot buffer will be adhered too. Low aerial applications will adhere to a 1/8 mile buffer.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments **may affect, not likely to adversely affect** the Roundtail chub.

5.5 REPTILES

5.5.1 Northern Mexican gartersnake, *Thamnophis eques megalops*

Status: Candidate to be listed as a T&E species. The U.S. Fish and Wildlife Service were petitioned in December 2003 to list the Mexican gartersnake as an endangered or threatened species with critical habitat under the Endangered Species Act. The Mexican gartersnake is a sensitive species of Special Concern of the Arizona Game and Fish Department, is considered a State Endangered Species by the New Mexico Department of Game and Fish, and is listed as Threatened by the Mexican Federal government.

Habitat and Distribution: This species occurs up to about 8,500 feet in elevation, but is most frequently found between 3,000 and 5,000 ft. The Mexican gartersnake uses three general habitat types in Arizona: 1) source area ponds and cienegas; 2) lowland river riparian forests and woodlands; and 3) upland stream gallery forests. This species uses densely vegetated cienegas, cienega-streams, and stock tanks in the southern part of its distribution in Mexico and within its historical distribution in New Mexico.

An important component to suitable Mexican gartersnake habitat is a stable native prey base. The Mexican gartersnake is surface-active at ambient temperatures ranging from 71˚ F to 91˚ F and forages along the banks of waterbodies feeding primarily upon native fish (e.g. Gila topminnow, desert pupfish, etc.) and adult and larval native ranid frogs (e.g. lowland leopard frog, Chiricahua leopard frog, etc.). It may also supplement its diet with earthworms and vertebrates such as lizards, small rodents, salamanders, and hylid frogs (treefrogs). In some populations, adult Mexican gartersnakes will prey upon juvenile nonnative bullfrogs and/or

bullfrog tadpoles where they co-occur.

Sexual maturity in male Mexican gartersnakes occurs at two years, and in two to three years in females. Mexican gartersnakes are ovoviviparous. The species mates in April and May in their northern distribution and gives live birth to between seven and 26 neonates (average is 13.6) in July and August. Only half of the sexually mature females within a population reproduce in any one season.

HISTORICAL RANGE: The Mexican gartersnakes' historical distribution in the U.S. included the Santa Cruz, San Pedro, Colorado, Gila, Salt, Agua Fria, Rio Yaqui, and Verde River watersheds in Arizona, in addition to the upper Gila and San Francisco headwater streams in western Grant and Hidalgo counties in New Mexico. Within Mexico, Mexican gartersnakes historically occurred within the Sierra Madre Occidental and the Mexican Plateau in the Mexican states of Sonora, Chihuahua, Durango, Coahila, Zacatecas, Guanajuato, Nayarit, Hidalgo, Jalisco, San Luis Potosí, Aguascalientes, Tlaxacala, Puebla, México, Michoacán, Oaxaca, Veracruz, and Querétaro

CURRENT RANGE: The Mexican gartersnake is likely extirpated from New Mexico. In Arizona, its distribution has been reduced to less than ten percent of its former range along large mainstem rivers. The species is considered likely extant in fragmented populations within the middle/upper Verde River drainage, middle/lower Tonto Creek, and the Cienega Creek drainage, as well as in a small number of isolated wetland habitats in southeastern Arizona. The species' current distribution in Mexico is uncertain.

Assessment: The Mexican gartersnake uses three general habitat types in Arizona: 1) source area ponds and cienegas; 2) lowland river riparian forests and woodlands; and 3) upland stream gallery forests. Based on the fact that this candidate species occurs in riparian areas and treatments would occur on open rangeland areas, treatments may affect but are not likely to adversely affect this species.

Protective measures: To protect this candidate species, APHIS will apply only RAAT's ground applications of carbaryl bait (pellets) and implement a 100 foot buffer from stock tanks or other bodies of water. Applications using diflubenzuron (Dimilin), only RAAT's ground applications with a 350 foot buffer would be implemented from stock tanks or other bodies of water. The Salt and Black Rivers will be excluded from treatment areas and a buffer of 1 mile from canyon rim will be applied. Tributaries to these rivers will be excluded from treatments due to the rough terrain making it unsafe for APHIS treatment personnel. Notification prior to treatments on rangeland would be made to the FWS.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments occurring only on rangeland the proposed action is **may affect but not likely to adversely affect** the Northern Mexican gartersnake.

5.5.2 Narrow-headed gartersnake, *Thamnophis rufipunctatus*

Status: Proposed Threatened with critical habitat (78 FR 41550 July 10, 2013),

Habitat and Distribution: The narrow-headed gartersnake is one of the most aquatic of the gartersnakes. This species is strongly associated with clear, rocky streams using predominantly pool and riffle habitat that includes cobbles and boulders, but it has also been observed using lake shoreline habitat in New Mexico. The species occurs at elevations from 2,300 – 8,200-feet in four types of biotic communities: Petran Montane Conifer Forest, Great Basin Conifer Woodland, Interior Chaparral, and the Arizona Upland subdivision of Sonoran Desertscrub. Narrow-headed gartersnakes primarily prey upon native fishes, including Sonora and desert suckers, speckled dace, and roundtail, headwater, and Gila chub. It also preys on native and nonnative trout. Unlike most species of gartersnakes that actively crawl about in search of prey, narrow-headed gartersnakes are ambush predators that often anchor to stream cobbles and wait for passing fish.

HISTORICAL RANGE: Perennial drainages across the Mogollon Rim from northern and eastern Arizona, southeast into southwestern New Mexico.

CURRENT RANGE: The species may still persist in the Upper Gila River subbasin, the Middle Gila River subbasin, the San Francisco River subbasin, the Salt River subbasin, the Tonto Creek subbasin; and the Verde River subbasin. Approximately 76% of narrow-headed gartersnake populations occur at low densities and are likely not viable.

Eagle Creek – is known to support at least six species of native fish (Fernandez and Rosen 1996, p. 71; Holycross *et al.* 2006, p. 47; Turner and List 2007, p. 9). Surveys have not occurred on the uppermost reaches of Eagle Creek located on the San Carlos Apache Indian Reservation but there is no reason to suspect that narrow-headed gartersnakes do not occur there where suitable habitat persists. The notable decline of this once-reliable population of narrow-headed gartersnakes is of serious concern. However, their history in Eagle Creek suggests the species remains extant there, likely as a very low-density population, possibly augmented from emigration of individuals from the San Francisco River.

Black River – Numerous historical records document the narrow-headed gartersnake in the Black River. Fifteen narrow-headed gartersnakes were captured in a 2007 survey effort that consisted of approximately 96 person-search hours and 9,300 trap-hours (Brennan 2007, p. 5). Brennan and Rosen (2009, p. 7) surveyed the Black River in Arizona in 2009, with a total investment of effort that consisted of approximately 54 person-search hours and 2,442 trap-hours, which resulted in the capture of 19 narrow-headed gartersnakes. Dense stands of willows overhang the stream channel; an important structural component to suitable narrow-headed gartersnake habitat. (Holycross *et al.* 2006), There is an approximate 75 river mile (121 km) reach of the Black River on White Mountain Apache Tribe lands that has never been surveyed. Big Bonito Creek and the Salt River may contribute emigrating individuals to the Black River. The narrow-headed gartersnake may be extant in the Black River, likely in low density populations.

Assessment: Based on the fact that this species occurs in aquatic/riparian areas and treatments would occur on open rangeland areas, treatments may affect but are not likely to adversely affect this species.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments occurring only on rangeland the proposed action is **may affect but not likely to adversely affect** the narrow-headed gartersnake.

5.5.3 Sonoran Desert tortoise, *Gopherus morafkai*

Status: Candidate to be listed under the Endangered Species Act (75 FR 78094). The U.S. Fish and Wildlife Service determined, on December 10, 2010, the Sonoran population of the desert tortoise warrants protection under the ESA but is precluded by the need to address other higher priorities. The Service will develop a proposed rule to list the Sonoran population of the desert tortoise as their priorities allow.

Habitat and Distribution: Desert tortoises that occur east and south of the Colorado River in Arizona are referred to as the Sonoran population. Sonoran desert tortoises are most closely associated with the Arizona Upland and Lower Colorado River subdivisions of Sonoran desertscrub and Mojave desertscrub vegetation types and, to a lesser extent, also found in other habitat types within their range and elevation parameters. They occur most commonly on rocky, steep slopes and bajadas (lower mountain slopes often formed by the coalescing of several alluvial fans and in paloverde-mixed cacti associations. Washes and valley bottoms may be used in dispersal and in some areas, as all or part of home ranges. Sonoran desert tortoises in Arizona generally occur within elevations from 510 to 5,300 ft, although according to the Arizona Game and Fish Department's Heritage Data Management system, 95 percent of Sonoran desert tortoises in Arizona occur between 904 to 4,198 feet in elevation. The Sonoran desert tortoise is an herbivore, and has been documented to eat 199 different species of plants, including herbs (55.3 percent), grasses (17.6 percent), woody plants (22.1 percent), and succulents (5 percent).
Historical Range: Found in suitable habitat south and east of the Colorado River in Arizona in all counties except for Navajo, Apache, Coconino, and Greenlee counties, south to the Rio Yaqui in southern Sonora, Mexico.
Current Range: Historical core populations remain extant in Arizona. Concerns for population genetics exist due to habitat fragmentation and barrier (roads, urban development, canals, railroads, etc.) development in valley bottoms used for dispersal and exchange of genetic material. Currently occupied range in Mexico is less understood.

Assessment: Due to the fact that Carbaryl and Malathion are class 1 in Reptile toxicity group these pesticides will not be used in known Desert Tortoise habitat for suppression of rangeland grasshoppers. Diflubenzuron (Dimilin) is a class 0 in Reptile toxicity group and would be the only pesticide that would be available for APHIS to use in known Desert Tortoise habitat. Ground application could subject tortoises to vehicle collisions. Pre-application surveys will be conducted and training for applicators to identify and avoid tortoises.

