Final - Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program

ARIZONA
EA Number: AZ-23-01

Prepared by:

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Site-Specific

Gila and Graham County portion within the San Carlos Apache Reservation.

May 1, 2023

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Acronyms and Abbreviations

ac	acre
a.i.	active ingredient
AChE	acetylcholinesterase
APHIS	Animal and Plant Health Inspection Service
BCF	bioconcentration factor
BLM	Bureau of Land Management
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
EA	environmental assessment
e.g.	example given (Latin, exempli gratia, “for the sake of example”)
EIS	environmental impact statement
E.O.	Executive Order
FONSI	finding of no significant impact
FR	Federal Register
FS	Forest Service
g	gram
ha	hectare
HHERA	human health and ecological risk assessments
i.e.	in explanation (Latin, id est “in other words.”)
IPM	integrated pest management
lb	pound
MBTA	Migratory Bird Treaty Act
MOU	memorandum of understanding
NEPA	National Environmental Policy Act

NHPA National Historic Preservation Act

NIH National Institute of Health

ppm parts per million

PPE personal protective equipment

PPQ Plant Protection and Quarantine

RAATs reduced agent area treatments

S&T Science and Technology

ULV ultra-low volume

U.S.C. United States Code

USDA United States Department of Agriculture

USEPA United States Environmental Protection Agency

USFWS United States Fish and Wildlife Services

[Final] Site-Specific Environmental Assessment

Rangeland Grasshopper and Mormon Cricket Suppression Program

ARIZONA

EA Number: AZ-23-01

I. Need for Proposed Action

A. Purpose and Need Statement

An infestation of grasshoppers or Mormon crickets may occur on rangeland in Graham and Gila County, San Carlos Apache Reservation. The Animal and Plant Health Inspection Service (APHIS) and may, upon request by land managers or State departments of agriculture, conduct treatments to suppress grasshopper infestations as part of the Rangeland Grasshopper and Mormon Cricket Suppression Program (program). The term "grasshopper" used in this environmental assessment (EA) refers to both grasshoppers and Mormon crickets, unless differentiation is necessary.

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 grasshoppers which defoliate grasses by direct feeding on leaf and stem tissue and by cutting off leaves or stems and heads while feeding. High populations of grasshoppers on rangeland can damage plant crowns so severely that many grass plants will not recover. Some grasshopper species not only reduces grass forage by consuming it but also by cutting it down. The cut grass may become litter on the ground where it may also be used for food by grasshoppers or becomes wasted biomass. Potential areas where large populations may occur can be found in the 2023 Grasshopper Hazard Map in appendix B. 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 economical infestation levels in order to protect rangeland ecosystems or cropland adjacent to rangeland.

This EA analyzes potential effects of the proposed action and its alternatives. This EA applies to a proposed suppression program that could take place from 04/01/23 to 09/30/23 on rangeland in Graham and Gila County, San Carlos Apache Reservation (Appendix D).

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. A decision will be made by APHIS based on the analysis presented in this EA, the results of public involvement, and consultation with other agencies and individuals. A selection of one of

the program alternatives will be made by APHIS for the 2023 Control Program for infested rangeland in Graham and Gila County, San Carlos Apache Reservation.

B. Background Discussion

Rangelands provide many goods and services, including food, fiber, recreational opportunities, and grazing land for cattle (Havstad et al., 2007; Follett and Reed, 2010). Grasshoppers and Mormon crickets are part of rangeland ecosystems, serving as food for wildlife and playing an important role in nutrient cycling. However, grasshoppers and Mormon crickets have the potential to occur at high population levels (Belovsky et al., 1996) that result in competition with livestock and other herbivores for rangeland forage and can result in damage to rangeland plant species.

In rangeland ecosystem areas of the United States, grasshopper populations can build up to economic infestation levels[1] 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 needed to prevent grasshopper migration to cropland adjacent to rangeland. In most circumstances, APHIS is not able to accurately predict specific treatment areas and treatment strategies months or even weeks before grasshopper populations reach economic infestation levels. The need for rapid and effective response when an outbreak occurs limits the options available to APHIS to inform the public other than those stakeholders who could be directly affected by the actual application. The emergency response aspect is why site-specific treatment details cannot be known, analyzed, and published in advance.

The site-specific data used to make treatment decisions in real time is gathered during spring nymphal surveys. The general site-specific data include: grasshopper densities, species complex, dominant species, dominant life stage, grazing allotment terrain, soil types, range conditions, local weather patterns (wind, temp., precipitation), slope and aspect for hatching beds, animal unit months (AUM's) present in grazing allotment, forage damage estimates, number of potential AUM's consumed by grasshopper population, potential AUM's managed for allotment and value of the AUM, estimated cost of replacement feed for livestock, rotational time frame for grazing allotments, number of livestock in grazing allotment. These are all factors that are considered when determining the economic infestation level.

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[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 decision making, 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 decision making, are not part of the economic values in determining the necessity of treatment.

APHIS surveys grasshopper populations on rangeland in the Western United States, provides technical assistance on grasshopper management to landowners and managers, and may cooperatively suppress 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). APHIS' enabling legislation provides, in relevant part, that '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'… (7 U.S.C. § 7717(c)(1)). The need for rapid and effective response 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 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 damage caused by grasshopper populations in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. During November 2019, APHIS published an updated EIS to incorporate the available data and analyze the environmental risk of new program tools. The risk analysis in the 2019 EIS is incorporated by reference.

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 landowners/managers, and

- subject to the availability of funds, to suppress grasshoppers and Mormon crickets on rangeland when direct intervention is requested by the landowner/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 September 16, 2016, 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. 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 November 6, 2019, 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 #19-8100-0573-MU, November 6, 2019). 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 January 11, 2022, 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 #22-8100-0870-MU, January 11, 2022). 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.

APHIS supports the use of Integrated Pest Management (IPM) principles in the management of grasshoppers and Mormon Crickets. APHIS provides technical assistance to Federal, Tribal, State and private land managers including the use of IPM. However, implementation of on-the-ground IPM activities is limited to land management agencies and Tribes, as well as private landowners. In addition, APHIS' authority under the Plant Protection Act is to treat Federal, State and private lands for grasshoppers and Mormon cricket populations. APHIS' technical assistance occurs under each of the three alternatives proposed in the EIS.

In addition to providing technical assistance, APHIS completed the Grasshopper Integrated Pest Management (GIPM) project. One of the goals of the GIPM is to develop new methods of suppressing grasshopper and Mormon cricket populations that will reduce non-target effects. RAATs are one of the methods that has been developed to reduce the amount of pesticide used in suppression activities and is a component of IPM. APHIS continues to evaluate new suppression tools and methods for grasshopper and Mormon cricket populations, including biological control, and as stated in the EIS, will implement those methods once proven effective and approved for use in the United States.

C. About This Process

The NEPA 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 act swiftly with respect to those requests. Surveys help to determine general areas, among the millions of acres where harmful grasshopper infestations may occur in the spring of the following year. Survey data provides the best estimate of future grasshopper populations, while short-term climate or environmental factors change where the specific treatments will be needed. Therefore, examining specific treatment areas for environmental risk analysis under NEPA is typically not possible. 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.

Intergovernmental agreements between APHIS and cooperators with Tribal Nations may preclude disclosure of Tribal site-specific information to the public without the consent of the Tribal Administrator. Individuals may request information on the specific treatment areas on Tribal Lands from the individual Tribal Nations.

Public involvement under the CEQ Regulations for Implementing the Procedural Provisions of NEPA distinguishes federal actions with effects of national concern from those with effects primarily of local concern (40 CFR 1506.6). The grasshopper and Mormon cricket suppression program EIS were published in the Federal Register (APHIS-2016-0045) and met all applicable notice and comment requirements for a federal action with effects of national concern. This process provided individuals and national groups the ability to participate in the development of alternatives and provide comment. Our subsequent state-based actions have the potential for effects of local concern, and we publish them according to the provisions that apply to federal actions with effects primarily of local concern. This includes the USDA APHIS NEPA Implementation Procedures, which allows for EAs and findings of no significant impact (FONSIs) where the effects of an action are primarily of regional or local concern, to normally provide notice of publication in a local or area newspaper of general circulation (7 CFR 372.7(b)(3)). These notices provide potentially locally affected individuals an additional opportunity to provide input into the decision-making process. Some states also provide additional opportunities for local public involvement, such as public meetings. In addition, when an interested party asks to be informed APHIS ensures their contact information is added to the list of interested stakeholders.

Scoping as defined by NEPA is an early and open process for determining the scope of issues to be addressed by the environmental risk analysis and for identifying the significant issues related to a proposed action (40 CFR 1501.7). APHIS uses the scoping process to enlist land managers and the public to identify alternatives and issues to be considered during the development of a grasshopper or Mormon cricket suppression program. Scoping was helpful in the preparation of the draft EAs. The process can occur formally and informally through meetings, conversations, or written comments from individuals and groups.

The current EIS provides a solid analytical foundation; however, it may not be enough to satisfy NEPA completely for actual treatment proposals. The program typically prepares a Draft EA tiered to the current EIS for each of the 17 Western States, or portion of a state, that may receive a request for treatment. The Draft EA analyzes aspects of environmental quality that could be affected by treatments in the area where grasshopper outbreaks are anticipated. The Draft EA will be made available to the public for a 30-day comment period. **The comment period will begin March 8th and end April 6th, 2023.** Comments can be sent to USDA, APHIS, 3640 East Wier Ave. Phoenix, Arizona 85040, or contacting the local USDA, APHIS Arizona State Office (602)431-3200. **Comments will be accepted until April 6th at 4pm MST**. When the program receives a treatment request and determines that treatment is necessary, the specific site within the state will

be evaluated to determine if environmental factors were thoroughly evaluated in the Draft EA. If all environmental issues were accounted for in the Draft EA, the program will prepare a Final EA and FONSI. Once the FONSI has been finalized copies of those documents will be sent to any parties that submitted comments on the Draft EA, and to other appropriate stakeholders. To allow the program to respond to comments in a timely manner, the Final EA and FONSI will be posted to the APHIS website. The program will also publish a notice of availability in the same manner used to advertise the availability of the Draft EA.

II. Alternatives

To engage in comprehensive NEPA risk analysis APHIS must frame potential agency decisions into distinct alternative actions. These program alternatives are then evaluated to determine the significance of environmental effects. The 2002 EIS presented three alternatives: (A) No Action; (B) Insecticide Applications at Conventional Rates and Complete Area Coverage; and (C) Reduced Agent Area Treatments (RAATs), and their potential impacts were described and analyzed in detail. The 2019 EIS was tiered to and updated the 2002 EIS. Therefore the 2019 EIS considered the environmental background or 'No Action' alternative of maintaining the program that was described in the 2002 EIS and Record of Decision. The 2019 EIS also considered an alternative where APHIS would not fund or participate in grasshopper suppression programs. The preferred alternative of the 2019 EIS allowed APHIS to update the program with new information and technologies that not were analyzed in the 2002 EIS. Copies of the complete 2002 and 2019 EIS documents are available for review at USDA, APHIS, 3640 East Wier Ave. Phoenix, Arizona 85040**.** These documents are also available at the Rangeland Grasshopper and Mormon Cricket Program website, http://www.aphis.usda.gov/plant-health/grasshopper.

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, Incorporated 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 and operational procedures, included as Appendix A to this EA.

This Final EA analyzes the significance of environmental effects that could result from the alternatives described below. These alternatives differ from those described in the 2019 EIS because grasshopper treatments are not likely to occur in most of the rangeland in Arizona and therefore the environmental baseline should describe a no treatment scenario in those rangeland areas.

A. No Suppression Program Alternative

Under Alternative A, the No Action alternative, APHIS would not conduct a program to suppress grasshopper infestations within Arizona. 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.

B. Insecticide Applications at Conventional Rates or Reduced Agent Area Treatments with Adaptive Management Strategy (Preferred Alternative)

Under Alternative B, the Preferred Alternative, APHIS would manage a grasshopper treatment program using techniques and tools discussed hereafter to suppress outbreaks. The insecticides available for use by APHIS include the U.S. Environmental Protection Agency (USEPA) registered chemicals carbaryl, chlorantraniliprole, and diflubenzuron. These chemicals have varied modes of action. Carbaryl work by inhibiting acetylcholinesterase (enzymes involved in nerve impulses) and diflubenzuron inhibits the formation of chitin by insects. APHIS would make a single application per year to a treatment area and could apply insecticide at an APHIS rate conventionally used for grasshopper suppression treatments, or more typically as reduced agent area treatments (RAATs). APHIS selects which insecticides and rates are appropriate for suppression of a grasshopper outbreak based on several biological, logistical, environmental, and economical criteria. The identification of grasshopper species and their life stage largely determines the choice of insecticides used among those available to the program. RAATs are the most common application method for all program insecticides, and only rarely do rangeland pest conditions warrant full coverage and higher rates.

Typically, the decision to use diflubenzuron, the pesticide most commonly used by the program, is determined by the life stage of the dominant species within the outbreak population. Diflubenzuron can produce 90 to 97% grasshopper mortality in nascent populations with a greater percentage of early instars. If the window for the use of diflubenzuron closes, because of treatment delays, then carbaryl or rarely malathion are the remaining control options. Certain species are more susceptible to carbaryl bait, and sometimes that pesticide is the best control option.