Protective measures: Occurrences are most commonly on rocky, steep slopes and bajadas (lower mountain slopes often formed by the coalescing of several alluvial fans and in paloverde-mixed cacti associations. If treatments are within known habitat, dimilin 2L would be used. Pre-application surveys will be conducted and extra precaution will be used by applicators applying ground applications to minimize and avoid encounters of desert tortoises.

Determination: Based on the determined protection measures proposed pesticide and the proposed rates of application, any grasshopper treatments occurring on rangeland within this species habitat, **may affect but not likely to adversely affect** the Sonoran Desert tortoise.

5.6 PLANTS

5.6.1 Arizona cliff-rose, *Purshia subintegra*

Status: Endangered (49 FR 22326, May 29, 1984) without critical habitat.

Habitat and Distribution: This species grows only on Tertiary limestone lakebed deposits. The distinctive white soil color of these deposits can be seen from a distance. RANGE: All four localities of this species are in central Arizona below the Mogollon Rim. These known sites include the Burro Creek drainage (Mohave County), Horseshoe Lake (Maricopa County), Verde Valley (Yavapai County) and the San Carlos Indian Reservation (Graham County).

Potential: In central Arizona below the Mogollon Rim where Tertiary limestone lakebed deposits occur.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting the Arizona cliff-rose.

Protective measures: Aerial applications of pesticides will not be used within 3 miles of Threatened and Endangered species occupied habitats. Within the 3 mile buffer, only RAAT's application of carbaryl bait will be used. Cottonwood Canyon will be excluded from treatments with a .5 mile buffer extending out from canyon rim. APHIS will provide notification prior to treatments to the San Carlos Wildlife Department and Forestry Department.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments will have **no effect** on the Arizona cliff-rose.

5.6.2 Arizona hedgehog cactus, *Echinocereus triglochidiatus* var. *arizonicus*

Status: Endangered (44 FR 61556; October 15, 1979) without critical habitat.

Habitat and Distribution: Plants are found on dacite or granite bedrock, open slopes, in narrow cracks between boulders, and in the understory of shrubs in the ecotone between Madrean Evergreen Woodland and Interior Chapparal. Elevation ranges from about 1,130-1,585 m (3,200-5,200 ft). Found in Gila and Pinal counties in central Arizona. Exact locations are not provided because illegal collecting threatens the species. Can be found wherever the habitat description is met.

Assessment: The 1995 Biological Opinion letter dated 10/3/95 to Mr. Bausch details the agreed-to measures for protecting the Arizona hedgehog cactus. Local APHIS has determined in Arizona all occupied habitat will be excluded from treatment areas.

Protective measures: None. All occupied habitat is excluded from treatment areas.

Determination: Based on the determined protection measures, proposed pesticides and the proposed rates of application, grasshopper treatments will have **no effect** on the Arizona hedgehog cactus.

Summary

APHIS has determined that the proposed action will **not affect**: the endangered Arizona cliff-rose (*Purshia subintegra*); endangered Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*).

APHIS has determined that the proposed action **may affect but is not likely to adversely affect:** the endangered Lesser long-nosed bat, (*Leptonycteris curasoae yerbabuenae*); endangered Mexican gray wolf (*Canis lupus baileyi*); endangered Ocelot, (*Leopardus pardalis*); endangered Black-footed ferret (*Mustela nigripes*); endangered Southwestern willow flycatcher (*Empidonax traillii extimus*) with critical habitat; endangered California Condor (*Gymnogyps californianus*); endangered Yuma clapper rail (*Rallus longirostris yumanensis*); endangered Desert pupfish (*Cyprinodon macularius*) with critical habitat; endangered Gila chub (*Gila intermedia*) with critical habitat; endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*); endangered Loach minnow (*Tiaroga cobitis*) with critical habitat; endangered Spikedace (*Meda fulgida*) with critical habitat; endangered Humpback chub (*Gila cypha*) with critical habitat; endangered Razorback sucker (*Xyrauchen texanus*) with critical habitat; threatened Mexican spotted owl (*Strix occidentalis lucida*) with critical habitat; threatened Chiricahua leopard frog (*Lithobates chiricahuensis*) with critical habitat; threatened Apache trout (*Oncorhynchus apache*); threatened Western yellow-billed cuckoo (*Coccyzus americanus*) with proposed critical habitat, (final ruling expected sometime in 2015); threatened Northern Mexican gartersnake (*Thamnophis eques megalops*); and threatened Narrow-headed gartersnake, *Thamnophis rufipunctatus* with critical habitat.

APHIS has determined that the proposed action for candidate and sensitive species of concern **may affect but not likely to adversely affect**: Headwater chub *(Gila nigra*); Roundtail chub (*Gila robusta*); and Sonoran Desert tortoise (*Gopherus morafkai*).

6. Monitoring

Monitoring involves the evaluation of various aspects of the grasshopper suppression programs. There are three aspects of the programs that may be monitored. The first is the efficacy of the treatment. APHIS will determine how effective the application of an insecticide has been in suppressing the grasshopper population within a treatment area and will report the results in a Work Achievement Report to Field Operations.

The second area included in monitoring is safety. This includes ensuring the safety of the program personnel through medical monitoring conducted specifically to determine risks of a hazardous material. (See APHIS Safety and Health Manual (USDA, APHIS, 1998) available online at: www.aphis.usda.gov/mb/aseu/shes/shes-manual.html).

The third area of monitoring is environmental monitoring. APHIS Directive 5640.1 commits APHIS to a policy of monitoring the effects of Federal programs on the environment. Environmental monitoring includes such activities as checking to make sure the insecticides are applied in accordance with the labels, and that sensitive sites and organisms are protected. The environmental monitoring recommended for grasshopper suppression programs involves monitoring sensitive sites such as bodies of water used for human consumption or recreation or which have wildlife value, habitats of endangered and threatened species, habitats of other sensitive wildlife species, edible crops, and any sites for which the public has expressed concern or where humans might congregate (e.g., schools, parks, hospitals).

7. Literature Cited

Adams, J.S., Knight, R.L., McEwen, L.C., and George, T.L., 1994. Survival and growth of nestling vesper sparrow exposed to experimental food reductions. The Condor 96:739–748.

Beyers, D.W., Farmer, M.S., and Sikoski, P.J., 1995. Effects of rangeland aerial application of Sevin-4-Oil® on fish and aquatic invertebrate drift in the Little Missouri River, North Dakota. Archives of Environmental Contamination and Toxicology 28:27–34.

Brown, David E. 1994. Biotic Communities: Southwestern United States and northwestern Mexico. University of Utah Press.

Catangui, M.A., Fuller, B.W., and Walz, A.W., 1996. Impact of Dimilin® on nontarget arthropods and its efficacy against rangeland grasshoppers. *In* U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1996. Grasshopper Integrated Pest Management User Handbook, Tech. Bul. No. 1809. Sec. VII.3. Washington, DC.

Census 2000. U.S. Bureau of the Census.

Dobroski, C.J., O'Neill, E.J., Donohue, J.M., and Curley, W.H., 1985. Carbaryl: a profile of its behavior in the environment. Roy F. Weston, Inc., West Chester, PA, and V.J. Ciccone and Associates, Inc., Woodbridge, VA.

Driscoll, JT., K.V. Jacobson, G.L. Beatty, J.S. Canaca, and J.G. Koloszar. 2006. Conservation assessment and strategy for the bald eagle in Arizona. Nongame and Endangered Wildlife program Technical Report 173. Arizona Game and Fish Department, Phoenix, Arizona.

Eisler, R., 2000. Handbook of chemical risk assessment: health hazards to humans, plants, and animals. Lewis Publishers, New York.

Emmett, B.J., and Archer, B.M, 1980. The toxicity of diflubenzuron to honey bee (*Apis melifera* L.) Colonies in apple orchards. Plant Pathology 29:637–183.

EPA – see U.S. Environmental Protection Agency

Foster, R.N., Reuter, K.C., Fridley, K., Kurtenback, D., Flakus, R., Bohls, R., Radsick, B., Helbig, J.B., Wagner A., and Jech, L., 2000. Field and economic evaluation of operational scale reduced agent and reduced area treatments (RAATs) for management of grasshoppers in South Dakota rangeland, 1997–1999. U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Phoenix AZ. Available online: http://www.sidney.ars.usda.gov/grasshopper.

Hazardous Substances Database, 1990. On-line database. National Library of Medicine, Bethesda, MD.

HSDB – see Hazardous Substances Database

Lockwood, J.A., and Schell, S.P., 1997. Decreasing economic and environmental costs through reduced area and agent insecticide treatments (RAATs) for the control of rangeland grasshoppers: empirical results and their implications for pest management. Journal of Orthoptera Research 6, November 1997, p. 19–32.

Lockwood, J.A., Schell, S.P., Foster, R.N., Reuter, C., and Rachadi, T., 2000. Reduced agentarea treatments (RAATs) for management of rangeland grasshoppers: efficacy and economics under operational conditions. International Journal of Pest Management 46(1):29–42.

Mayer, F.L., Jr, and Ellersieck, M.C., 1986. Manual of acute toxicity: interpretation and data base for 410 chemicals and 66 species of freshwater animals. Resource Publication 160. Department of the Interior, Fish and Wildlife Service, Washington, DC.

McEwen, L.C., Althouse, C.M., and Peterson, B.E., 1996a. Direct and indirect effects of grasshopper integrated pest management (GHIPM) chemicals and biologicals on nontarget animal life. *In* U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1996. Grasshopper Integrated Pest Management User Handbook, Tech. Bul. No. 1809. Sec. III.2. Washington, DC.

McEwen, L.C., Petersen, B.E., and Althouse, C.M., 1996b. Bioindicator species for evaluating potential effects of pesticides on threatened and endangered wildlife. *In* U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1996. Grasshopper Integrated Pest Management User Handbook, Tech. Bul. No. 1809. Sec. III.7. Washington, DC.

Norelius, E.E., and Lockwood, J.A., 1999. The effects of reduced agent-area insecticide treatments for rangeland grasshopper (Orthoptera: Acrididae) control on bird densities. Archives of Environmental Contamination and Toxicology 37:519–528.

Opdycke, J.C., Miller, R.W., and Menzer, R.E., 1982. Metabolism and fate of diflubenzuron in swine. Journal of Agricultural Food and Chemistry 30:1223–1227.