The RAATs strategy is effective for grasshopper suppression because the insecticide controls grasshoppers within treated swaths while conserving grasshopper predators and parasites in swaths not directly treated. RAATs can decrease the rate of insecticide applied by either using lower insecticide concentrations or decreasing the deposition of insecticide applied by alternating one or more treatment swaths. Both options are most often incorporated simultaneously into RAATs. Either carbaryl and/or diflubenzuron would be considered under this alternative, typically at the following application rates:

- 8.0 fluid ounces (0.25 lb a.i.) of carbaryl ULV spray per acre.
- 10.0 pounds (0.20 lb a.i.) of 2 percent carbaryl bait per acre.
- 0.75 or 1.0 fluid ounce (0.012 lb a.i.) of diflubenzuron per acre; or
- 4.0 fluid ounces (0.013 lbs a.i./ac sprayed) of chlorantraniliprole.

The width of the area not directly treated (the untreated swath) under the RAATs approach is not standardized. The proportion of land treated in a RAATs approach is a

complex function of the rate of grasshopper movement, which is a function of developmental stage, population density, and weather (Narisu et al., 1999, 2000), as well as the properties of the insecticide (insecticides with longer residuals allow wider spacing between treated swaths). Foster et al. (2000) left 20 to 50% of their study plots untreated, while Lockwood et al. (2000) left 20 to 67% of their treatment areas untreated. Currently the grasshopper program typically leaves 50% of a spray block untreated for ground applications where the swath width is between 20 and 45 feet depending on type of ground equipment used. The selection of insecticide and the use of an associated swath widths is site dependent. Rather than suppress grasshopper populations to the greatest extent possible, the goal of this method is to suppress grasshopper populations to less than the economic infestation level.

Applicator's use of Trimble GPS Navigation equipment is used to navigate and capture shapefiles of the treatment areas. All sensitive sites are buffered out of the treatment area using flagging which is highly visible to the aerial applicator. All sensitive sites are reviewed in the daily briefing with APHIS personnel including the applicator working on the treatment site. Treatments are conducted to suppress large grasshopper populations to protect rangeland vegetation.

Treatments are conducted using the Reduced Agent Area Treatment (RAAT's) method. This method of skipping swaths (fig.1) decreases the amount of chemical and acreage treated still maintaining an effective kill rate. Swath widths usually range from 40-45 feet depending on ground equipment used. In Arizona, only ground equipment is used, no aerial treatments are conducted. Grasshoppers in untreated areas will tend to move to treated areas, thus becoming exposed to the insecticide. For example, if the area in *figure 1* was 100 acres, with 50% RAAT's the acreage actually treated would be 50 acres. Protection would include the entire 100 acres, only exposing half the area with half the chemical amount compared to a conventional blanket treatment covering the entire 100 acres and the label rate of application.

Figure 1. Reduced Agent Area Treatment (RAAT's)

Insecticide applications at conventional rates and complete area coverage, is an approach that APHIS has used in the past but is currently uncommon. Under this alternative, carbaryl and diflubenzuron would cover all treatable sites within the designated treatment block per label directions.

The application rates under this alternative are typically at the following application rates:

- 16.0 fluid ounces (0.50 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 (0.027 lbs a.i./ac sprayed) of chlorantraniliprole.

The potential generalized environmental effects of the application of carbaryl and diflubenzuron under this alternative are discussed in detail in the 2019 EIS. A description of anticipated site-specific impacts from this alternative may be found in Part IV of this document.

C. *Experimental Treatments Alternative*

APHIS-PPQ continues to refine its methods of grasshopper and Mormon cricket management in order to improve the abilities of the Rangeland Grasshopper and Mormon Cricket Suppression Program (herein referred to as the Program) to make it more economically feasible, and environmentally acceptable. These refinements can include reduced rates of currently used pesticides, improved formulations, development of more target-specific baits, development of biological pesticide suppression alternatives, and improvements to aerial (e.g., incorporating the use of Unmanned Aircraft Systems (UAS)) and ground application equipment. A division of APHIS-PPQ, Science and Technology's (S&T) Phoenix Lab is in Arizona and its Rangeland Grasshopper and Mormon Cricket Management Team (Rangeland Unit) conducts methods development and evaluations on behalf of the Program. The Rangeland Unit's primary mission is to comply with Section 7717 of the Plant Protection Act and protect the health of rangelands (wildlife habitats and where domestic livestock graze) against economically damaging cyclical outbreaks of grasshoppers and Mormon crickets. The Rangeland Unit tests and develops more effective, economical, and less environmentally harmful management methods for the Program and its federal, state, tribal, and private stakeholders.

To achieve this mission, experimental plots ranging in area from less than one foot to 640 acres are used and often replicated. The primary purpose of these experiments is to test and develop improved methods of management for grasshoppers and Mormon crickets. This often includes testing and refining pesticide and biopesticide formulations that may be incorporated into the Program. These investigations often occur in the summer (May-August) and the locations typically vary annually. The plots often include "no treatment" (or control) areas that are monitored to compare with treated areas. Some of these plots

may be monitored for additional years to gather information on the effects of utilized pesticides on non-target arthropods. Note that an Experimental Use Permit is not needed when testing non-labeled experimental pesticides if the use is limited to laboratory or greenhouse tests, or limited replicated field Trials involving 10 acres or less per pest for terrestrial tests.

Studies and experimental plots are typically located on large acreages of rangelands and the Rangeland Unit often works on private land with the permission of landowners. Locations of experimental trials will be made available to the appropriate agencies in order to ensure these activities are not conducted near sensitive species or habitats. Due to the small size of the experimental plots, no adverse effects to the environment, including protected species and their critical habitats, are expected, and great care is taken to avoid sensitive areas of concern prior to initiating studies.

Methods Development Studies

Methods development studies may use planes and all-terrain vehicles (ATVs) to apply labeled pesticides using conventional applications and the Reduced Agent Area Treatments (RAATs) methodology. The experiments may include the use of an ultra-low volume sprayer system for applying biopesticides (such as native fungal pathogens). Mixtures of native pathogens and low doses of pesticides may be conducted to determine if these multiple stressor combinations enhance mortality. Aircraft will be operated by Federal Aviation Administration-licensed pilots with an aerial pesticide applicator's permit.

Rangeland Unit often uses one square foot micro plots covered by various types of cages depending on the study type and species used. These types of study plots are preferred for Mormon cricket treatments and those involving non-labeled experimental pesticides or biopesticides. Our most common application method for micro plots is simulating aerial applications via the Field Aerial Application Spray Simulation Tower Technique (FAASSTT). This system consists of a large tube enclosed on all sides except for the bottom, so micro plot treatments can be accurately applied to only the intended treatment target. Treatments are applied with the FAASSTT in micro doses via a syringe and airbrush apparatus mounted in the top.

Pesticides and Biopesticides Used in Studies
Pesticides likely to be involved in studies currently include:

1) Liquids: diflubenzuron (Dimilin 2L and generics: currently Unforgiven and Cavalier 2L) and chlorantraniliprole (Prevathon). Program standard application rates are diflubenzuron - 1.0 fl. oz./acre in a total volume of 31 fl. oz./acre; chlorantraniliprole - 2.0 fl. oz./acre (RAATs) or 4.0 fl. oz./acre (conventional coverage), both in a total volume of 32 fl. oz./acre. Experimental rates often vary, but the doses are lower than standard Program rates unless otherwise noted.

2) Baits: carbaryl. Program standard application rates: 2% bait at 10 lbs. /acre (2 lbs. AI/acre) or 5% bait at 4 lbs. /acre (2 lbs. AI/acre).

Biopesticides likely to be involved in studies currently include:

1) *Metarhizium robertsii* (isolate DWR2009), a native fungal pathogen. Note that *Metarhizium robertsii* (isolate DWR2009) is experimental; for more information, see "Potential Impacts of *Metarhizium robertsii* Applications" in the section "Information on Experimental Treatments."

2) *Beauveria bassiana* GHA, a native fungal pathogen sold commercially and registered for use across the U.S.

At this time, we are unsure where in the 17 states we will be doing most of the following proposed experimental field studies. The final location decision is dependent upon grasshopper and/or Mormon cricket population densities, and availability of suitable sites, but we plan to most likely work in Arizona, Idaho, New Mexico, Oregon, Montana, or Washington.

Study 1: Evaluate persistence of the experimental biopesticide DWR2009 in bait form by coating wheat bran with the pathogen. A species of local abundance will be placed into replicated microplot cages and fed the baits by hand. Mortality and sporulation will then be observed for a duration of time to determine persistence in both the field and lab.

Study 2: Evaluate efficacy of the experimental biopesticide DWR2009 in bait form by coating wheat bran with the pathogen. A species of local abundance will be placed into replicated microplot cages and fed the baits by hand. Mortality and sporulation will then be observed for a duration of time to determine efficacy in both the field and lab.

Study 3: A stressor study to evaluate efficacy of the experimental biopesticide DWR2009 in liquid form when combined with Dimilin 2L. The FAASSTT will be utilized to apply varying dose levels of Dimilin 2L (below label rates) in order to compare efficacy, starting at the rate of 1.0 fl. oz. /acre. Replicated microplots will be treated and then a species of local abundance will be placed into each cage. Mortality will then be observed for a duration of time to determine efficacy.

Study 4: Evaluate efficacy of the experimental biopesticide DWR2009 in liquid and bait form (by coating wheat bran with the pathogen) using ultra-low volume RAATs (involves a timing device and ULV nozzles) and a 10-acre plot. ATV-mounted liquid and bait spreaders will be utilized to apply DWR2009. Specimens will be periodically collected to observe mortality and sporulation for a duration of time to determine efficacy.

Study 5: A study to evaluate the efficacy of sonic frequencies. Replicated plots will be treated with and without sonic frequencies using speakers. Specimens will be periodically collected to determine the effect on orthopteran distribution, plant/insect species diversity, and habitat quality. Periodic observations will also be made on what effects, if any, the frequencies are having on other arthropods, vertebrates, and plants around the study sites. Camera-traps, handheld cameras, and periodic visual surveys will be used to record sight observations.

III. Affected Environment

A. Description of Affected Environment

The Site-Specific Graham and Gila County portion within the San Carlos Apache Reservation proposed suppression program area in the EA encompasses 332,120 acres. This is the total estimated acres within the proposed action area (Appendix D map). Acres treated will be from somewhere within this total. Actual acres treated will be far less than this amount and fluctuate from season to season depending on infestation levels. For example, 2021 season only 2,437 actual acres were treated from within this proposed action area. The 2022 season 6,003 acres were treated within the proposed action area.

The vegetative communities (fig. 2) 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. All rangeland covered in this EA is managed by the San Carlos Apache Tribe.

Figure 2. Typical rangeland ecosystem surveyed for economic species of grasshoppers in Arizona.

Elevations range from approximately 3,500 to over 6,000 feet. Potential treatment sites are within watersheds which drain into tributaries of the Bonita Creek, Hackberry Creek, Hackberry Draw, Cottonwood Canyon Salt Creek, and San Carlos 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).*

B. Summary of Target Grasshopper Species

There are over 600 species of grasshoppers in the United States. Of these 400 species of grasshoppers are in the 17 western states. Of these there are 238 species of grasshoppers and other orthoptera which been recorded from localities in Arizona (Ball 1942). There are 35 species in Arizona known to reach outbreak status and threaten crops and/or valuable range resources. The most frequent complex of economic grasshopper species from 2003-2022 in Arizona have included the following damaging species:

Melanoplus sanguinipes	migratory grasshopper
Camnula pellucida	clear-winged grasshopper
Aulocara elliotti	big-headed grasshopper
Oedaleonotus enigma	valley grasshopper
Melanoplus bivittatus	two-striped grasshopper
Melanoplus femurrubrum	red-legged grasshopper
Ageneotettix deorum	white-whiskered grasshopper
Melanoplus packardii	Packard's grasshopper
Melanoplus foedus	striped sand grasshopper
Cordillacris occipitalis	spotted-wing grasshopper
Amphitornus coloradus	striped grasshopper
Melanoplus infantilis	small spur-throat grasshopper
Philibostroma quadrimaculatum	Four-spotted grasshopper
Phoetaliotes nebrascensis	Large-headed grasshopper
Hadrotettix trifasciatus	three-banded grasshopper

C. Site-Specific Considerations

1. Human Health

The 2019 EIS contains detailed hazard, exposure, and risk analyses for the chemicals available to APHIS. APHIS has incorporated by reference the analysis from the EIS and the associated risk assessments of pesticides which are mentioned this EA. These documents are titled, The Final Human Health and Ecological Risk Assessments (USDA, APHIS 2018a, 2018b, 2018c, 2018d) for program pesticides which are available at the following website, http://www.aphis.usda.gov/plant-health/grasshopper.

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 public for operations within these potential proposed treatment areas detailed in this EA. The operational procedures identified in Appendix A 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 17 miles away. Refer to the Operational Procedures, Specific Procedures for Aerial and Ground Applications in Appendix A 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 A) will be followed in regard to treatments bordering open surface waters.

2. Nontarget Species

Threatened & Endangered Species and Sensitive Species of Concern

APHIS has entered in Section 7 consultations with Fish & Wildlife Service regarding the T&E species which are covered in the 2023 Rangeland Grasshopper Suppression Program Biological Assessment. Effects determinations for T&E species covered in the proposed action areas are outlined in table 1. All protective measures to be implemented by APHIS, PPQ, Arizona Field Operations outlined in the 2023 BA document will be adhered to (table 2). APHIS also consulted with local agency officials to determine appropriate protective measures for sensitive species of concern not covered by the ESA and FWS does not issue concurrence determinations for.