Quinn, M.A., 1996. Impact of control programs on nontarget arthropods. *In* U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1996. Grasshopper Integrated Pest Management User Handbook, Tech. Bul. No. 1809. Sec. III.3. Washington, DC.

Schroeder, W.J., Sutton, R.A., and Beavers, L.B., 1980. *Diaprepes abbreviatus*: Fate of diflubenzuron and effect on nontarget pest and beneficial species after application to citrus for weevil control. J. Econ. Entomol. 73:637–638.

Tsuda, T., Aoki, S., Kojima, M., and Harada, H., 1989. Bioconcentration and excretion of diazinon, IBP, malathion, and fenitrothion by willow shiner. Toxicology and Environmental Chemistry 24:185–190.

USDA – see U.S. Department of Agriculture

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1998. Safety and health manual. Safety, Health, and Environmental Staff, Riverdale, MD. February 28, 1998. [online] available: http://www.aphis.usda.gov/mb/aseu/shes/shes-manual.html.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1999. APHIS Directive 5600.3, Evaluating APHIS programs and activities for ensuring protection of children from environmental health risks and safety risks. September 3, 1999. U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Riverdale, MD. [online] available: http://www.aphis.usda.gov/library/directives.

U.S. Environmental Protection Agency, 1993. Carcinogenicity peer review of carbaryl, 1–napthyl n–methylcarbamate. MRID 421889—01, 02. Memorandum from Ray Landolt, Toxicological Branch II, October 7, 1993, 35 pp

U.S. Environmental Protection Agency, 2000. Cancer Assessment Document #2. Evaluation of the carcinogenic potential of malathion. Report of the 12 April 2000 meeting and its 29 attachments. April 28, 2000. U.S. Environmental Protection Agency, Washington, DC.

U.S. Fish and Wildlife Service, 2007. National Bald Eagle Management Guidelines. U.S. Department of Interior, Fish and wildlife Service. May 2007. [online] available: http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf

8. Listing of Agencies and Persons Consulted

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Seligman, AZ 86337

9. Appendices

Appendix 1

APHIS Rangeland Grasshopper and Mormon cricket Suppression Program
FY-2016 Treatment Guidelines
Version 2/11/2016

The objectives of the APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program are to 1) conduct surveys in 17 Western States; 2) provide technical assistance to land managers; and 3) when funds permit, suppress economically damaging grasshopper and Mormon cricket outbreaks on Federal, Tribal, State, and/or private rangeland. The Plant Protection Act of 2000 provides APHIS the authority to take these actions.

General Guidelines for Grasshopper / Mormon cricket Treatments

1. All treatments must be in accordance with:
    a. the Plant Protection Act of 2000;
    b. applicable environmental laws and policies such as: the National Environmental Policy Act, the Endangered Species Act, the Federal Insecticide, Fungicide, and Rodenticide Act, and the Clean Water Act (including National Pollutant Discharge Elimination System requirements – if applicable);
    c. applicable state laws;
    d. APHIS Directives pertaining to the proposed action;
    e. Memoranda of Understanding with other Federal agencies.

2. Subject to the availability of funds, upon request of the administering agency or the agriculture department of an affected State, APHIS, to protect rangeland, shall immediately treat Federal, Tribal, State, or private lands that are infested with grasshoppers or Mormon crickets at levels of economic infestation, unless APHIS determines that delaying treatment will not cause greater economic damage to adjacent owners of rangeland. In carrying out this section, APHIS shall work in conjunction with other Federal, State, Tribal, and private prevention, control, or suppression efforts to protect rangeland.

3. Prior to the treatment season, conduct meetings or provide guidance that allows for public participation in the decision making process. In addition, notify Federal, State and Tribal land managers and private landowners of the potential for grasshopper and Mormon cricket outbreaks on their lands. Request that the land manager / land owner advise APHIS of any sensitive sites that may exist in the proposed treatment areas.

4. Consultation with local Tribal representatives will take place prior to treatment programs to fully inform the Tribes of possible actions APHIS may take on Tribal lands.

5. On APHIS run suppression programs, the Federal government will bear the cost of treatment up to 100 percent on Federal and Tribal Trust land, 50 percent of the cost on State land, and 33 percent of cost on private land. There is an additional 16.15% charged to any funds received by APHIS for federal involvement with suppression treatments.

6. Land managers are responsible for the overall management of rangeland under their control to prevent or reduce the severity of grasshopper and Mormon cricket outbreaks. Land managers are encouraged to have implemented Integrated Pest Management Systems prior to requesting a treatment. In the absence of available funding or in the place of APHIS funding, the Federal land management agency, Tribal authority or other party/ies may opt to reimburse APHIS for suppression treatments. Interagency agreements or reimbursement agreements must be completed prior to the start of treatments which will be charged thereto.

7. There are situations where APHIS may be requested to treat rangeland that also includes areas where crops are being grown (typically less than 10 percent of the treatment area). In those situations the crop owner pays the entire treatment costs on the croplands.

   NOTE: the insecticide being considered must be labeled for included crop as well as rangeland.

8. In some cases, rangeland treatments may be conducted by other federal agencies (e.g., Forest Service, Bureau of Land Management, or Bureau of Indian Affairs) or by non-federal entities (e.g., Grazing Association or County Pest District). APHIS may choose to assist these groups in a variety of ways, such as:
   a. loaning equipment(an agreement may be required):
   b. contributing in-kind services such as surveys to determine insect species, instars, and infestation levels;
   c. monitoring for effectiveness of the treatment;
   d. giving technical guidance.

9. In areas considered for treatment, State-registered beekeepers and organic producers shall be notified in advance of proposed treatments. If necessary, non-treated buffer zones can be established.

Operational Procedures

GENERAL PROCEDURES FOR ALL AERIAL AND GROUND APPLICATIONS

1. Follow all applicable Federal, Tribal, State and local laws and regulations in conducting grasshopper and Mormon cricket suppression treatments.

2. Notify residents within treatment areas, or their designated representatives, prior to proposed operations. Advise them of the control method to be used, proposed method of application, and precautions to be taken.

3. One of the following insecticides that are labeled for rangeland use can be used for a suppression treatment of grasshoppers and Mormon crickets:
    a) Carbaryl
        a. solid bait
        b. ultra low volume spray
    b) Diflubenzuron ultra low volume spay
    c) Malathion ultra-low volume spray

4. Do not apply insecticides directly to water bodies (defined herein as reservoirs, lakes, ponds, pools left by seasonal streams, springs, wetlands, and perennial streams and rivers).

    Furthermore, provide the following buffers for water bodies:

    - 500-foot buffer with aerial liquid insecticide.
    - 200 foot buffer with ground liquid insecticide.
    - 200-foot buffer with aerial bait.
    - 50-foot buffer with ground bait.

5. Instruct program personnel in the safe use of equipment, materials and procedures; supervise to ensure procedures are properly followed.

6. Conduct mixing, loading, and unloading in an approved area where an accidental spill would not contaminate a water body.

7. Each aerial suppression program will have a Contracting Officer's Representative (COR) OR a Treatment Manager on site. Each State will have at least one COR available to assist the Contracting Officer (CO) in GH/MC suppression programs.

    NOTE: A Treatment Manager is an individual that the COR has delegated authority to oversee the actual suppression treatment; someone who is on the treatment site and overseeing/coordinating the treatment and communicating with the COR. No specific

training is required, but knowledge of the Aerial Application Manual and treatment experience is critical; attendance to the Aerial Applicators Workshop is very beneficial.

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8. Each suppression program will conduct environmental monitoring as outlined in the current year's Environmental Monitoring Plan.

   APHIS will assess and monitor rangeland treatments for the efficacy of the treatment, to verify that a suppression treatment program has properly been implemented and assure that any environmentally sensitive sites were protected.

9. APHIS reporting requirements associated with grasshopper / Mormon cricket suppression treatments can be found in the APHIS Grasshopper Program Guidebook: http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/grasshopper.pdf