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. In Arizona, all stock tanks/ponds will be buffered with a 500-foot buffer. APHIS will also consult with local agency officials to determine appropriate protective measures.

The area assessed by this EA is inhabited by a large variety of organisms, including terrestrial vertebrates and invertebrates, migratory birds, biocontrol agents, pollinators, aquatic organisms, plants (both native and introduced), etc.

Under the No Action Alternative, destruction of grasses and forbs by grasshoppers could cause localized disruption of food and cover for several 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 because 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 widespread 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 the APHIS FEIS 2019 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.

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 three pounds per 1000 sq. ft. in poultry houses when poultry are present. (http://www.cdms.net/Label-Database.) 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.

Domestic bees will be protected in accordance with operational procedures. Field level contacts with local beekeepers and the Arizona Department of Agriculture will ensure safeguards for bees.

APHIS is the lead agency in Arizona regarding biological control for invasive weeds. All biocontrol programs are coordinated between APHIS and Federal, Tribal, State agencies and Weed Management Districts and City Municipalities. APHIS has GIS data for all Biological Control programs throughout Arizona. There has been no overlap between biocontrol programs and grasshopper treatments. If this does become the case in the future, the grasshopper program would eliminate questionable acreage from the treatment area.

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 eagle's 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.*

Table 1. 2023 Biological Assessment Effects Determination for T&E Species

Species	Status	Effects Determination
Mexican gray wolf, *Canis lupus baileyi*	Endangered	May affect- Not likely to adversely affect
California condor, *Gymnogyps californianus*	Endangered	May affect- Not likely to adversely affect
California Least Tern, *Sterna antillarum browni*	Endangered	May affect- Not likely to adversely affect
Mexican spotted owl, St*rix occidentalis lucida*	Threatened	May affect- Not likely to adversely affect
Southwestern willow flycatcher, *Empidonax traillii extimus*	Endangered	May affect- Not likely to adversely affect
Yellow-billed cuckoo, *Coccyzus americanus*	Threatened	May affect- Not likely to adversely affect
Chiricahua leopard frog, *Rana chiricahuensis*	Threatened	May affect- Not likely to adversely affect
Northern leopard frog, *Rana pipiens*	Arizona Game and Fish Department, Species of Greatest Conservation Need.	May affect- Not likely to adversely affect
Desert pupfish, *Cyprinodon macularius*	Endangered	May affect- Not likely to adversely affect
Gila chub, *Gila intermedia*	Endangered	May affect- Not likely to adversely affect
Gila topminnow, *Poeciliopsis occidentalis occidentalis*	Endangered	May affect- Not likely to adversely affect
Loach minnow, *Tiaroga cobitis*	Endangered	May affect- Not likely to adversely affect
Spikedace, *Meda fulgida*	Endangered	May affect- Not likely to adversely affect
Humpback chub, *Gila cypha*	Endangered	May affect- Not likely to adversely affect
Razorback sucker, *Xyrauchen texanus*	Endangered	May affect- Not likely to adversely affect
Woundfin, *Plagopterus argentissimus*	Endangered	May affect- Not likely to adversely affect
Arizona cliffrose, *Purshia subintegra*	Endangered	No Effect
Fickeisen plains cactus, *Pediocactus peeblesianus fickeiseniae*	Endangered	No Effect
Jones cycladenia, *Cycladenia jonesii*	Threatened	No Effect
Siler pincushion cactus, *Pediocactus sileri*	Threatened	No Effect
Welsh's milkweed, *Asclepias welshii*	Threatened	No Effect
Mohave Desert tortoise, *Gopherus agassizii*	Threatened	May affect- Not likely to adversely affect
Sonoran Desert tortoise, *Gopherus morafkai*	Candidate	May affect- Not likely to adversely affect
Northern Mexican gartersnake, *Thamnophis eques megalops*	Threatened	May affect- Not likely to adversely affect
Monarch Butterfly, *Danaus plexippus*	Candidate	May affect- Not likely to adversely affect

Table 2. Proposed application buffers to protect listed T&E species and habitat

Species	Method of Application	Protective Measure Only RAAT's Methodology Used
Mexican gray wolf	Ground	500-foot buffer
California condor	Ground Aerial	.25-mile buffer 1.5-mile buffer
California Least Tern		No Treatments within 5 miles of known nesting habitat
Mexican spotted owl	Ground	RAAT's Only No Aerial treatments
Southwestern willow flycatcher		No Treatments within 5 miles of known nesting habitat
Yellow-billed cuckoo		No Treatments within 5 miles of known nesting habitat
Chiricahua leopard frog	Ground Aerial	500-foot buffer .25-mile buffer
Northern leopard frog	Ground Aerial	500-foot buffer .25-mile buffer
Desert pupfish		No Treatments within 1 mile of rivers and tributaries
Gila chub		No Treatments within 1 mile of rivers and tributaries
Gila topminnow		No Treatments within 1 mile of rivers and tributaries
Loach minnow		No Treatments within 1 mile of rivers and tributaries
Spikedace		No Treatments within 1 mile of rivers and tributaries
Humpback chub		No Treatments within 1 mile of rivers and tributaries
Razorback sucker		No Treatments within 1 mile of rivers and tributaries
Woundfin		No Treatments within 1 mile of rivers and tributaries
Arizona cliffrose	Aerial Ground	3-mile buffer occupied habitat .25-mile buffer from Cottonwood Canyon Gila/Graham County
Fickeisen plains cactus		All occupied habitat excluded from treatment area
Jones cycladenia		All occupied habitat excluded from treatment area
Siler pincushion cactus		All occupied habitat excluded from treatment area
Welsh's milkweed		All occupied habitat excluded from treatment area
Mohave Desert tortoise		All designated habitat excluded from treatment area
Sonoran Desert tortoise	Ground	Pre-application surveys will be conducted if treatments are within known habitat, only diflubenzuron will be used
Northern Mexican gartersnake	Ground	500-foot buffer
Monarch Butterfly		Any known milkweed stands on rangeland will be buffered by 50 feet. Riparian areas excluded from treatment area

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).

As of August 2014, the San Carlos Apache tribe had an enrollment of 15,393 tribal members. Currently there is approximately 9,945-10,945 living on the Reservation according to the My Tribal Data. US Census. Retrieved 20 July 2020.

The San Carlos Reservation's annual median household income of approximately $27,542, according to the US Census. About 49.2 percent of the people live under the poverty line, and 36.7 percent of the active labor force is unemployed. Replacement feed for damage rangeland would be almost impossible to afford under these circumstances. It is critical that APHIS provide the Rangeland Grasshopper Suppression Program to assist the Tribal Ranches management of resources.

The principal economic activities are tourism, cattle ranching, and arts and crafts. The San Carlos is rich in hunting, fishing. 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 landowners. 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.

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 Tribal Officials, 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.

5. Special Considerations for Certain Populations

a) 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 Reservation's annual median household income of approximately $31,696 according to the US Census and BUREAU OF WOMEN'S AND CHILDREN'S HEALTH, Arizona Department of Health Services. About 49.2 percent of the people live under the poverty line, and 36.7 percent of the active labor force is unemployed.

b) 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 those risks. APHIS has developed agency guidance for its programs to follow to ensure the protection of children (USDA, APHIS, 1999).

According to the BUREAU OF WOMEN'S AND CHILDREN'S HEALTH, Arizona Department of Health Services, there are 3,235 children between the ages of 0-14. There is approximately 1,151 youth from the ages of 15-19 according to the Arizona Department of Health Services. The risk for children to be exposed to treatment pesticides is very low due to the remote nature of the Tribal Rangeland. The nearest communities are approximately 50 miles from the Tribal rangeland areas. There will be no aerial treatments conducted in Arizona only by ground-based equipment.

IV. 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 and 2019 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 nontarget organisms (including threatened and endangered species).

APHIS has written human health and ecological risk assessments (HHERAs) to assess the insecticides and use patterns that are specific to the program. The risk assessments provide an in-depth technical analysis of the potential impacts of each insecticide to human health, and non-target fish and wildlife along with its environmental fate in soil, air, and water. The assessments rely on data required by the USEPA for pesticide product registrations, as well as peer-reviewed and other published literature. The HHERAs are heavily referenced in the EIS and this EA. These Environmental Documents can be found at the following website: http://www.aphis.usda.gov/plant-health/grasshopper.

A. Environmental Consequences of the Alternatives

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

1. No Suppression Program Alternative

Under this alternative, APHIS would not conduct a program to suppress grasshoppers. If APHIS does not participate in any grasshopper suppression program, Federal land management agencies, State agriculture departments, local governments, private groups or individuals, may not effectively combat outbreaks in a coordinated effort. Without the technical assistance and coordination that APHIS provides during grasshopper outbreaks, the uncoordinated programs could use insecticides that APHIS considers too environmentally harsh. Multiple treatments and excessive amount of insecticide could be applied in efforts to suppress or even locally eradicate grasshopper populations. There are approximately 100 pesticide products registered by USEPA for use on rangelands and against grasshoppers (Purdue University, 2018). 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. However, the environmental impacts could be much greater than under the APHIS led suppression program alternative due to lack of treatment knowledge or coordination among the groups.

The potential environmental impacts from the No Action alternative, where other agencies and land managers do not control outbreaks, stem primarily from grasshoppers consuming vast amounts of vegetation in rangelands and surrounding areas. Grasshoppers are generalist feeders, eating grasses and forbs first and often moving to cultivated crops. High grasshopper density of one or several species and the resulting defoliation may reach an economic threshold where the damage caused by grasshoppers exceeds the cost of controlling the grasshoppers. Researchers determined that during typical grasshopper infestation years, approximately 20% of forage rangeland is removed, valued at a dollar adjusted amount of $900 million. This value represents 32 to 63% of the total value of rangeland across the western states (Rashford et al., 2012). Other

market and non-market values such as carbon sequestration, general ecosystem services, and recreational use may also be impacted by pest outbreaks in rangeland.

Vegetation damage during serious grasshopper outbreaks may be so severe that all grasses and forbs are destroyed; thus, plant growth is impaired for several years. Rare plants may be consumed during critical times of development such as during seed production, and loss of important plant species, or seed production may lead to reduced biological diversity of the rangeland habitats, potentially creating opportunities for the expansion of invasive and exotic weeds (Lockwood and Latchininsky, 2000). When grasshoppers consume plant cover, soil is more susceptible to the drying effects of the sun, making plant roots less capable of holding soil in place. Soil damage results in erosion and disruption of nutrient cycling, water infiltration, seed germination, and other ecological processes which are important components of rangeland ecosystems (Latchininsky et al., 2011).

When the density of grasshoppers reaches economic infestation levels, grasshoppers begin to compete with livestock for food by reducing available forage (Wakeland and Shull, 1936; Belovsky, 2000; Pfadt, 2002; Branson et al., 2006; Bradshaw et al., 2018). Ranchers could offset some of the costs by leasing rangeland in another area and relocating their livestock, finding other means to feed their animals by purchasing hay or grain, or selling their livestock. Ranchers could also incur economic losses from personal attempts to control grasshopper damage to rangeland. Local communities could see adverse economic impacts to the entire area. Grasshoppers that infest rangeland could move to surrounding croplands. Farmers could incur economic losses from attempts to chemically control grasshopper populations or due to the loss of their crops. The general public could see an increase in the cost of meat, crops, and their byproducts.

2. Insecticide Applications at Conventional Rates or Reduced Agent Area Treatments with Adaptive Management Strategy

Under Alternative 2, APHIS would participate in grasshopper programs with the option of using one of the insecticides carbaryl or diflubenzuron depending upon the various factors related to the grasshopper outbreak and the site-specific characteristics. The use of an insecticide would typically occur at half the conventional application rates following the RAATs strategy. APHIS would apply a single treatment to affected rangeland areas to suppress grasshopper outbreak populations by a range of 35 to 98 percent, depending upon the insecticide used.

a) Carbaryl

Carbaryl is a member of the N-methyl carbamate class of insecticides, which affect the nervous system via cholinesterase inhibition. Inhibiting the enzyme acetylcholinesterase (AChE) causes nervous system signals to persist longer than normal. While these effects are desired in controlling insects, they can have undesirable impacts to non-target organisms that are exposed. The APHIS HHERA assessed available laboratory studies regarding the toxicity of carbaryl on fish and wildlife. In summary, the document indicates the chemical is highly toxic to insects, including native bees, honeybees, and

aquatic insects; slightly to highly toxic to fish; highly to very highly toxic to most aquatic crustaceans, moderately toxic to mammals, minimally toxic to birds; moderately to highly toxic to several terrestrial arthropod predators; and slightly to highly toxic to larval amphibians (USDA APHIS, 2018a). However, adherence to label requirements and additional program measures designed to prevent carbaryl from reaching sensitive habitats or mitigate exposure of non-target organisms will reduce environmental effects of treatments.

The offsite movement and deposition of carbaryl after treatments is unlikely because it does not significantly vaporize from the soil, water, or treated surfaces (Dobroski et al., 1985). Temperature, pH, light, oxygen, and the presence of microorganisms and organic material are factors that contribute to how quickly carbaryl will degrade in water. Hydrolysis, the breaking of a chemical bond with water, is the primary degradation pathway for carbaryl at pH 7 and above. In natural water, carbaryl is expected to degrade faster than in laboratory settings due to the presence of microorganisms. The half-lives of carbaryl in natural waters varied between 0.3 to 4.7 days (Stanley and Trial, 1980; Bonderenko et al., 2004). Degradation in the latter study was temperature dependent with shorter half-lives at higher temperatures. Aerobic aquatic metabolism of carbaryl reported half-life ranged of 4.9 to 8.3 days compared to anaerobic (without oxygen) aquatic metabolism range of 15.3 to 72 days (Thomson and Strachan, 1981; USEPA, 2003). Carbaryl is not persistent in soil due to multiple degradation pathways including hydrolysis, photolysis, and microbial metabolism. Little transport of carbaryl through runoff or leaching to groundwater is expected due to the low water solubility, moderate sorption, and rapid degradation in soils. There are no reports of carbaryl detection in groundwater, and less than 1% of granule carbaryl applied to a sloping plot was detected in runoff (Caro et al., 1974).

Acute and chronic risks to mammals are expected to be low to moderate based on the available toxicity data and conservative assumptions that were used to evaluate risk. There is the potential for impacts to small mammal populations that rely on terrestrial invertebrates for food. However, based on the toxicity data for terrestrial plants, minimal risks of indirect effects are expected to mammals that rely on plant material for food. Carbaryl has a reported half-life on vegetation of three to ten days, suggesting mammal exposure would be short-term. Direct risks to mammals from carbaryl bait applications is expected to be minimal based on oral, dermal, and inhalation studies (USDA APHIS, 2018a).

A number of studies have reported no effects on bird populations in areas treated with carbaryl (Buckner et al., 1973; Richmond et al., 1979; McEwen et al., 1996). Some applications of formulated carbaryl were found to cause depressed AChE levels (Zinkl et al., 1977; Gramlich, 1979); however, the doses were twice those proposed for the full coverage application in the grasshopper program.

While sublethal effects have been noted in fish with depressed AChE, as well as some impacts to amphibians (i.e. days to metamorphosis) and aquatic invertebrates in the field due to carbaryl, the application rates and measured aquatic residues observed in these studies are well above values that would be expected from current program operations.

Indirect risks to amphibian and fish species can occur through the loss of habitat or reduction in prey, yet data suggests that carbaryl risk to aquatic plants that may serve as habitat, or food, for fish and aquatic invertebrates is very low.

Product use restrictions appear on the USEPA-approved label and attempt to keep carbaryl out of waterways. Carbaryl must not be applied directly to water, or to areas where surface water is present (USEPA, 2012c). The USEPA-approved use rates and patterns and the additional mitigations imposed by the grasshopper program, such as using RAATs and application buffers, where applicable, further minimize aquatic exposure and risk.

The majority of rangeland plants require insect-mediated pollination. Native, solitary bee species are important pollinators on western rangeland (Tepedino, 1979). Potential negative effects of insecticides on pollinators are of concern because a decrease in their numbers has been associated with a decline in fruit and seed production of plants. Laboratory studies have indicated that bees are sensitive to carbaryl applications, but the studies were at rates above those proposed in the program. The reduced rates of carbaryl used in the program and the implementation of application buffers should significantly reduce exposure of carbaryl applications to pollinators. In areas of direct application where impacts may occur, alternating swaths and reduced rates (i.e., RAATs) would reduce risk. Potential negative effects of grasshopper program insecticides on bee populations may also be mitigated by the more common use of carbaryl baits than the ULV spray formulation. Studies with carbaryl bran bait have found no sublethal effects on adults or larvae bees (Peach et al., 1994, 1995).

Carbaryl can cause cholinesterase inhibition (i.e., overstimulate the nervous system) in humans resulting in nausea, headaches, dizziness, anxiety, and mental confusion, as well as convulsions, coma, and respiratory depression at high levels of exposure (NIH, 2009a; Beauvais, 2014). USEPA classifies carbaryl as “likely to be carcinogenic to humans” based on vascular tumors in mice (USEPA, 2007, 2015a, 2017a).

USEPA regulates the amount of pesticide residues that can remain in or on food or feed commodities as the result of a pesticide application. The agency does this by setting a tolerance, which is the maximum residue level of a pesticide, usually measured in parts per million (ppm), that can legally be present in food or feed. USEPA-registered carbaryl products used by the grasshopper program are labeled with rates and treatment intervals that are meant to protect livestock and keep chemical residues in cattle at acceptable levels (thereby protecting human health). While livestock and horses may graze on rangeland the same day that the land is sprayed, in order to keep tolerances to acceptable levels, carbaryl spray applications on rangeland are limited to half a pound active ingredient per acre per year (USEPA, 2012c). The grasshopper program would treat at or below use rates that appear on the label, as well as follow all appropriate label mitigations, which would ensure residues are below the tolerance levels.

Adverse human health effects from the proposed program ULV applications of the carbaryl spray (Sevin® XLR Plus) and bait applications of the carbaryl 5% and 2% baits formulations to control grasshoppers are not expected based on low potential for human

exposure to carbaryl and the favorable environmental fate and effects data. Technical grade (approximately 100% of the insecticide product is composed of the active ingredient) carbaryl exhibits moderate acute oral toxicity in rats, low acute dermal toxicity in rabbits, and very low acute inhalation toxicity in rats. Technical carbaryl is not a primary eye or skin irritant in rabbits and is not a dermal sensitization in guinea pig (USEPA, 2007). This data can be extrapolated and applied to humans revealing low health risks associated with carbaryl.

The Sevin® XLR Plus formulation, which contains a lower percent of the active ingredient than the technical grade formulation, is less toxic via the oral route, but is a mild irritant to eyes and skin. The proposed use of carbaryl as a ULV spray or a bait, use of RAATs, and adherence to label requirements, substantially reduces the potential for exposure to humans. Program workers are the most likely human population to be exposed. APHIS does not expect adverse health risks to workers based on low potential for exposure to carbaryl when applied according to label directions and use of personal protective equipment (PPE) (e.g., long-sleeved shirt and long pants, shoes plus socks, chemical-resistant gloves, and chemical-resistant apron) (USEPA, 2012c) during loading and applications. APHIS quantified the potential health risks associated with accidental worker exposure to carbaryl during mixing, loading, and applications. The quantitative risk evaluation results indicate no concerns for adverse health risk for program workers (http://www.aphis.usda.gov/plant-health/grasshopper).

Adherence to label requirements and additional program measures designed to reduce exposure to workers and the public (e.g., mitigations to protect water sources, mitigations to limit spray drift, and restricted-entry intervals) result in low health risk to all human population segments.

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negative effects of insecticides on pollinators are of concern because a decrease in their numbers has been associated with a decline in fruit and seed production of plants. Laboratory studies have indicated that bees are sensitive to carbaryl applications, but the studies were at rates above those proposed in the program. The reduced rates of carbaryl used in the program and the implementation of application buffers should significantly reduce exposure of carbaryl applications to pollinators. In areas of direct application where impacts may occur, alternating swaths and reduced rates (i.e., RAATs) would reduce risk. Potential negative effects of grasshopper program insecticides on bee populations may also be mitigated by the more common use of carbaryl baits than the ULV spray formulation. Studies with carbaryl bran bait have found no sublethal effects on adults or larvae bees (Peach et al., 1994, 1995).

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USEPA regulates the amount of pesticide residues that can remain in or on food or feed commodities as the result of a pesticide application. The agency does this by setting a tolerance, which is the maximum residue level of a pesticide, usually measured in parts per million (ppm), that can legally be present in food or feed. USEPA-registered carbaryl products used by the grasshopper program are labeled with rates and treatment intervals that are meant to protect livestock and keep chemical residues in cattle at acceptable levels (thereby protecting human health). While livestock and horses may graze on rangeland the same day that the land is sprayed, in order to keep tolerances to acceptable levels, carbaryl spray applications on rangeland are limited to half a pound active ingredient per acre per year (USEPA, 2012c). The grasshopper program would treat at or below use rates that appear on the label, as well as follow all appropriate label mitigations, which would ensure residues are below the tolerance levels.

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The Sevin® XLR Plus formulation, which contains a lower percent of the active ingredient than the technical grade formulation, is less toxic via the oral route, but is a mild irritant to eyes and skin. The proposed use of carbaryl as a ULV spray or a bait, use of RAATs, and adherence to label requirements, substantially reduces the potential for exposure to humans. Program workers are the most likely human population to be

exposed. APHIS does not expect adverse health risks to workers based on low potential for exposure to carbaryl when applied according to label directions and use of personal protective equipment (PPE) (e.g., long-sleeved shirt and long pants, shoes plus socks, chemical-resistant gloves, and chemical-resistant apron) (USEPA, 2012c) during loading and applications. APHIS quantified the potential health risks associated with accidental worker exposure to carbaryl during mixing, loading, and applications. The quantitative risk evaluation results indicate no concerns for adverse health risk for program workers (http://www.aphis.usda.gov/plant-health/grasshopper).

Adherence to label requirements and additional program measures designed to reduce exposure to workers and the public (e.g., mitigations to protect water sources, mitigations to limit spray drift, and restricted-entry intervals) result in low health risk to all human population segments.

b) Chlorantraniliprole

Chlorantraniliprole (Rynaxypyr™) is a recently introduced insecticide that belongs to the anthranilic diamide insecticide class. The mode of action is the activation of insect ryanodine receptors which causes an uncontrolled release of calcium from smooth and striated muscles that impairs muscle regulation and causes paralysis in insects (USEPA, 2008). Although these receptors occur in mammals, the insecticide is very selective to insect ryanodine receptors with more than 350-fold differential selectivity compared to mammalian receptors (Cordova et.al. 2006, USEPA, 2008). Primary activity of chlorantraniliprole is through ingestion with some contact toxicity against lepidopteran pests but also against Orthoptera, Coleoptera, Diptera, and Hemiptera pests (Hannig et al., 2009).

Chlorantraniliprole is considered practically nontoxic via oral, dermal, and inhalation exposures (DuPont, 2011; USEPA, 2008). Median lethality values (LD50) from oral and dermal exposure to the active ingredient, chlorantraniliprole, and the proposed formulation exceeded the highest concentration tested (5,000 milligrams/kilogram (mg/kg)). Inhalation toxicity is also very low for the technical material and the formulation with median lethality values exceeding the highest test concentration (2.1 mg/L). Available acute toxicity data suggests that the acute toxicity between the active ingredient and the formulation are comparable. Prevathon® is not considered an irritant to the eyes or skin and is not a skin sensitizer. In addition, chlorantraniliprole is not considered to be carcinogenic or mutagenic, and is not known to cause reproductive or developmental toxicity. The no observable effect level (NOEL) in reproductive and developmental toxicity studies was 1,000 mg/kg/day, or the highest concentration tested (USEPA, 2008). Studies designed to assess neurotoxicity and effects on the immune system show no effects at a range of doses from the low mg/kg range to greater than 1,000 mg/kg.

Exposure and risk to all population groups is expected to be negligible. The potential for exposure is greatest for workers from handling and applying Prevathon®, however the very low toxicity and label required personal protective equipment result in minimal exposure and risk to this subgroup of the population. Exposure and risk to the general public will also be negligible based on Program use of Prevathon®. Conservative

estimates of potential groundwater contamination using standard USEPA models suggest residues would be orders of magnitude below any levels of concern for the general public, including children. Drift may occur during applications however Program restrictions regarding treatment proximity to schools, and other measures to reduce drift, will minimize the potential for exposure and risk to the general public (USDA APHIS, 2013).

Toxicity to most non-target organisms is low based on available toxicity data. Acute fish toxicity is low with median lethality values (LC50) for freshwater and marine test species above the highest test concentration. Amphibian toxicity data does not appear to be available however based on the reported toxicity values for fish, the toxicity to amphibians is expected to be low. Aquatic invertebrates are more sensitive to the effects of chlorantraniliprole with median lethality and effect concentrations ranging from 0.0098 milligrams per liter (mg/L) for the freshwater cladoceran, *Daphnia magna*, to 1.15 mg/L for marine mysid shrimp (Barbee et al., 2010; EPA, 2012b). Chronic no observable effect concentrations (NOEC) range from 0.0045 mg/L for *D. magna* to 0.695 mg/L for a marine mysid (USEPA, 2012b). Available aquatic plant toxicity data suggests low toxicity of chlorantraniliprole to diatoms, algae, and aquatic macrophytes with median effect concentrations exceeding the highest test concentration (USEPA, 2008). Primary and secondary metabolites that could occur in aquatic environments are less toxic than the parent material when comparing toxicity values for the freshwater cladoceran, *D. magna* (USEPA, 2012b).

The exposure and risk to aquatic organisms from the proposed applications of Prevathon® will be negligible based on the low toxicity of chlorantraniliprole, and program restrictions regarding applications near surface water. The Program currently uses a 200-foot ground and 500-foot aerial application buffer from surface water. Using standardized drift modeling at the highest application rate proposed in this study results in shallow water residues of chlorantraniliprole that are approximately ten-fold below the most sensitive sublethal endpoint for aquatic invertebrates (USDA APHIS, 2018b). Residue values were also approximately ten-fold below the most sensitive acute toxicity value for aquatic vertebrates and four orders of magnitude below the acute toxicity values for fish. No indirect effects would be expected for aquatic vertebrates that depend on aquatic plants and invertebrates for habitat and prey from the proposed use of Prevathon®.