SPECIFIC PROCEDURES FOR AERIAL APPLICATIONS

1. APHIS Aerial treatment contracts will adhere to the current year's Statement of Work.

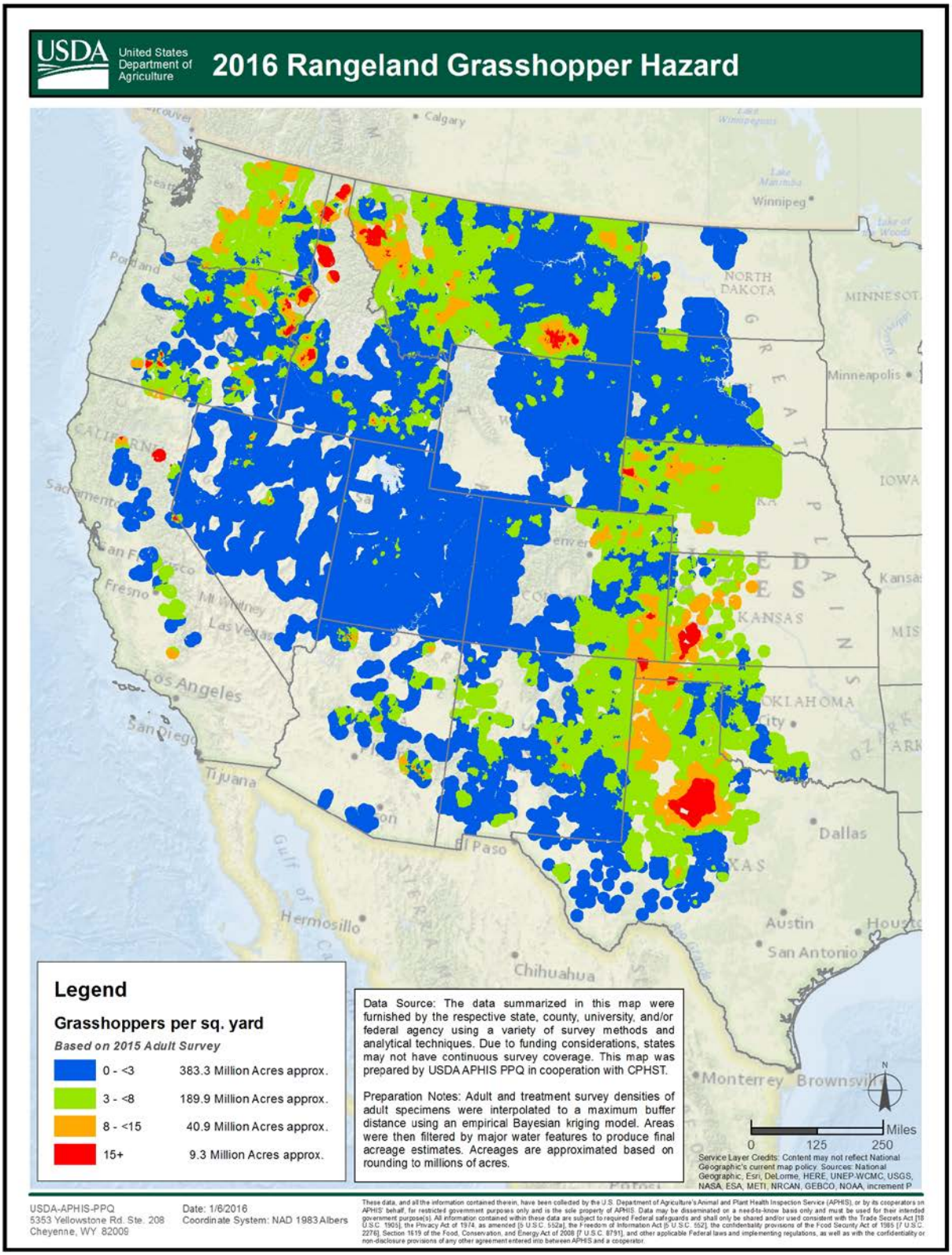
2. Minimize the potential for drift and volatilization by not using ULV sprays when the following conditions exist in the spray area:
   a. Wind velocity exceeds 10 miles per hour (unless state law requires lower wind speed);
   b. Rain is falling or is imminent;
   c. Dew is present over large areas within the treatment block;
   d. There is air turbulence that could affect the spray deposition;
   e. Temperature inversions (ground temperature higher than air temperature) develop and deposition onto the ground is affected.

3. Weather conditions will be monitored and documented during application and treatment will be suspended when conditions could jeopardize the correct spray placement or pilot safety.

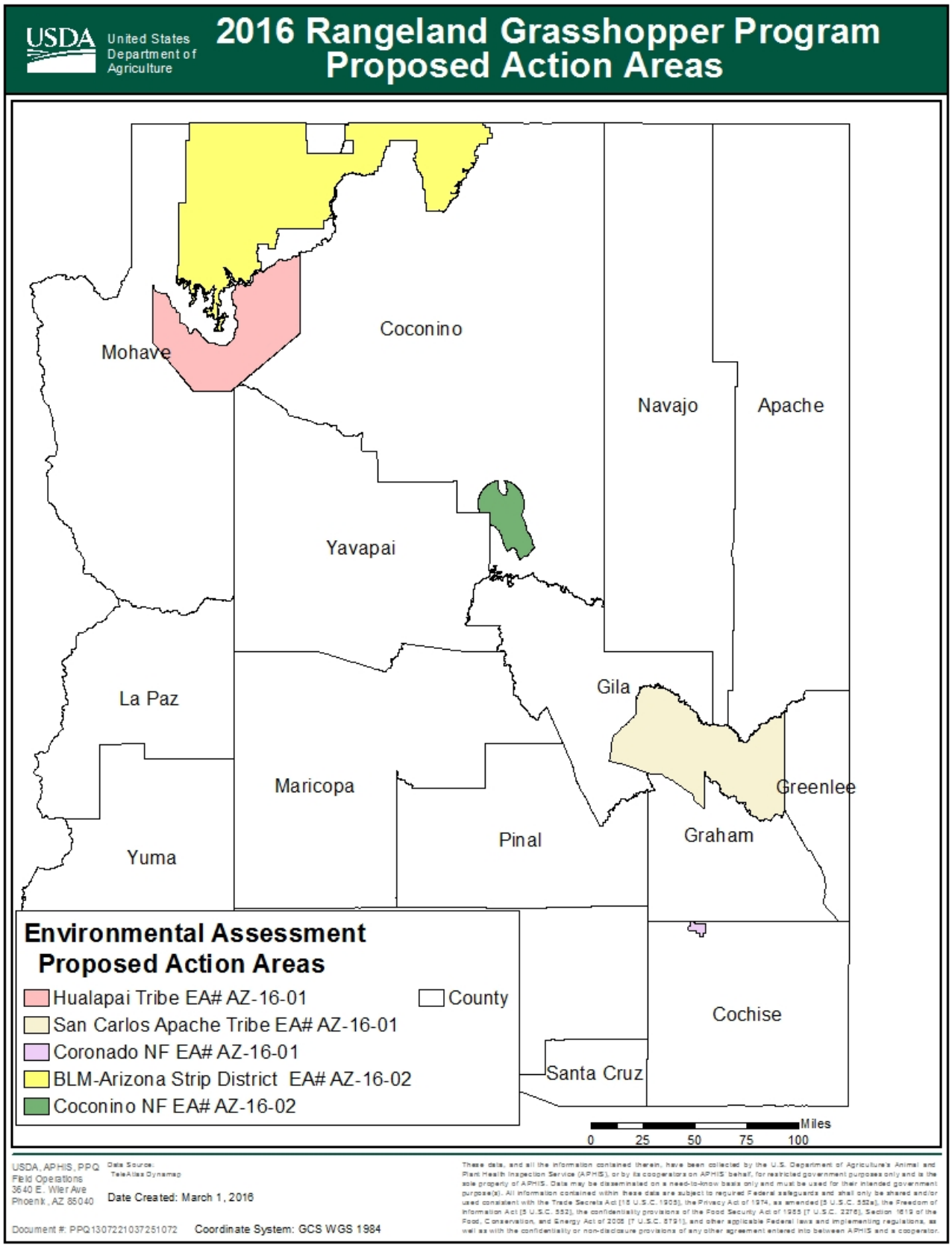
4. Application aircraft, if used, will fly at a median altitude of 1 to 1.5 times the aircraft's wingspan.

5. Whenever possible, plan aerial ferrying and turnaround routes to avoid flights over congested areas, water bodies, and other sensitive areas that are not to be treated.