Acute toxicity for terrestrial wildlife such as mammals and birds is very low with median lethality values exceeding the highest concentration tested for mammals and birds, such as bobwhite quail and the mallard (USEPA, 2012b). Laboratory toxicity data for technical and formulated chlorantraniliprole shows that the product is practically non-toxic to honeybees in oral or contact exposures. In semi-field studies using two formulations reported NOECs ranging from 52.5 to 156.16 g a.i. chlorantraniliprole/ha (Dinter et al., 2009; USEPA, 2008). Three semi-field honeybee tunnel tests demonstrated no behavioral or flight intensity effects nor were any hive related impacts noted at a dose of 52.5 g/ha (Dinter et al., 2009). The lowest reported NOEC is approximately four times the proposed RAATs application rate for chlorantraniliprole and two times the proposed full rate. Similar NOECs have been observed for other invertebrates such as the hover fly, *Episyrphus balteatus*, ladybird beetle larvae,

Coccinella septempunctata, green lacewing, *Chrysoperla carnea*, the plant bug, *Typhlodromus pyri*, and predatory mite, *Orius laevigatus* (USEPA, 2008; USEPA, 2012b). The low toxicity to non-target terrestrial invertebrates has also been observed in greenhouse and field applications. Gradish et al. (2011) reported low acute toxicity of formulated chlorantraniliprole to the parasitoid, *Eretmocerus eremicus*, the pirate bug, *Orius insidiosus* and the predatory mite, *Amblyseius swirskii*, in 48-hour exposures. Brugger et al. (2010) evaluated lethal and sublethal impacts of formulated chlorantraniliprole to seven parasitic hymenopterans and found no negative impacts on adult survival, percentage parasitism, or emergence when compared to controls at rates well above the full and RAATs program rates. The lack of toxicity in other insect groups at rates that are toxic to grasshoppers is related to the activity of chlorantraniliprole which is primarily through ingestion. Insects such as grasshoppers and larval Coleoptera and Lepidoptera would receive a larger dose consuming treated plant material compared to many of the non-target pests that have been evaluated in the literature.

Exposure and risk to terrestrial vertebrates that may consume treated plant material or insects in the proposed spray blocks will be negligible. USEPA exposure models to this group of non-target organisms from treated plant material and insects at maximum Prevathon® rates show that residues are at least two orders of magnitude below the most sensitive toxicity endpoint for wild mammals or birds (USDA APHIS, 2015). Indirect risk to this group of organisms is also not anticipated based on the selectivity of chlorantraniliprole to certain insect taxa and the relatively small areas of treatment. Additionally, the selective nature of chlorantraniliprole to certain insect taxa and the low application rates suggest that impacts to all terrestrial invertebrates would not be anticipated. Any decrease in chlorantraniliprole-sensitive terrestrial invertebrate numbers would be expected to be local in nature due to the size of the treatment plots and recovery would occur more rapidly than in larger treatment areas due to immigration and the selective nature of chlorantraniliprole to certain life stages of invertebrates.

The potential for impacts to soil, air and water quality are expected to be negligible based on the proposed use pattern and available environmental fate data for chlorantraniliprole. Air quality is not expected to be significantly impacted since chlorantraniliprole has chemical properties that demonstrate it is not likely to volatilize into the atmosphere (USEPA, 2008). There will be some insecticide present in the atmosphere within and adjacent to the spray block immediately after application as drift but this will be localized and of short duration. Chlorantraniliprole has low solubility in water (<1 mg/L) and is susceptible to sunlight with a half-life of 0.31 days. Microbial degradation in water and pH-related effects to chlorantraniliprole are minor with half-lives greater than 125 days (USEPA, 2008). Slow degradation in soil is also anticipated with half-lives ranging from 228 to 924 days in various soil types (USEPA, 2008). Chlorantraniliprole has a varying affinity for binding to soil, but is generally low, suggesting that it may be susceptible to run-off during storm events. However, the proposed use rates and program restrictions regarding buffers suggest that surface and ground water quality will not be impacted from the proposed Program use of chlorantraniliprole.

c) Diflubenzuron

Diflubenzuron is a restricted use pesticide (only certified applicators or persons under their direct supervision may make applications) registered with USEPA as an insect growth regulator. It specifically interferes with chitin synthesis, the formation of the insect's exoskeleton. Larvae of affected insects are unable to molt properly. While this effect is desirable in controlling certain insects, it can have undesirable impacts to non-target organisms that are exposed.

USEPA considers diflubenzuron relatively non-persistent and immobile under normal use conditions and stable to hydrolysis and photolysis. The chemical is considered unlikely to contaminate ground water or surface water (USEPA, 1997). The vapor pressure of diflubenzuron is relatively low, as is the Henry's Law Constant value, suggesting the chemical will not volatilize readily into the atmosphere from soil, plants or water. Therefore, exposure from volatilization is expected to be minimal. Due to its low solubility (0.2 mg/L) and preferential binding to organic matter, diflubenzuron seldom persists more than a few days in water (Schaefer and Dupras, 1977; Schaefer et al., 1980). Mobility and leachability of diflubenzuron in soils is low, and residues are usually not detectable after seven days (Eisler, 2000). Aerobic aquatic half-life data in water and sediment was reported as 26.0 days (USEPA, 1997). Diflubenzuron applied to foliage remains adsorbed to leaf surfaces for several weeks with little or no absorption or translocation from plant surfaces (Eisler, 1992, 2000). Field dissipation studies in California citrus and Oregon apple orchards reported half-live values of 68.2 to 78 days (USEPA, 2018). Diflubenzuron persistence varies depending on site conditions and rangeland persistence is unfortunately not available. Diflubenzuron degradation is microbially mediated with soil aerobic half-lives much less than dissipation half-lives. Diflubenzuron treatments are expected to have minimal effects on terrestrial plants. Both laboratory and field studies demonstrate no effects using diflubenzuron over a range of application rates, and the direct risk to terrestrial plants is expected to be minimal (USDA APHIS, 2018c).

Dimilin® 2L is labeled with rates and treatment intervals that are meant to protect livestock and keep residues in cattle at acceptable levels (thereby, protecting human health). Tolerances are set for the amount of diflubenzuron that is allowed in cattle fat (0.05 ppm) and meat (0.05 ppm) (40 CFR Parts 180.377). The grasshopper program would treat at application rates indicated on product labels or lower, which should ensure approved residues levels.

APHIS' literature review found that on an acute basis, diflubenzuron is considered toxic to some aquatic invertebrates and practically non-toxic to adult honeybees. However, diflubenzuron is toxic to larval honeybees (USEPA, 2018). It is slightly nontoxic to practically nontoxic to fish and birds and has very slight acute oral toxicity to mammals, with the most sensitive endpoint from exposure being the occurrence of methemoglobinemia (a condition that impairs the ability of the blood to carry oxygen). Minimal direct risk to amphibians and reptiles is expected, although there is some uncertainty due to lack of information (USDA APHIS, 2018c; USEPA, 2018).

Risk is low for most non-target species based on laboratory toxicity data, USEPA approved use rates and patterns, and additional mitigations such as the use of lower rates and RAATs that further reduces risk. Risk is greatest for sensitive terrestrial and aquatic invertebrates that may be exposed to diflubenzuron residues.

In a review of mammalian field studies, Dimilin® applications at a rate of 60 to 280 g a.i./ha had no effects on the abundance and reproduction in voles, field mice, and shrews (USDA FS, 2004). These rates are approximately three to 16 times greater than the highest application rate proposed in the program. Potential indirect impacts from application of diflubenzuron on small mammals includes loss of habitat or food items. Mice on treated plots consumed fewer lepidopteran (order of insects that includes butterflies and moths) larvae compared to controls; however, the total amount of food consumed did not differ between treated and untreated plots. Body measurements, weight, and fat content in mice collected from treated and non-treated areas did not differ.

Poisoning of insectivorous birds by diflubenzuron after spraying in orchards at labeled rates is unlikely due to low toxicity (Muzzarelli, 1986). The primary concern for bird species is related to an indirect effect on insectivorous species from a decrease in insect prey. At the proposed application rates, grasshoppers have the highest risk of being impacted while other taxa have a much-reduced risk because the lack of effects seen in multiple field studies on other taxa of invertebrates at use rates much higher than those proposed for the program. Shifting diets in insectivorous birds in response to prey densities is not uncommon in undisturbed areas (Rosenberg et al., 1982; Cooper et al., 1990; Sample et al., 1993).

Indirect risk to fish species can be defined as a loss of habitat or prey base that provides food and shelter for fish populations, however these impacts are not expected based on the available fish and invertebrate toxicity data (USDA APHIS, 2018c). A review of several aquatic field studies demonstrated that when effects were observed it was at diflubenzuron levels not expected from program activities (Fischer and Hall, 1992; USEPA, 1997; Eisler, 2000; USDA FS, 2004).

Diflubenzuron applications have the potential to affect chitin production in various other beneficial terrestrial invertebrates. Multiple field studies in a variety of application settings, including grasshopper control, have been conducted regarding the impacts of diflubenzuron to terrestrial invertebrates. Based on the available data, sensitivity of terrestrial invertebrates to diflubenzuron is highly variable depending on which group of insects and which life stages are being exposed. Immature grasshoppers, beetle larvae, lepidopteran larvae, and chewing herbivorous insects appear to be more susceptible to diflubenzuron than other invertebrates. Within this group, however, grasshoppers appear to be more sensitive to the proposed use rates for the program. Honeybees, parasitic wasps, predatory insects, and sucking insects show greater tolerance to diflubenzuron exposure (Murphy et al., 1994; Eisler, 2000; USDA FS, 2004).

Diflubenzuron is moderately toxic to spiders and mites (USDA APHIS, 2018c). Deakle and Bradley (1982) measured the effects of four diflubenzuron applications on predators of *Heliothis* spp. at a rate of 0.06 lb a.i./ac and found no effects on several predator

groups. This supported earlier studies by Keever et al. (1977) that demonstrated no effects on the arthropod predator community after multiple applications of diflubenzuron in cotton fields. Grasshopper integrated pest management (IPM) field studies have shown diflubenzuron to have a minimal impact on ants, spiders, predatory beetles, and scavenger beetles. There was no significant reduction in populations of these species from seven to 76 days after treatment. Although ant populations exhibited declines of up to 50 percent, these reductions were temporary, and population recovery was described as immediate (Catangui et al., 1996).

Due to its mode of action, diflubenzuron has greater activity on immature stages of terrestrial invertebrates. Based on standardized laboratory testing diflubenzuron is considered practically non-toxic to adult honeybees. The contact LD50 value for the honeybee, *Apis mellifera*, is reported at greater than 114.8 µg a.i./bee while the oral LD50 value was reported at greater than 30 µg a.i./bee. USEPA (2018) reports diflubenzuron toxicity values to adult honeybees are typically greater than the highest test concentration using the end-use product or technical active ingredient. The lack of toxicity to honeybees, as well as other bees, in laboratory studies has been confirmed in additional studies (Nation et al., 1986; Chandel and Gupta, 1992; Mommaerts et al., 2006). Mommaerts et al. (2006) and Thompson et al. (2005) documented sublethal effects on reproduction-related endpoints for the bumble bee, *Bombus terrestris* and *A. mellifera*, respectively, testing a formulation of diflubenzuron. However, these effects were observed at much higher use rates relative to those used in the program.

Insecticide applications to rangelands have the potential to impact pollinators, and in turn, vegetation and various rangeland species that depend on pollinated vegetation. Based on the review of laboratory and field toxicity data for terrestrial invertebrates, applications of diflubenzuron are expected to have minimal risk to pollinators of terrestrial plants. The use of RAATs provide additional benefits by using reduced rates and creating untreated swaths within the spray block that will further reduce the potential risk to pollinators.

APHIS reduces the risk to native bees and pollinators through monitoring grasshopper and Mormon cricket populations and making pesticide applications in a manner that reduces the risk to this group of nontarget invertebrates. Monitoring grasshopper and Mormon cricket populations allows APHIS to determine if populations require treatment and to make treatments in a timely manner reducing pesticide use and emphasizing the use of Program insecticides that are not broad spectrum. Historical use of Program insecticides demonstrate that diflubenzuron is the preferred insecticide for use. Over 90% of the acreage treated by the Program has been with diflubenzuron. Diflubenzuron poses a reduced risk to native bees and pollinators compared to liquid carbaryl and malathion applications.

Adverse human health effects from ground or aerial ULV applications of diflubenzuron to control grasshoppers are not expected based on the low acute toxicity of diflubenzuron and low potential for human exposure. The adverse health effects of diflubenzuron to mammals and humans involves damage to hemoglobin in blood and the transport of oxygen. Diflubenzuron causes the formation of methemoglobin. Methemoglobin is a

form of hemoglobin that is not able to transport oxygen (USDA FS, 2004). USEPA classifies diflubenzuron as non-carcinogenic to humans (USEPA, 2015b).

Program workers adverse health risks are not likely when diflubenzuron is applied according to label directions that reduce or eliminate exposures. Adverse health risk to the general public in treatment areas is not expected due to the low potential for exposure resulting from low population density in the treatment areas, adherence to label requirements, program measures designed to reduce exposure to the public, and low toxicity to mammals.

d) Reduced Area Agent Treatments (RAATs)

The use of RAATS is the most common application and the preferred method for all program insecticides and would continue to be so, accept in rare pest conditions that warrant full coverage and higher rates. The goal of the RAATs strategy is to suppress grasshopper populations to a desired level, rather than to reduce those populations to the greatest possible extent. This strategy has both economic and environmental benefits. APHIS would apply a single application of insecticide per year, typically using a RAATs strategy that decreases the rate of insecticide applied by either using lower insecticide spray concentrations, or by alternating one or more treatment swaths. Usually, RAATs applications use both lower concentrations and skip treatment swaths. The RAATs strategy suppresses grasshoppers within treated swaths, while conserving grasshopper predators and parasites in swaths that are not treated.