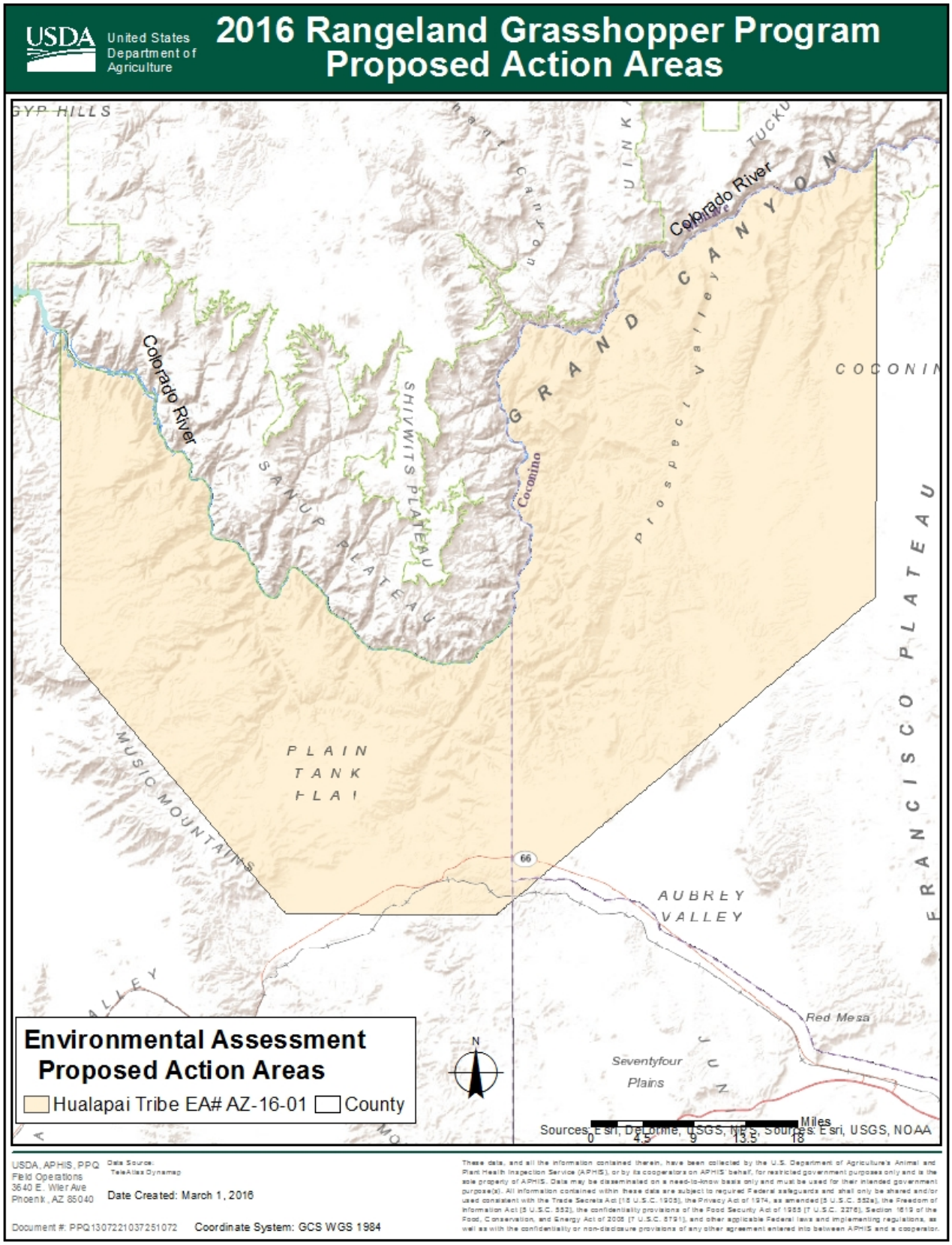
Appendix 2


USDA United States Department of Agriculture
2016 Rangeland Grasshopper Hazard
Legend
Grasshoppers per sq. yard
Based on 2015 Adult Survey
0 - <3 383.3 Million Acres approx.
3 - <8 189.9 Million Acres approx.
8 - <15 40.9 Million Acres approx.
15+ 9.3 Million Acres approx.
Data Source: The data summarized in this map were furnished by the respective state, county, university, and/or federal agency using a variety of survey methods and analytical techniques. Due to funding considerations, states may not have continuous survey coverage. This map was prepared by USDA APHIS PPQ in cooperation with CPHST.
Preparation Notes: Adult and treatment survey densities of adult specimens were interpolated to a maximum buffer distance using an empirical Bayesian kriging model. Areas were then filtered by major water features to produce final acreage estimates. Acreages are approximated based on rounding to millions of acres.
Miles
0 125 250
Service Layer Credits: Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P
USDA-APHIS-PPQ
5353 Yellowstone Rd. Ste. 208
Cheyenne, WY 82009
Date: 1/6/2016
Coordinate System: NAD 1983 Albers
These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), or by its cooperators on APHIS' behalf, for restricted government purposes only and is the sole property of APHIS. Data may be disseminated on a need-to-know basis only and must be used for their intended government purpose(s). All information contained within these data are subject to required Federal safeguards and shall only be shared and/or used consistent with the Trade Secrets Act [18 U.S.C. 1905], the Privacy Act of 1974, as amended [5 U.S.C. 552a], the Freedom of Information Act [5 U.S.C. 552], the confidentiality provisions of the Food Security Act of 1985 [7 U.S.C. 2276], Section 1619 of the Food, Conservation, and Energy Act of 2008 [7 U.S.C. 8791], and other applicable Federal laws and implementing regulations, as well as with the confidentiality or non-disclosure provisions of any other agreement entered into between APHIS and a cooperator.

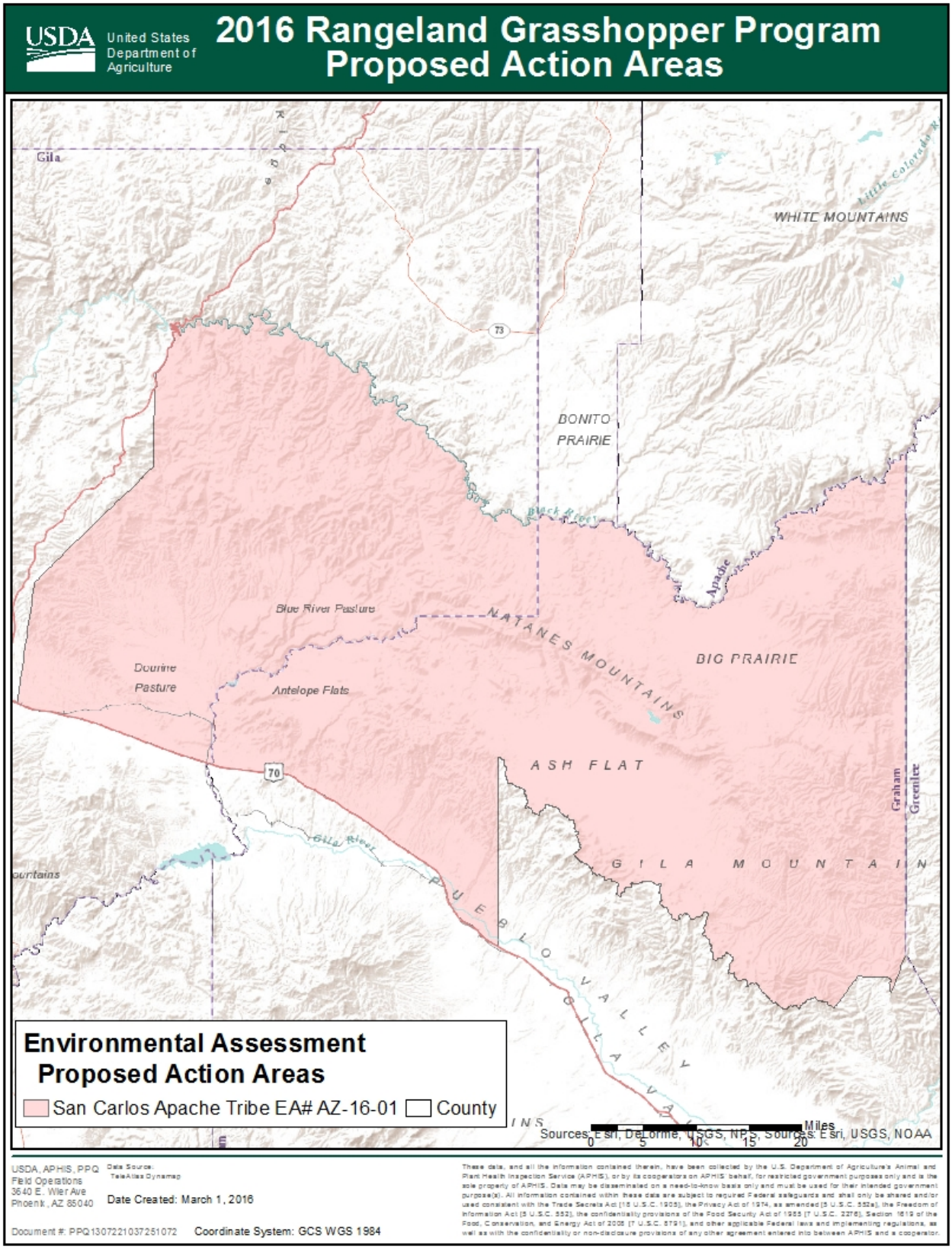
Appendix 3


USDA United States Department of Agriculture
2016 Rangeland Grasshopper Program
Proposed Action Areas
Coconino
Mohave
Navajo
Apache
Yavapai
La Paz
Gila
Maricopa
Greenlee
Pinal
Graham
Yuma
Cochise
Santa Cruz
Environmental Assessment
Proposed Action Areas
Hualapai Tribe EA# AZ-16-01
San Carlos Apache Tribe EA# AZ-16-01
Coronado NF EA# AZ-16-01
BLM-Arizona Strip District EA# AZ-16-02
Coconino NF EA# AZ-16-02
County
Miles
0 25 50 75 100
USDA, APHIS, PPQ
Field Operations
3640 E. Wier Ave
Phoenix, AZ 85040
Data Source:
TeleAtlas Dynamap
Date Created: March 1, 2016
Document #: PPQ130722103725107 2
Coordinate System: GCS WGS 1984
These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), or by its cooperators on APHIS' behalf, for restricted government purposes only and is the sole property of APHIS. Data may be disseminated on a need-to-know basis only and must be used for their intended government purpose(s). All information contained within these data are subject to required Federal safeguards and shall only be shared and/or used consistent with the Trade Secrets Act [18 U.S.C. 1905], the Privacy Act of 1974, as amended [5 U.S.C. 552a], the Freedom of Information Act [5 U.S.C. 552], the confidentiality provisions of the Food Security Act of 1985 [7 U.S.C. 2276], Section 1619 of the Food, Conservation, and Energy Act of 2008 [7 U.S.C. 8791], and other applicable Federal laws and implementing regulations, as well as with the confidentiality or non-disclosure provisions of any other agreement entered into between APHIS and a cooperator.

Appendix 4


USDA United States Department of Agriculture
2016 Rangeland Grasshopper Program
Proposed Action Areas
GYP HILLS
Colorado River
GRAND CANYON
Prospect Valley
COCONINO
Colorado River
SHIVWITS PLATEAU
SANUP PLATEAU
Coconino
PLAIN TANK FLAT
MUSIC MOUNTAINS
66
AUBREY VALLEY
FRANCISCO PLATEAU
Red Mesa
Seventyfour Plains
Environmental Assessment
Proposed Action Areas
Hualapai Tribe EA# AZ-16-01
County
N
Miles
0 4.5 9 13.5 18
Sources: Esri, DeLorme, USGS, NPS, Sources: Esri, USGS, NOAA
USDA, APHIS, PPQ
Field Operations
3640 E. Wier Ave
Phoenix, AZ 85040
Data Source:
TeleAtlas Dynamap
Date Created: March 1, 2016
Document #: PPQ1307221037251072
Coordinate System: GCS WGS 1984
These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), or by its cooperators on APHIS' behalf, for restricted government purposes only and is the sole property of APHIS. Data may be disseminated on a need-to-know basis only and must be used for their intended government purpose(s). All information contained within these data are subject to required Federal safeguards and shall only be shared and/or used consistent with the Trade Secrets Act [18 U.S.C. 1905], the Privacy Act of 1974, as amended [5 U.S.C. 552a], the Freedom of Information Act [5 U.S.C. 552], the confidentiality provisions of the Food Security Act of 1985 [7 U.S.C. 2276], Section 1619 of the Food, Conservation, and Energy Act of 2008 [7 U.S.C. 8791], and other applicable Federal laws and implementing regulations, as well as with the confidentiality or non-disclosure provisions of any other agreement entered into between APHIS and a cooperator.

Appendix 5


USDA United States Department of Agriculture
2016 Rangeland Grasshopper Program
Proposed Action Areas
Gila
WHITE MOUNTAINS
Little Colorado R.
73
BONITO
PRAIRIE
Black River
Apache
Blue River Pasture
NATANES MOUNTAINS
BIG PRAIRIE
Dourine
Pasture
Antelope Flats
70
ASH FLAT
Graham
Greenlee
Gila River
G I L A M O U N T A I N
P U E B L O V A L L E Y
Environmental Assessment
Proposed Action Areas
San Carlos Apache Tribe EA# AZ-16-01
County
Sources: Esri, DeLorme, USGS, NPS
Sources: Esri, USGS, NOAA
Miles
0 5 10 15 20
USDA, APHIS, PPQ
Field Operations
3640 E. Wier Ave
Phoenix, AZ 85040
Data Source:
TeleAtlas Dynamap
Date Created: March 1, 2016
Document #: PPQ130722103725107 2
Coordinate System: GCS WGS 1984
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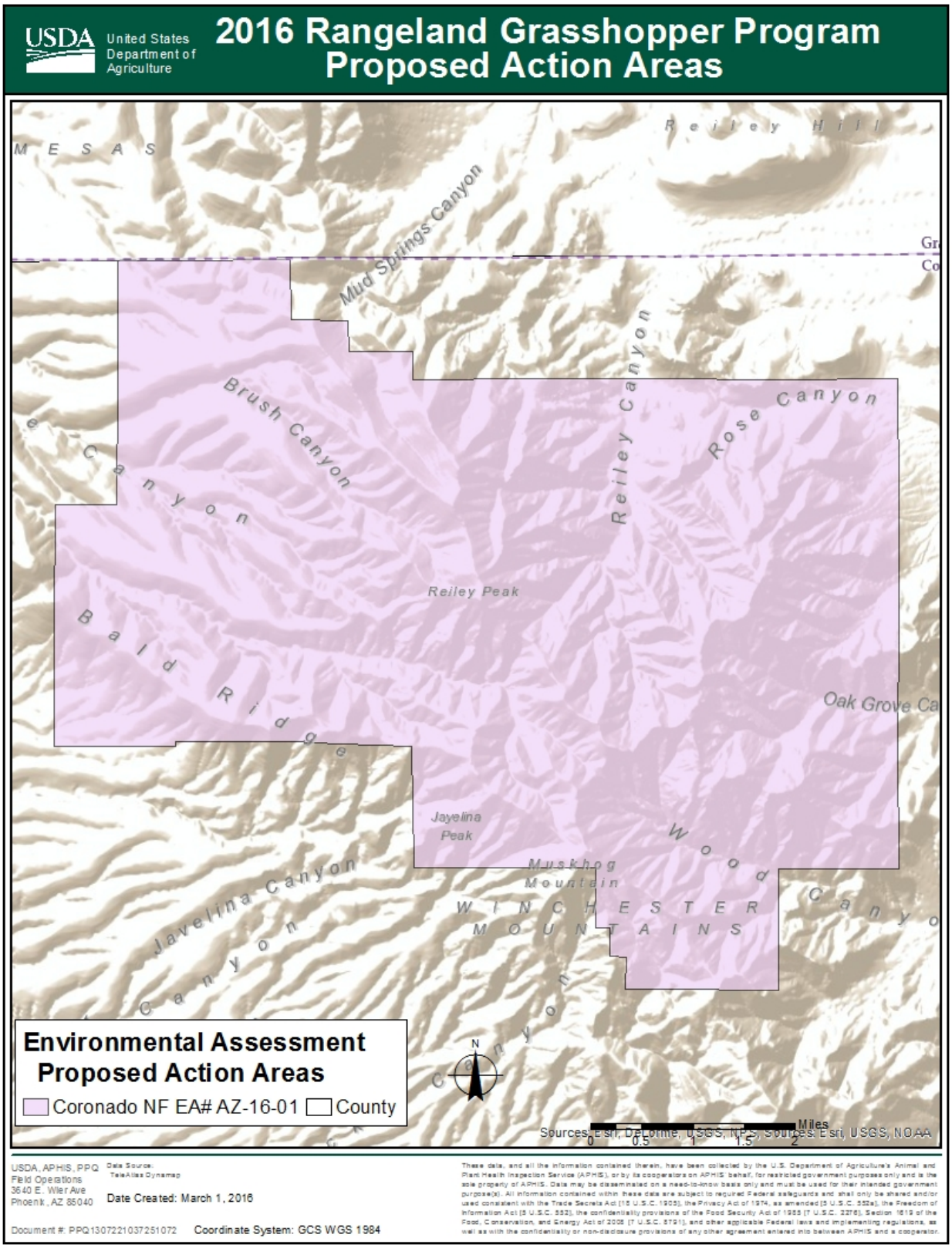
Appendix 6


USDA United States Department of Agriculture
2016 Rangeland Grasshopper Program
Proposed Action Areas
M E S A S
Reiley Hill
Mud Springs Canyon
Brush Canyon
Reiley Canyon
Rose Canyon
Reiley Peak
Bald Ridge
Oak Grove Ca
Jayelina Peak
Muskhog Mountain
W I N C H E S T E R M O U N T A I N S
Javelina Canyon
Environmental Assessment
Proposed Action Areas
Coronado NF EA# AZ-16-01
County
N
Miles
0 0.5 1 1.5 2
Sources: Esri, DeLorme, USGS, NPS, Sources: Esri, USGS, NOAA
USDA, APHIS, PPQ
Field Operations
3640 E. Wier Ave
Phoenix, AZ 85040
Data Source:
TeleAtlas Dynamap
Date Created: March 1, 2016
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Appendix 7
FWS/NMFS Correspondence

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Ecological Services
P.O. Box 1306
Albuquerque, New Mexico 87103

In Reply Refer To:
FWS/R2/ES-CR/062675
Consultation #:
02EAAZ00-2016-SLI-0177
02EAAZ00-2016-SLI-0178
02EAAZ00-2016-SLI-0180

MAR 2 4 2016

Dewey Murray, Domestic Program Coordinator - Arizona
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Phoenix, Arizona 85040

Dear Mr. Murray:

Thank you for your correspondence of February 16, 2016, received via email on the same day. This letter documents our review of the Animal and Plant Health Inspection Service's (APHIS) 2016 Rangeland Grasshopper and Mormon Cricket Suppression Program in Arizona, on the: Hualapai Indian Reservation, Coconino, Mohave and Yavapai counties; San Carlos Reservation, Gila and Graham counties, and Winchester Mountains, Coronado National Forest (Coronado NF), Cochise County, Arizona, in compliance with section 7 of the Endangered Species Act of 1973 as amended (16 U.S.C. 1531 et seq.) (Act).

The "Biological Assessment for the APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program in Arizona" (BA), dated February 16, 2016, covers the San Carlos and Hualapai Indian reservations and Coronado National Forest, as well as two other geographic areas located on the Bureau of Land Management's Arizona Strip District, Mohave and Coconino counties, and on the Coconino National Forest, Coconino County, Arizona. We have responded to your request for concurrence for effects from treatments on the Arizona Strip District and Coconino National Forest by separate letter.

Your letter, referencing the BA, concluded that the proposed project "may affect, but is not likely to adversely affect" the endangered black-footed ferret (*Mustela nigripes*), California condor (*Gymnogyps californianus*)[a], desert pupfish (*Cyprinodon macularius*), Gila chub (*Gila intermedia*), Gila topminnow (*Poeciliopsis occidentalis occidentalis*), humpback chub (*Gila cypha*), lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), loach minnow (*Tiaroga cobitis*), Mexican gray wolf (*Canis lupus baileyi*), ocelot (*Leopardus pardalis*), razorback sucker (*Xyrauchen texanus*), southwestern willow flycatcher (*Empidonax traillii extimus*), spikedace (*Meda fulgida*) and Yuma clapper rail (*Rallus longirostris yumanensis*); the threatened Apache trout (*Oncorhynchus apache*), Chiricahua leopard frog (*Lithobates chiricahuensis*),

[a] The populations if black-footed ferret and California condor subject to this action have been designated non-essential experimental per 61 FR 11320 and 61 FR 54044, respectively.

Mexican spotted owl (*Strix occidentalis lucida*), narrow-headed gartersnake (*Thamnophis rufipunctatus*) and proposed critical habitat, northern Mexican gartersnake (*Thamnophis eques megalops*) and proposed critical habitat, and yellow-billed cuckoo (*Coccyzus americanus*); and the proposed headwater chub (*Gila nigra*), roundtail chub (*Gila robusta*). We concur with your determinations and provide our rationale below.

You also included a description of conservation measures to minimize impacts to bald eagles (*Haliaeetus leucocephalus*) in anticipation of our technical assistance with respect to compliance with the Bald and Golden Eagle Protection Act. Our documentation of APHIS' minimization measures to reduce the likelihood of take is included in Appendix A.

DESCRIPTION OF THE PROPOSED ACTION

A complete description of the proposed action is found in your BA and the accompanying maps. The purpose of the proposed action is to suppress grasshopper and Mormon cricket populations to protect rangeland from economic infestations in Arizona. The treatment areas are described in section 3.0 of the BA, and delineated on three maps entitled "2016 Rangeland Grasshopper Proposed Action Areas" in section 7.0 on maps: two (Hualapai), three (San Carlos) and four (Coronado NF) of the BA. Within the area delineated on the San Carlos map, the geographic features APHIS plans to treat are Antelope Flats, Ash Flat and Big Prairie (Dewey Murray, personal communication). All treatment areas are located within rangelands. No grasslands associated with woodlands or forests will be treated.

The proposed action will be Alternative 3, with insecticides applied at rates using Reduced Agent Area Treatments (RAATS) or modified RAATS, as described in the BA. Suppression activities involve a single application of one insecticide early in the life cycle of the target grasshopper species, which include *Aulocara elliotti* and *Melanoplus sanguinipes* (Dewey Murray, personal communication). The application time frame is April to September. The insecticides are diflubenzuron (Dimilin®2L), carbaryl and Malathion, only one of which will be used per application. The chemical control methods are the use of Ultra-Low Volume (ULV) sprays of all three insecticides and carbaryl in bait formulation, using ground or aerial equipment.

The APHIS will employ buffer zones, within which there will be no pesticide application, and other conservation measures from the nine biological opinions issued by the U.S. Fish and Wildlife Service (Service) for the APHIS's control program in 18 western states, and subsequently consolidated in an October 3, 1995, letter from the Service - Mountain Prairie Region, to the Deputy Director, APHIS. The APHIS will also employ buffer zones and other conservation measures from the 2007 "Recommended Protection Measures for Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service" (RPR) for species and the pesticide (diflubenzuron) not covered in the aforementioned consultations, or whichever buffer is greater. All bodies of water are buffered to prevent contamination, and persistence of insecticides in the environment is limited (maximum half-life in soil is 28 days; 6 days in water).