The concept of reducing the treatment area of insecticides while also applying less insecticide per treated acre was developed in 1995, with the first field tests of RAATs in Wyoming (Lockwood and Schell, 1997). Applications can be made either aerially or with ground-based equipment (Deneke and Keyser, 2011). Studies using the RAATs strategy have shown good control (up to 85% of that achieved with a total area insecticide application) at a significantly lower cost and less insecticide, and with a markedly higher abundance of non-target organisms following application (Lockwood et al., 2000; Deneke and Keyser, 2011). Levels of control may also depend on variables such as body size of targeted grasshoppers, growth rate of forage, and the amount of coverage obtained by the spray applications (Deneke and Keyser, 2011). Control rates may also be augmented by the necrophilic and necrophagic behavior of grasshoppers, in which grasshoppers are attracted to volatile fatty acids emanating from cadavers of dead grasshoppers and move into treated swaths to cannibalize cadavers (Lockwood et al., 2002; Smith and Lockwood, 2003). Under optimal conditions, RAATs decrease control costs, as well as host plant losses and environmental effects (Lockwood et al., 2000; Lockwood et al., 2002).

The efficacy of a RAATs strategy in reducing grasshoppers is, therefore, less than conventional treatments and more variable. Foster et al. (2000) reported that grasshopper mortality using RAATs was reduced 2 to 15% from conventional treatments, depending on the insecticide, while Lockwood et al. (2000) reported 0 to 26% difference in mortality between conventional and RAATs methods. APHIS will consider the effects of not suppressing grasshoppers to the greatest extent possible as part of the treatment planning process.

RAATs reduces treatment costs and conserves non-target biological resources in untreated areas. The potential economic advantages of RAATs was proposed by Larsen and Foster (1996), and empirically demonstrated by Lockwood and Schell (1997). Widespread efforts to communicate the advantages of RAATs across the Western States were undertaken in 1998 and have continued on an annual basis. The viability of RAATs at an operational scale was initially demonstrated by Lockwood et al. (2000), and subsequently confirmed by Foster et al. (2000). The first government agencies to adopt RAATs in their grasshopper suppression programs were the Platte and Goshen County Weed and Pest Districts in Wyoming; they also funded research at the University of Wyoming to support the initial studies in 1995. This method is now commonly used by government agencies and private landowners in States where grasshopper control is required.

Reduced rates should prove beneficial for the environment. All APHIS grasshopper treatments using carbaryl, diflubenzuron, or malathion are conducted in adherence with USEPA-approved label directions. Labeled application rates for grasshopper control tend to be lower than rates used against other pests. In addition, use rates proposed for grasshopper control by APHIS are lower than rates used by private landowners.

B. Other Environmental Considerations

1. Cumulative Impacts

Cumulative impact, as defined in the Council on Environmental Quality (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."

Potential cumulative impacts associated with the No Action alternative where APHIS would not take part in any grasshopper suppression program include the continued increase in grasshopper populations and potential expansion of populations into neighboring range and cropland. In addition, State and private land managers could apply insecticides to manage grasshopper populations however, land managers may opt not to use RAATs, which would increase insecticides applied to the rangeland. Increased insecticide applications from the lack of coordination or foregoing RAATs methods could increase the exposure risk to non-target species. In addition, land managers may not employ the extra program measures designed to reduce exposure to the public and the environment to insecticides.

Potential cumulative impacts associated with the Preferred Alternative are not expected to be significant because the program applies an insecticide application once during a treatment. The program may treat an area with different insecticides but does not overlap the treatments. The program does not mix or combine insecticides. Based on historical outbreaks in the United States, the probability of an outbreak occurring in the same area where treatment occurred in the previous year is unlikely; however, given time,

populations eventually will reach economically damaging thresholds and require treatment

The insecticide application reduces the insect population down to levels that cause an acceptable level of economic damage. The duration of treatment activity, which is relatively short since it is a one-time application, and the lack of repeated treatments in the same area in the same year reduce the possibility of significant cumulative impacts.

Potential cumulative impacts resulting from the use of insecticides include insect pest resistance, synergistic chemical effects, chemical persistence and bioaccumulation in the environment. The program use of reduced insecticide application rates (i.e. ULV and RAATs) are expected to mitigate the development of insect resistance to the insecticides. Grasshopper outbreaks in the United States occur cyclically so applications do not occur to the same population over time further eliminating the selection pressure increasing the chances of insecticide resistance.

The insecticides proposed for use in the program have a variety of agricultural and non-agricultural uses. There may be an increased use of these insecticides in an area under suppression when private, State, or Federal entities make applications to control other pests. However, most of the land where program treatments occur is uncultivated rangeland and additional treatments by landowners or managers are very uncommon making possible cumulative or synergistic chemical effects extremely unlikely.

The insecticides proposed for use in the grasshopper program are not anticipated to persist in the environment or bioaccumulate. Therefore, a grasshopper outbreak that occurs in an area previously treated for grasshoppers is unlikely to cause an accumulation of insecticides from previous program treatments.

Herbicide treatments for invasive species have been conducted on the San Carlos Reservation by Tribal management agencies. These areas are not located in the 2021 Action area for the rangeland grasshopper suppression program. Therefore, there would be no synergistic effect from an overlap of pesticide and herbicide treatments.

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

Federal agencies identify and address the disproportionately high and adverse human health or environmental effects of their proposed activities, as described in E.O. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

APHIS has evaluated the proposed grasshopper program and has determined that there is no disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

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

Federal agencies consider a proposed action's potential effects on children to comply with E.O. 13045, "Protection of Children from Environmental Health Risks and Safety Risks." This E.O. requires each Federal agency, consistent with its mission, to identify and assess environmental health and safety risks that may disproportionately affect children and to ensure 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).

APHIS' HHERAs evaluated the potential exposure to each insecticide used in the program and risks associated with these insecticides to residents, including children. The HHERAs for the proposed program insecticides, located at http://www.aphis.usda.gov/plant-health/grasshopper, suggest that no disproportionate risks to children, as part of the general public, are anticipated.

According to the BUREAU OF WOMEN'S AND CHILDREN'S HEALTH, Arizona Department of Health Services, there are 3,235 children between the ages of 0-14. There is approximately 1,151 youth from the ages of 15-19 according to the Arizona Department of Health Services. The risk for children to be exposed to treatment pesticides is very low due to the remote nature of the Tribal Rangeland. The nearest communities are approximately 50 miles from the Tribal rangeland areas. There will be no aerial treatments conducted in Arizona only by ground-based equipment.

APHIS grasshopper insecticide treatments are conducted in rural rangeland areas, where agriculture is a primary industry. The areas consist of widely scattered, single, rural dwellings in ranching communities with low population density. The program notifies residents within treatment areas, or their designated representatives, prior to proposed operations to reduce the potential for incidental exposure to residents including children. Treatments are conducted primarily on open rangelands where children would not be expected to be present during treatment or to enter should there be any restricted entry period after treatment. The program also implements mitigation measures beyond label requirements to ensure that no treatments occur within the required buffer zones from structures, such as a 500-foot treatment buffer zone from schools and recreational areas. Program insecticides are not applied while school buses are operating in the treatment area.

4. Tribal Consultation

Executive Order 13175 "Consultation and Coordination with Indian Tribal Governments," calls for agency communication and collaboration with tribal officials when proposed Federal actions have potential tribal implications. The Archaeological Resources Protection Act of 1979 (16 U.S.C. §§ 470aa-mm), secures the protection of archaeological resources and sites on public and tribal lands.

Prior to the treatment season, program personnel notify Tribal land managers of the potential for grasshopper and Mormon cricket outbreaks on their lands. Consultation with local Tribal representatives takes place prior to treatment programs to inform fully the Tribes of possible actions APHIS may take on Tribal lands. Treatments typically do not occur at cultural sites, and drift from a program treatment at such locations is not expected to adversely affect natural surfaces, such as rock formations and carvings. APHIS would also confer with the appropriate Tribal authority to ensure that the timing and location of a planned program treatment does not coincide or conflict with cultural events or observances on Tribal lands. APHIS has received a letter of request for services to suppress economic populations of rangeland grasshoppers, signed by the Tribal Administrator for the 2023 season. Suppression work will only occur within the proposed action areas of the San Carlos Apache Reservation. Any tribal lands outside of the proposed action area will be excluded from any treatment program.

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

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703–712) established a Federal prohibition, unless permitted by regulations, to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird or any part, nest, or egg of any such bird.

APHIS will support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or reducing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Impacts are minimized as a result of buffers to water, habitat, nesting areas, riparian areas, and the use of RAATs. For any given treatment, only a portion of the environment will be treated, therefore minimizing potential impacts to migratory bird populations.

6. Endangered Species Act

Section 7 of the Endangered Species Act (ESA) and its implementing regulations require Federal agencies to ensure their actions are not likely to jeopardize the continued existence of listed threatened or endangered species or result in the destruction or adverse modification of critical habitat. Numerous federally listed species and areas of designated critical habitat occur within the 17-State program area, although not all occur within or near potential grasshopper suppression areas or within the area under consideration by through this EA.

APHIS considers whether listed species, species proposed for listing, experimental populations, or critical habitat are present in the proposed suppression area. Before treatments are conducted, APHIS contacts the U.S Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) (where applicable) to determine if listed

species are present in the suppression area, and whether mitigations or protection measures must be implemented to protect listed species or critical habitat.

APHIS completed a programmatic Section 7 consultation with NMFS for use of carbaryl, malathion, and diflubenzuron to suppress grasshoppers in the 17-state program area because of the listed salmonid (*Oncorhynchus* spp.) and critical habitat. To minimize the possibility of insecticides from reaching salmonid habitat, APHIS implements the following protection measures:

- RAATs are used in all areas adjacent to salmonid habitat
- ULV sprays are used, which are between 50% and 66% of the USEPA recommended rate
- Insecticides are not aerially applied in a 3,500-foot buffer zones for carbaryl or malathion, or applied within a 1,500-foot buffer zones for diflubenzuron along stream corridors
- Insecticides will not be applied when wind speeds exceed 10 miles per hour. APHIS will attempt to avoid insecticide application if the wind is blowing towards salmonid habitat
- Insecticide applications are avoided when precipitation is likely or during temperature inversions

APHIS determined that with the implementation of these measures, the grasshopper suppression program may affect, but is not likely to adversely affect listed salmonids or designated critical habitat in the program area. NMFS concurred with this determination in a letter dated April 12, 2010.

APHIS submitted a programmatic biological assessment for grasshopper suppression in the 17-state program area and requested consultation with USFWS on March 9, 2015. With the incorporation and use of application buffers and other operational procedures APHIS anticipates that any impacts associated with the use and fate of program insecticides will be insignificant and discountable to listed species and their habitats. Based on an assessment of the potential exposure, response, and subsequent risk characterization of program operations, APHIS concludes the proposed action is not likely to adversely affect listed species or critical habitat in the program area. APHIS has requested concurrence from the USFWS on these determinations. Until this programmatic Section 7 consultation with USFWS is completed, APHIS will continue to conduct consultations with USFWS field offices at the local level. The BA addresses the protective measures and use of diflubenzuron and carbaryl bait as it relates to species previously addressed in biological assessments with concurrences from FWS dated February 24, 2022, April 1, 2022, January 19, 2021, and March 29, 2021.

Concurrence to informal consultations from FWS Regional office, was signed March 15, 2023 (Appendix E).

APHIS considers the role of pollinators in any consultations conducted with the FWS to protect federally listed plants. Mitigation measures, such as no treatment buffers are applied with consideration of the protection of pollinators that are important to a listed

plant species. Correspondence from FWS is in appendix E of this EA. *There are no species in Arizona regulated by NMFS. No consultation or concurrence from NMFS is needed.*

In the 2023 biological assessment APHIS, PPQ Arizona Field Ops determined that the proposed action **will not effect**: the endangered Arizona cliffrose (*Purshia subintegra*); endangered Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*) with critical habitat; threatened Jones cycladenia, (*Cycladenia jonesii*); threatened Siler pincushion cactus (*Pediocactus sileri*); threatened Welsh's milkweed (*Asclepias welshii*) with critical habitat; threatened Mojave Desert tortoise (*Gopherus agassizii*) with critical habitat.

APHIS has determined that the proposed action **may affect but is not likely to adversely affect:** the endangered Mexican gray wolf (*Canis lupus baileyi*); endangered California Condor (*Gymnogyps californianus*); endangered California Least Tern, (*Sterna antillarum browni)*; endangered Southwestern willow flycatcher (*Empidonax traillii extimus*) with critical habitat; endangered Desert pupfish (*Cyprinodon macularius*); endangered Gila chub (*Gila intermedia*); endangered Razorback sucker (*Xyrauchen texanus*) with critical habitat; threatened Mexican spotted owl (*Strix occidentalis lucida*) with critical habitat; threatened Western yellow-billed cuckoo (*Coccyzus americanus*) with proposed critical habitat, threatened Chiricahua leopard frog (*Rana chiricahuensis*) with critical habitat; threatened Northern Mexican gartersnake (*Thamnophis eques megalops*).