DETERMINATION OF EFFECTS

We concur with your determination that the proposed action may affect, but is not likely to adversely affect, the Apache trout, black-footed ferret, California condor, Chiricahua leopard frog, desert pupfish, Gila chub, Gila topminnow, headwater chub, humpback chub, lesser long-nosed bat, loach minnow, Mexican gray wolf, Mexican spotted owl, narrow-headed gartersnake, northern Mexican gartersnake, ocelot, razorback sucker, roundtail chub, southwestern willow flycatcher, spikedace yellow-billed cuckoo and Yuma clapper rail for the reasons described below.

Apache trout

- This species is known to occur in the Black River, upstream of the proposed Big Prairie treatment area (San Carlos Apache Reservation Proposed Action Area). The Black River will be buffered by a one-mile no-treatment zone extending out from the rim of the canyon bounding the river, which will eliminate the likelihood of any direct effects.

- The likelihood of any indirect exposure of Apache trout to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dilution in water and degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

Black-footed ferret

- This species is known to occur on the Hualapai Indian Reservation where the Aubrey Valley Experimental Population Area overlaps the reservation, and may occur elsewhere on the reservation where prairie dog colonies occur. Suppression treatments may occur in these areas. However, carbaryl has been used to control fleas (a plague (*Yersinia pestis*) vector) in ferret-inhabited prairie dog towns without adverse effects to ferrets (USFWS 1993). The rate at which diflubenzuron will be applied (1 ounce/acre) has no adverse effects on mammals. Bioaccumulation of these pesticides is insignificant for mammals, and there is no recommended buffer in the RPR. Malathion will not be used on or near prairie dog colonies (Dewey Murray, personal communication).

- Based on the best available information, any exposure to these insecticides would not be detectable, and the effects of carbaryl may be beneficial; therefore, any effects to this species are insignificant.

California condor

- No treatments will occur near release sites or in any areas or over terrain considered habitat for nesting or roosting. The APHIS will observe a 0.25 mile buffer from currently occupied nests, roosts, or release sites for ground applications, and a 1.5 mile buffer will be applied for aerial applications, which meet the RPR.

- The likelihood of any direct or indirect exposure of California condors to insecticides is extremely low because application will be targeted and the insecticides are expected to be taken up quickly by grasshoppers; therefore, any effects to this species are assumed to be discountable.

Chiricahua leopard frog

- Potential habitat for the Chiricahua leopard frog exists in the San Carlos Apache Reservation Proposed Action Area primarily in the form of stock tanks. Buffers and other conservation measures from the RPR will be applied to all stock tanks and other bodies of water in order to eliminate the likelihood of direct effects to these aquatic habitats.

- Other conservation measures include avoiding application of pesticides before, during or after precipitation, which will avoid application when Chiricahua leopard frogs may be foraging away from water.

- The likelihood of any indirect exposure of Chiricahua leopard frogs to insecticides is extremely low; the magnitude of any exposure would not be detectable due to dilution in water and

degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

Desert pupfish, Gila topminnow, loach minnow and spikedace

- The closest suitable habitat for these species in the San Carlos Apache Reservation Proposed Action Area is the lower part of Bonita Creek, about eight miles from any treatment area. The closest suitable habitat for these species in the Coronado National Forest Proposed Action Area is in Hot Springs Canyon, over four miles from any treatment area. Per the RPR, the maximum buffer zone for these species, including upstream considerations, is 1.75 miles, which is sufficient to avoid any direct effects to these species and their habitats.

- The likelihood of any indirect exposure of desert pupfish, Gila topminnow, loach minnow and spikedace to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dilution in water and degradation of the insecticide. Therefore, any effects to these species would be discountable and insignificant.

Gila chub

- The closest suitable habitat for this species in the San Carlos Apache Reservation Proposed Action Area is in Bonita Creek, 2.5 miles from the boundary of the Ash Flat treatment area, which overlaps an ephemeral part of Bonita Creek. The closest suitable habitat for this species in the Coronado National Forest Proposed Action Area is in Bass Canyon, which is about four miles from the boundary of the treatment area. Per the RPR, the maximum buffer zone for Gila chub, including upstream considerations, is 1.75 miles, which is sufficient to avoid any direct effects to this species and its habitat.

- The likelihood of any indirect exposure of Gila chub to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dilution in water and degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

Headwater chub

- This species occurs in the San Carlos River, which is buffered by no treatment zones as follows: 1 mile for aerial ULV application of Malathion; 0.25 mile for aerial ULV application of carbaryl; and for diflurbenzuron, 0.125 (⅛) mile for low aerial applications, and 400 feet for ground applications.

- The likelihood of any indirect exposure of headwater chub to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dilution in water and degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

Humpback chub and razorback sucker

- These species are known to occur in the Colorado River, where critical habitat is also designated (Hualapai Indian Reservation Proposed Action Area). The river is separated by the Grand Canyon from where range land occurs above the canyon rim, where suppression activities might occur; this separation is at least 0.5 mile horizontal distance and 0.4 mile vertical distance. In addition, the Colorado River will be buffered by a one-mile no-treatment zone for aerial applications. These natural and programmatic buffers will eliminate the likelihood of any direct effects.

- The likelihood of any indirect exposure of these species to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dispersal over large distances, dilution in water and degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

- The likelihood of any indirect exposure of critical habitat to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dispersal over distance, dilution in water and degradation of the insecticide. Therefore, any effects to critical habitat would be discountable and insignificant.

Lesser long-nosed bat

- There is no nesting or roosting habitat in the treatment areas for this species. Canyons near the areas proposed for treatment on Antelope Flats and Ash Flat may contain suitable substrate for roosting; however, based on historical records, the potential for the lesser long-nosed bat to occur in or near the treatment areas is extremely unlikely, so direct exposure is unlikely.

- There is roosting habitat within foraging distance of the Coronado National Forest Proposed Action Area. However, insecticides will be applied by ground equipment in this area, and treatments will avoid the flowering stalks of *Agave* species upon which lesser long-nosed bats forage.

- The likelihood of indirect exposure of the lesser long-nosed bat to insecticides is extremely low; therefore, any effects to the species are discountable.

Mexican gray wolf

- This species is known to occur on the San Carlos Apache Reservation, but temporarily and in very limited numbers; there is no established pack on the reservation. Although it is possible wolves may occur in the vicinity of treatment areas, they do not typically use rangeland. Bioaccumulation of these pesticides is minimal for this species.

- The likelihood of any direct or indirect exposure of Mexican gray wolves to insecticides is extremely low; therefore, any effects to this species are discountable.

Mexican spotted owl

- Suitable habitat for this species occurs at higher elevations in the Coronado National Forest Proposed Action Area, and potential habitat for this species may occur in higher elevations and canyons in the San Carlos Apache Reservation Proposed Action Area. However, treatments will be restricted to rangeland at lower elevations. Owls may migrate or disperse through the treatment area before or after the breeding season, but are not likely to be present in the area proposed for treatment in mid-April to September.

- The likelihood of any direct or indirect exposure of Mexican spotted owls to insecticides is extremely low; therefore, any effects to this species are discountable.

Narrow-headed gartersnake and northern Mexican gartersnake

- These species (gartersnakes) likely occur along the Black River, where critical habitat has been proposed for both gartersnakes. The narrow-headed gartersnake also likely occurs along Eagle

Creek, where critical habitat has also been proposed. The Black River will be buffered by a one-mile no-treatment zone extending out from the rim of the canyon bounding the river, which will eliminate the likelihood of any direct effects to the species. There are no large areas of rangeland associated with Eagle Creek and the closest identified treatment area, Big Prairie, is over 7 miles away, upstream. Eagle Creek will be buffered by a 0.5 mile no-treatment area, which will eliminate the likelihood of any direct effects to the narrow-headed gartersnake.

- The likelihood of any indirect exposure of gartersnakes to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dilution in water and degradation of the insecticide. Therefore, any effects to these species would be discountable and insignificant.

- The likelihood of any indirect exposure of proposed critical habitat to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dilution in water and degradation of the insecticide. Therefore, any effects to critical habitat would be discountable and insignificant.

Ocelot

- This species is not known to occur on the San Carlos Apache Reservation or Coronado National Forest, but there have been rare sightings in both Gila and Cochise counties. Although is it possible an ocelot may occur in the vicinity of treatment areas, they do not typically use rangeland. Bioaccumulation of these pesticides is minimal for this species.

- The likelihood of any direct or indirect exposure of ocelots to insecticides is extremely low; therefore, any effects to this species are discountable.

Roundtail chub

- This species is known to occur in the Black River, bordering the San Carlos Apache Reservation. The Black River will be buffered by a one-mile no-treatment zone extending out from the rim of the canyon bounding the river, which will eliminate the likelihood of any direct effects.

- The likelihood of any indirect exposure of roundtail chub to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dilution in water and degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

Southwestern willow flycatcher

- This species occurs along the Gila River, which is buffered by a five-mile no-treatment zone from the San Carlos Apache Reservation Proposed Action Area. Southwestern willow flycatchers occur along the San Carlos River below Talkalai Lake, which is about a mile from the area proposed for treatment on Antelope Flats. Flycatchers may fly upstream along the San Carlos River, which is buffered by a 0.25 mile no-treatment zone. Southwestern willow flycatchers may fly through part of a treatment area; however, there is no nesting habitat within the treatment areas.

- This species may occur along the Colorado River, which is separated by the Grand Canyon from where rangeland occurs above the canyon rim, where suppression activities might occur; this separation is at least 0.5 mile horizontal distance and 0.4 mile vertical distance (Hualapai Indian Reservation Proposed Action Area). In addition, the Colorado River will be buffered by a one-mile no-treatment zone for aerial applications. These natural and programmatic buffers will eliminate the likelihood of any direct effects.

- The likelihood of any indirect exposure of this species to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dispersal over large distances, dilution in water and degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

Yellow-billed cuckoo

- This species occurs along the Gila River, which is buffered by a four-mile no-treatment zone from the San Carlos Apache Reservation Proposed Action Area. Yellow-billed cuckoos may also occur along the San Carlos River, which is buffered by a 0.25 mile no-treatment zone. Yellow-billed cuckoos may fly through part of a treatment area; however, there is no nesting habitat within the treatment areas.

- This species may occur along the Colorado River, which is separated by the Grand Canyon from where range land occurs above the canyon rim, where suppression activities might occur; this separation is at least 0.5 mile horizontal distance and 0.4 mile vertical distance (Hualapai Indian Reservation Proposed Action Area). In addition, the Colorado River will be buffered by a one-mile no-treatment zone for aerial applications. These natural and programmatic buffers will eliminate the likelihood of any direct effects.

- The likelihood of any indirect exposure of this species to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dispersal over large distances, dilution in water and degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

Yuma clapper rail

- This species may occur along the Colorado River, which is separated by the Grand Canyon from where rangeland occurs above the canyon rim, where suppression activities might occur; this separation is at least 0.5 mile horizontal distance and 0.4 mile vertical distance (Hualapai Indian Reservation Proposed Action Area). In addition, the Colorado River will be buffered by a one-mile no-treatment zone for aerial applications. These natural and programmatic buffers will eliminate the likelihood of any direct effects.

- The likelihood of any indirect exposure of this species to insecticides is extremely low, and the magnitude of any exposure would not be detectable due to dispersal over large distances, dilution in water and degradation of the insecticide. Therefore, any effects to this species would be discountable and insignificant.

In keeping with our trust responsibility to American Indian Tribes, when we enter into consultation with agencies not in the Departments of the Interior or Commerce on a proposed action that may affect Indian lands, Tribal trust resources, or Tribal rights, we encourage you to invite the affected Tribe and Bureau of Indian Affairs (BIA) to participate in the consultation process and, by copy of this letter, are notifying the Hualapai Tribe, San Carlos Apache Tribe and the BIA.

Thank you for your continued coordination. No further section 7 consultation is required for this project at this time. Should project plans change, or if information on the distribution or abundance of listed species or critical habitat becomes available, this determination may need to be reconsidered. In all future correspondence on this project, please refer to the consultation number 02EAAZ00-2016-SLI-0177 (San

Carlos Reservation), 02EAAZ00-2016-SLI-0178 (Hualapai Indian Reservation), or 02EAAZ00-2016-SLI-0180 (Winchester Mountains).

Should you require further assistance or if you have any questions, please contact John Nystedt, Fish and Wildlife Biologist–Tribal Coordinator, Flagstaff Sub-office, at 928- 556-2160; or Delfinia Montano, Section 7 Coordinator, Biologist, Regional Office, at 505-248-6401.

Sincerely,

Susan Jacobsen

Chief, Division of Classification and Restoration
Ecological Services

cc: Director, Natural Resources Department, Hualapai Tribe, Peach Springs, AZ
Director, Recreation and Wildlife Department, San Carlos Apache Tribe, San Carlos, AZ
Branch Chief, Environmental Quality Services, Western Regional Office, Bureau of Indian Affairs, Phoenix, AZ
Environmental Coordinator, San Carlos Agency, Western Regional Office, Bureau of Indian Affairs, San Carlos, AZ
Superintendent, Truxton Canyon Agency Field Office, Bureau of Indian Affairs, Valentine, AZ
District Ranger, Safford Ranger District, Coronado National Forest, Forest Service Stafford, AZ
Field Manager, Safford Field Office, Gila District, Bureau of Land Management, Safford, AZ
Tribal Liaison, Southwest Region, U.S. Fish and Wildlife Service, Albuquerque, NM
Assistant Field Supervisor, Arizona Ecological Services Field Office, Tucson, AZ
Assistant Field Supervisor, Arizona Ecological Services Field Office, Flagstaff, AZ

LITERATURE CITED

U.S. Fish and Wildlife Service, 1993. Management of Prairie Dog Complexes for the Reintroduction of Black-footed ferret. Department of Interior, Fish and Wildlife Service. July 1993. 102pp. http://pubs.usgs.gov/fedgov/70039171/report.pdf#page=32

U.S. Fish and Wildlife Service, Region 2, Environmental Contaminants Program. 2007. Recommended Protection Measures for Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service. Albuquerque, NM. 205 pp.

APPENDIX A – TECHNICAL ASSISTANCE

This appendix contains recommendations to APHIS to reduce the likelihood of take of bald eagles (*Haliaeetus leucocephalus*) from implementation of the proposed 2016 Rangeland Grasshopper and Mormon Cricket Suppression Program in Arizona.

The final rule to remove the bald eagle from the Federal List of Threatened and Endangered Species was published in the Federal Register on July 9, 2007, and took effect on August 8, 2007. However, bald eagles continue to be protected by the Bald and Golden Eagle Protection Act (Eagle Act). The Eagle Act prohibits anyone, without a permit issued by the Secretary of Interior, from taking eagles, including their parts, nests, or eggs. "Take" is defined under the Eagle Act as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" eagles. Disturb means to agitate or bother an eagle to a degree that causes, or is likely to cause, based upon the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (USDI 2007).

The APHIS and the FWS jointly developed the following conservation measures to minimize impacts to bald eagles in the project area. These measures are consistent with the strategies identified in the Conservation Assessment and Strategy for the Bald Eagle in Arizona (Driscoll et al., 2006). We agree that implementation of the following measures will reduce the likelihood of take.

Bald eagle

1. The APHIS will include a one-mile radius no fly-over and treatment-free buffer around occupied eagle nests.

2. To protect foraging areas, application of diflubenzuron will not occur within 2.5 miles upstream and downstream of a nesting site and within 0.25 miles of waters used as foraging areas.

LITERATURE CITED

Driscoll, J.T., K.V. Jacobsen, G.L. Beatty, J.S. Canaca, and J.G. Koloszar. Conservation assessment and strategy for the bald eagle in Arizona. Nongame and Endangered Wildlife Program Technical Report 173. Arizona Game and Fish Department, Phoenix, Arizona.

U.S. Department of the Interior (USDI), Fish and Wildlife Service. 2007. Protection of Eagles and Authorizations under the Bald and Golden Eagle Protection Act for Take of Eagles; Final Rule. Federal Register 72 (107):31132-31140. June 5, 2007.

Appendix 8:

Public Comments and Response

No Public Comments

Table 1. Representative Species

Plants:

Emory oak (*Quercus emoryi*)
Alligator bark juniper (*Juniperus deppeana*)
Pinyon pine (*Pinus edulis*)
Arizona cypress (*Cupressus arizonica*)
Gray oak (*Quercus grisea*)
Canyon live oak (*Quercus chrysolepis*)
Arizona oak (*Quercus arizonica*)
Western chokecherry (*Prunus virginiana*)
Manzanita (*Arctostaphylos pungens*)
Shrub live-oak (*Quercus turbinella*)
Sugar sumac (*Rhus ovata*)
Ceanothus (*Ceanothus greggii*)
California buckthorn (*Rhamnus crocea*)
Yellowleaf silktassel (*Garrya flavescens*)
Box elder (*Acer negundo*)
Arizona sycamore (*Platanus wrightii*)
Tamarisk (*Tamarix* sp.)
Netleaf hackberry (*Celtis reticulata*)
Mexican elderberry (*Sambuccus mexicanus*)
Crucifixion thorn (*Canotia holocantha*)
Penstemon (*Penstemon palmeri*)
Desert verbena (*Verbena wrightii*)
Right buckwheat (*Eriogonum wrightii*)
Narrowleaf yerbasanta (*Eriodictyon angustifolium*)
Sideoats grama (*Bouteloua curtipendula*)
Cane bluestem (*Bothriochloa barbinodis*)
Plains lovegrass (*Eragrostis intermedia*)
Black grama (*Bouteloua eriopoda*)
Blue grama (*Bouteloua gracilis*)
Fendler three-awn (*Aristida fendleriana*)
Agave (*Agave parryi*)
Beargrass (*Nolina microcarpa*)
Sotol (*Dasylirion wheeleri*)
Banana yucca (*Yucca baccata*)
Arizona walnut (*Juglans major*)
Seepwillow (*Baccharis glutinosa*).
Velvet ash (*Fraxinus velutina*),

Mammals:

Cliff chipmunk (E*utamias dorsalis*)
White-throated woodrat (*Neotoma albigula*)
Mule deer (*Odocoileus hemionus*)
Brush mouse (*Peromyscus boylei*)
Rock mouse (*P. difficilis*)
White-footed mouse (*P. leucopus*)
Eastern cottontail (*Sylvilagus floridanus holzeri*)

Birds:

Rufous-crowned sparrow (*Aimophila ruficeps*)
Scrub jay (*Aphelocoma coerulescens*)
Canyon wren (*Catherpes mexicanus*)
Rufous-sided towhee (*Pipilo erythrophthalmus*)
Brown towhee (*P. fuscus*)
Bushtit (*Psaltriparus minimus*)
Black-chinned sparrow (*Spizella atrogularis*)
Crissal thrasher (*Toxostoma dorsale*)
Burrowing owl (*Athene cunicularia*)

Amphibians and reptiles:

Glossy snake (*Arizona elegans*)
Western rattlesnake (*Crotalus viridis*)
Arizona alligator lizard (*Gerrhonotus kingi*)
Night snake (*Hypsiglena torquata*)
Sonoran mountain kingsnake (*Lampropeltis pyromelana*)
Southwestern blind snake (*Leptotyphlops humilis*)
Sonora whipsnake (*Masticophis bilineatus*)
Desert striped whipsnake (*M. taeniatus*)
Western fence lizard (*Scleroporus occidentalis*)
Eastern fence lizard (*S. undulates*)
Western blackhead snake (*Tantilla planiceps*)
Sonoran lyre snake (*Trimorphodon biscutatus lambda*)
Texas lyre snake (*T. b. vilkinsoni*)
Side-blotched lizard (*Uta stansburiana*)
Arizona night lizard (*Zantusia arizonae*)
Whip-tail lizard (*Cnemidophorus tessellatus tessellates*)
Striped racer (*Coluher taeniatus taeniatus*)
Great Basin rattle snake (*Crotalus viridus lutosus*)
Collared lizard (*Crotaphytus collaris baileyi*)
Desert horned toad (*Phrynosoma platyrhinos*)
Gopher snake (*Pituophis catenijer deserticola*)
Sagebrush lizard (*Sceloporus graciosus graciosus*)
Brown-shouldered uta (*Uta stanshuriana stansburiana*)