APHIS is not required to develop mitigation buffer zones for candidate or other species of concern. The Monarch Butterfly, *Danaus plexippus*, Sonoran Desert tortoise, *Gopherus morafkai*, Northern leopard frog (*Rana pipiens*), (Arizona Game and Fish Department Species of Greatest Conservation Need) are species of concern and may or may not be located within our proposed treatment areas for 2023. However, species of concern receive no legal protection under the Act, but APHIS has considered these species and discussions with the local land managers prior to any treatments to assist in any conservation efforts. Agreed upon mitigation measures between USFWS, BLM, Tribal Nations, BIA, ADA, Arizona Game & Fish, BLM, and APHIS will be adhered too for species of concern (see table 2).

7. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668–668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. During the breeding season, bald eagles are sensitive to a variety of human activities. Grasshopper management activities could cause disturbance of nesting eagles, depending on the duration, noise levels, extent of the area affected by the activity, prior experiences that eagles have with humans, and tolerance of the individual nesting pair. Also, disruptive activities in or near eagle foraging areas can interfere with bald eagle feeding, reducing chances of survival. USFWS has provided

recommendations for avoiding disturbance at foraging areas and communal roost sites that are applicable to grasshopper management programs (USFWS, 2007).

No toxic effects are anticipated on eagles as a direct consequence of insecticide treatments. Toxic effects on the principal food source, fish, are not expected because insecticide treatments will not be conducted over rivers or lakes. Buffer's protective of aquatic biota is applied to their habitats to ensure that there are no indirect effects from loss of prey.

8. Additional Species of Concern

There may be species that are of special concern to land management agencies, the public, or other groups and individuals in proposed treatment areas. For example, the sage grouse populations have declined throughout most of their entire range, with habitat loss being a major factor in their decline.

Grasshopper suppression programs reduce grasshoppers and at least some other insects in the treatment area that can be a food item for sage grouse chicks. As indicated in previous sections on impacts to birds, there is low potential that the program insecticides would be toxic to sage grouse, either by direct exposure to the insecticides or indirectly through immature sage grouse eating moribund grasshoppers.

Because grasshopper numbers are so high in an outbreak year, treatments would not likely reduce the number of grasshoppers below levels present in a normal year which would usually range from 3-7 gh/yd^2. Should grasshoppers be unavailable in small, localized areas, sage grouse chicks may consume other insects, which sage grouse chicks likely do in years when grasshopper numbers are naturally low. By suppressing grasshoppers, rangeland vegetation is available for use by other species, including sage grouse, and rangeland areas are less susceptible to invasive plants that may be undesirable for sage grouse habitat.

However, extreme grasshopper outbreaks can cause massive defoliation and the loss of forbs, reducing nesting cover for the following spring and reducing another important food source for sage- grouse. An effective rangeland treatment program will balance these short- and long- term impacts. The goal is to reduce grasshopper numbers to what would be encountered in a normal year, leaving an ample food base while protecting rangeland resources.

APHIS also implements several BMP practices in their treatment strategies that are designed to protect nontarget invertebrates, including pollinators. APHIS minimizes insecticide use by using lower than labeled rates for all Program insecticides, alternating swaths during treatment, making only one application per season and minimizing use of liquid broad-spectrum insecticides. APHIS also continues to evaluate new monitoring and control methods designed to increase the response to economically damaging populations of grasshoppers and Mormon crickets while protecting rangeland resources such as pollinators.

9. Fires and Human Health Hazards

Various compounds are released in smoke during wildland fires, including carbon monoxide (CO), carbon dioxide, nitrous oxides, sulfur dioxide, hydrogen chloride, aerosols, polynuclear aromatic hydrocarbons contained within fine particulate matter (a byproduct of the combustion of organic matter such as wood), aldehydes, and most notably formaldehyde produced from the incomplete combustion of burning biomass (Reisen and Brown, 2009; Burling et al., 2010; Broyles, 2013). Particulate matter, CO, benzene, acrolein, and formaldehyde have been identified as compounds of particular concern in wildland fire smoke (Reinhardt and Ottmar, 2004).

Many of the naturally occurring products associated with combustion from wildfires may also be present as a result of combustion of program insecticides that are applied to rangeland. These combustion byproducts will be at lower quantities due to the short half-lives of most of the program insecticides and their low use rates. Other minor combustion products specific to each insecticide may also be present as a result of combustion from a rangeland fire but these are typically less toxic based on available human health data (http://www.aphis.usda.gov/plant-health/grasshopper).

The safety data sheet for each insecticide identifies these combustion products for each insecticide as well as recommendations for PPE. The PPE is similar to what typically is used in fighting wildfires. Material applied in the field will be at a much lower concentration than what would occur in a fire involving a concentrated formulation. Therefore, the PPE worn by rangeland firefighters would also be protective of any additional exposure resulting from the burning of residual insecticides.

10. Cultural and Historical Resources

Federal actions must seek to avoid, minimize, and mitigate potential negative impacts to cultural and historic resources as part of compliance with the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act of 1979, and NEPA. Section 106 of the NHPA requires Federal agencies to provide the Advisory Council on Historic Preservation with an opportunity to comment on their findings. There are no known historic resources and National Trails within the proposed action area.

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Appendix A: APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program

FY-2023 Treatment Guidelines
Version 1/10/2023

The objectives of the APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program are to 1) conduct surveys in the Western States; 2) provide technical assistance to land managers and private landowners; 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, the agriculture department of an affected State, or private landowners, 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 / landowner 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 and subject to funding availablity, 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% charge, however, on 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 small 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 the included crop as well as rangeland and current Worker Protection Standards must be followed by the applicator and private landowner.

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. providing 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 (ULV) spray
    B. Diflubenzuron ULV spray
    C. Malathion ULV spray
    D. Chlorantraniliprole 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 safety 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 aerial 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.

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 to assure that any environmentally sensitive sites are protected.

9. APHIS reporting requirements associated with grasshopper / Mormon cricket suppression treatments include:
    A. Completion of a post-treatment report (Part C of the Project Planning and Reporting Worksheet (PPQ Form 62)
    B. Providing an entry for each treatment in the PPQ Grasshopper/Mormon Cricket treatment database
    C. For aerial treatments, providing copies of forms and treatment/plane data for input into the Federal Aviation Interactive Reporting System (FAIRS) by PPQ's designee

SPECIFIC PROCEDURES FOR AERIAL APPLICATIONS

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

2. Minimize the potential for drift and volatilization by not using ULV sprays when the following conditions exist in the spray area:

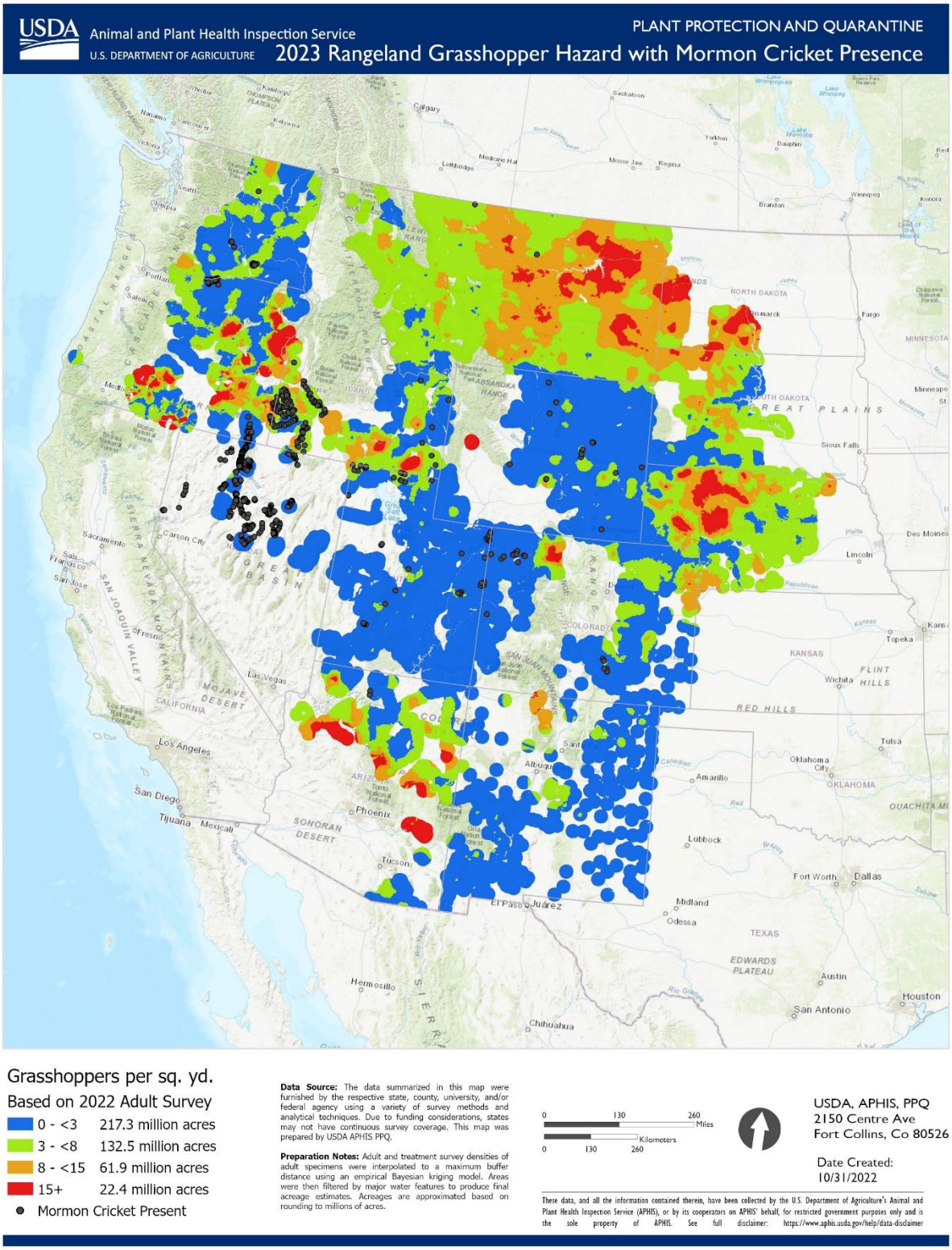
    a. Wind velocity exceeds 10 miles per hour (unless state law requires lower wind speed);
    b. Rain is falling or is imminent;
    c. Dew is present over large areas within the treatment block;
    d. There is air turbulence that could affect the spray deposition;
    e. Temperature inversions (ground 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.

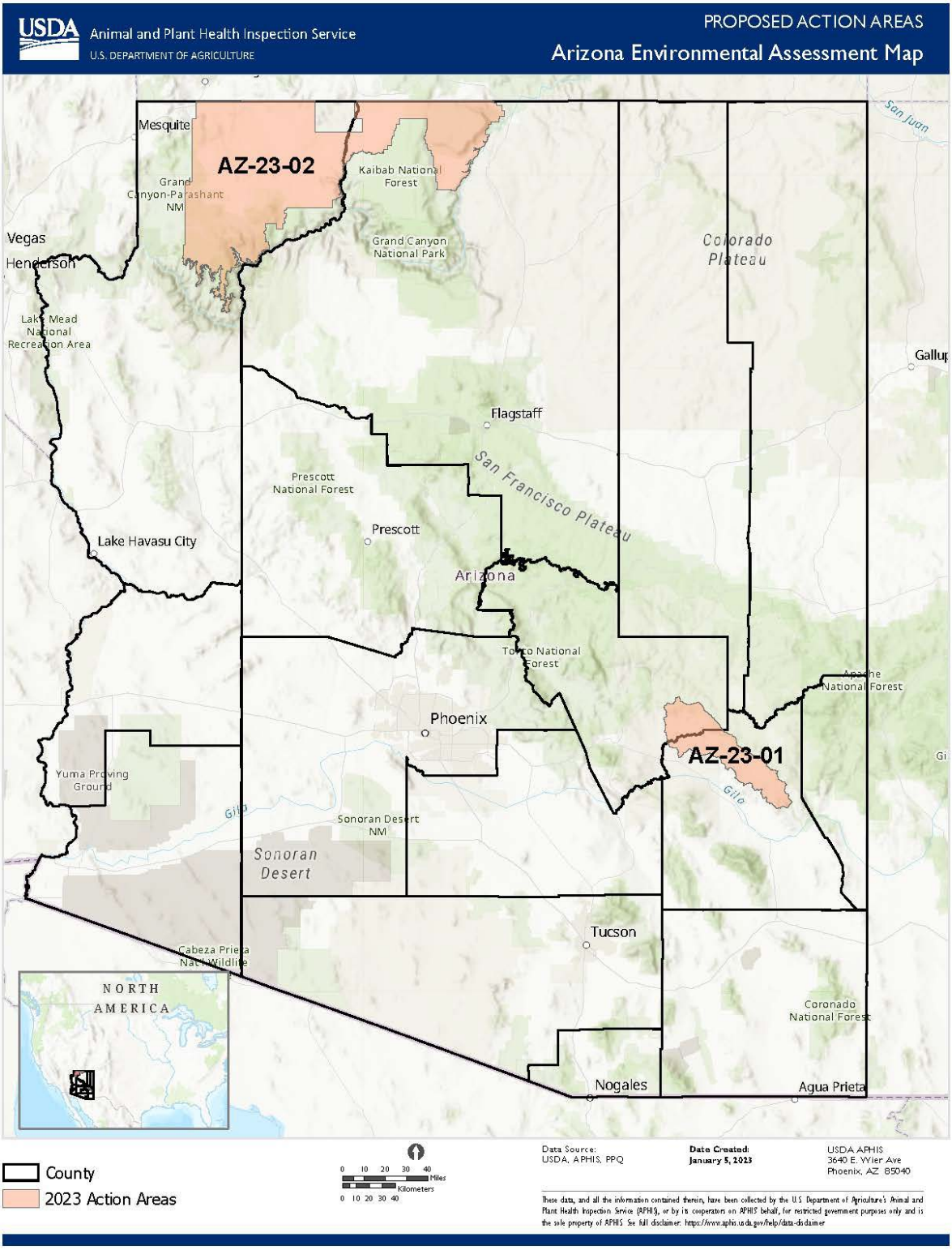
4. Application aircraft will fly at a median altitude of 1 to 1.5 times the wingspan of the aircraft whenever possible or as specified by the COR or the Treatment Manager.

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.

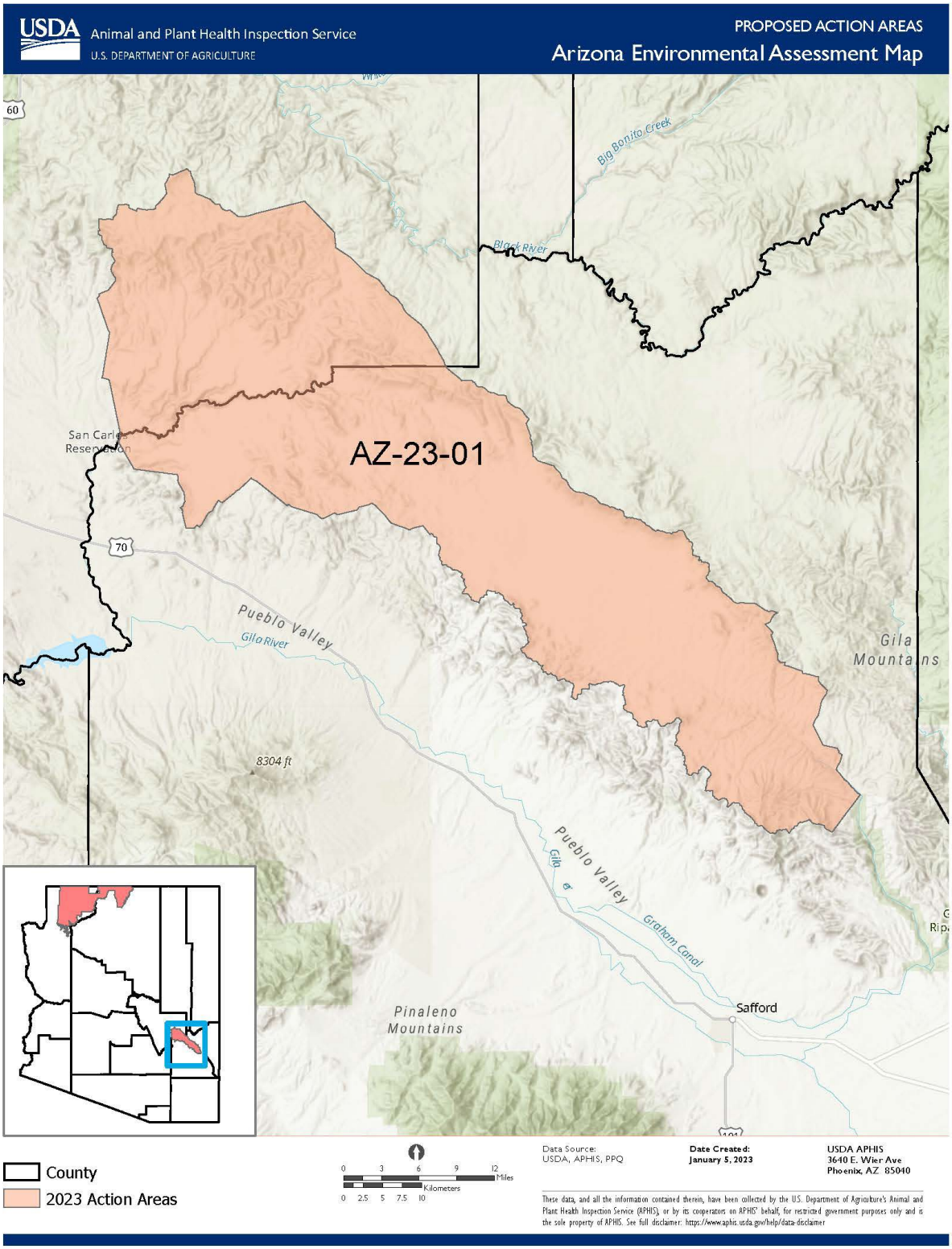
Appendix B: Grasshopper Hazard Map of the Affected Environment



Appendix C: Map of Proposed Action Areas



Appendix D: Map of the San Carlos Apache Tribal Proposed Action Area



Appendix E: FWS/NMFS Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Post Office Box 1306
Albuquerque, New Mexico 87103

In Reply Refer To:
FWS/R2/ES-ER/078481
2023-0052629-S7-001

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

Dear Mr. Murray:

Thank you for your correspondence of January 5, 2023, which we received on January 9, 2023, via email. This letter documents our review of your Animal and Plant Health Inspection Service (APHIS) 2023 Rangeland Grasshopper and Mormon Cricket Suppression Program, in compliance with section 7 of the Endangered Species Act of 1973 (Act) as amended (16 U.S.C. 1531 et seq.). Specifically, the project under analysis in this letter includes a portion of the San Carlos Reservation in Gila and Graham counties, Arizona.

Your letter concluded that the proposed project "may affect, but is not likely to adversely affect" the endangered desert pupfish (*Cyprinodon macularius*), Gila chub (*Gila intermedia*), Gila topminnow (*Poeciliopsis occidentalis occidentalis*), loach minnow (*Tiaroga cobitis*), Mexican gray wolf (*Canis lupus baileyi*), southwestern willow flycatcher (*Empidonax traillii extimus*; flycatcher), spikedace (*Meda fulgida*), the threatened Chiricahua leopard frog (*Lithobates chiricahuensis*; frog), Mexican spotted owl (*Strix occidentalis lucida;* owl), and the western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus*; cuckoo). We concur with your determinations and provide our rationales below.

You also described conservation measures to minimize impacts to bald eagles (*Haliaeetus leucocephalus*), anticipating our technical assistance with respect to Bald and Golden Eagle Protection Act compliance. Appendix A includes our documentation of APHIS's minimization measures to reduce the likelihood of take.

DESCRIPTION OF THE PROPOSED ACTION:

A complete description of the proposed action is included in your January 9, 2023, Biological Assessment (BA).

The APHIS, in coordination with the San Carlos Apache Tribe, proposes to suppress economically damaging grasshopper and Mormon cricket populations on rangelands using chemicals within the San Carlos Apache Reservation. The BA, section 3.0, describes treatment areas, and section 7.2, "San Carlos Tribal Lands" delineates them. The areas APHIS plans to treat within the San Carlos Apache Reservation are rangeland within Antelope Flats and Ash Flats in Graham County, and Blue River Pasture and Rocky Gulch Valley in Gila County. The APHIS will exclude treatments within Antelope Flats, Cottonwood Canyon with a 0.5-mile buffer along canyon rim. All treatment areas are located within rangelands and APHIS is not treating grasslands associated with woodlands or forests.

The Plant Protection Act of 2000 (PPA) authorizes APHIS's programs to suppress grasshoppers and Mormon crickets on rangelands to reduce vegetation losses. The PPA mandates APHIS control economic infestations of grasshoppers and Mormon crickets to protect Federal rangeland, when requested. The APHIS only considers conducting suppression upon request from a Tribal government or land management agency.

The proposed action is Alternative 3, as the BA describes, involving a single application per year of one insecticide early in the target species' life cycle, applied using the Reduced Agent Area Treatment (RAAT) method, or modified RAAT. Target grasshoppers include *Aulocara elliotti* and *Melanoplus sanguinipes*. The APHIS will begin application in early March to early April 2023. The insecticides are diflubenzuron, chlorantraniliprole, carbaryl and Malathion. The chemical control methods available to APHIS include the use of Ultra-Low-Volume (ULV) sprays of all three insecticides, and carbaryl in bait formulation, using ground or aerial equipment. The ULV application rates are 0.75 to 8.0 fluid ounces per acre. The application rate of carbaryl in bait formulation (five percent active ingredient) is 10 pounds per acre.

The APHIS will employ buffer zones, within which there will be no pesticide application, and other conservation measures from the nine biological opinions the U. S. Fish and Wildlife Service (FWS) issued the APHIS control program in 18 western states, and subsequently consolidated in an October 3, 1995, FWS - Mountain Prairie Region letter 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" (RPM) for species and the pesticide (diflubenzuron) not covered in the aforementioned consultations, or whichever buffer is greater. The APHIS will buffer all bodies of water to prevent contamination. Persistence of insecticides in the environment is limited (maximum half-life in soil is 28 days, and six days in water).

The action may also include experimental treatments. The APHIS continues to refine its grasshopper and Mormon cricket control methods to make the program more economically feasible and environmentally sound. Refinements may include reduced rates of currently used insecticides, improved formulations, more target-specific baits, and biological pesticide suppression alternatives or improvements to aerial and ground application equipment. The APHIS uses experimental plots for this work. The APHIS also monitors a no treatment area to determine the effect of no treatment. The APHIS monitors all plots for two additional years to gather insecticides effects information on non-target arthropods. The APHIS applies all buffers and other conservation measures to any experimental plot.

DETERMINATION OF EFFECTS:

We concur with your determination the proposal "may affect, but is not likely to adversely affect", the Chiricahua leopard frog, desert pupfish, Gila chub, Gila topminnow, loach minnow, Mexican gray wolf, Mexican spotted owl, southwestern willow flycatcher, spikedace, and western yellow-billed cuckoo for the reasons described below.

Chiricahua Leopard Frog:

- Potential habitat for the frog exists primarily in stock tanks. The APHIS will apply buffers and other RPM conservation measures to all stock tanks and any other body of water to minimize the likelihood of directly affecting aquatic habitats; therefore, effects to frog habitat from the proposed action are discountable.

- Other conservation measures include avoiding applying insecticides before, during or after precipitation, which will avoid the time when frogs may be foraging away from water; therefore, there will be no effects on foraging frogs.

- The likelihood of indirectly exposing frogs to insecticides is extremely low; the magnitude of any exposure would not be detectable due to water dilution and insecticide degradation. Therefore, any effects to this species from insecticide exposure would be insignificant.

Desert Pupfish, Gila Topminnow, Loach Minnow and Spikedace:

- The nearest suitable habitat for these species is the lower part of Bonita Creek, about eight miles downstream from the Ash Flat treatment area boundary, which overlaps an ephemeral part of Bonita Creek. Per the RPM, these species' maximum buffer zone, including upstream considerations, is 1.75 miles, which is sufficient to avoid directly affecting these species and their habitats; therefore, effects to these species and their habitats from the proposed action are discountable.

- The likelihood of indirectly exposing 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 water dilution and insecticide degradation. Therefore, any effects to these species from insecticide exposure would be insignificant.

Gila Chub:

- This nearest Gila chub suitable habitat is in Bonita Creek, 2.5 miles from the Ash Flat treatment area boundary, which overlaps an ephemeral part of Bonita Creek. Per the RPM, the Gila chub maximum buffer zone, including upstream considerations, is 1.75 miles, which is sufficient to avoid directly affecting this species and its habitat; therefore, effects to Gila chub and its habitat from the proposed action are discountable.

- The likelihood of indirectly exposing Gila chub to insecticides is extremely low because the magnitude of any exposure would not be detectable due to water dilution and

insecticide degradation. Therefore, any effects to this species from insecticide exposure would be insignificant.

Mexican Wolf:

- The Mexican wolf occurs on the San Carlos Apache Reservation, but for only brief periods of time and in very limited numbers; the reservation has no established wolf pack. Although wolves may occur infrequently near treatment areas, insecticide bioaccumulation is minimal for this species; therefore, any effects would be insignificant.

- The likelihood of exposing Mexican wolves directly or indirectly to the insecticides is extremely low; therefore, any project effects to this species from insecticide exposure are discountable.

Mexican Spotted Owl:

- Potential habitat for this owl may occur in higher elevations and canyons on the San Carlos Apache Reservation. However, treatments will be restricted to rangeland at lower elevations, so there will be no disturbance to breeding owls. Owls may migrate or disperse through the treatment area before or after the breeding season but are not likely to be present in the proposed treatment area from March 1st to August 31st; therefore, the proposed action will not result in disturbance to non-breeding owls.

- The likelihood of exposing owls directly or indirectly to insecticides is extremely low; therefore, any effects to the species from insecticide exposure are discountable.

Southwestern Willow Flycatcher:

- The flycatcher occurs along the San Carlos River below Talkalai Lake, which is about one mile from the proposed treatment area on Antelope Flats. Flycatchers may fly upstream along the San Carlos River, which APHIS buffered by a 0.25-mile no-treatment zone. Flycatchers may fly through part of a treatment area. However, treatment areas do not contain flycatcher nesting habitat; therefore, there will be no effect to nesting flycatchers from the proposed action.

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

Western Yellow-billed Cuckoo:

- The cuckoo may occur along the San Carlos River, which APHIS buffered by a 0.25-mile no-treatment zone. However, treatment areas do not contain cuckoo nesting habitat. Therefore, there will be no effect to breeding cuckoos from the proposed action.

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

In keeping with our trust responsibility to American Indian Tribes, by copy of this letter we are notifying the San Carlos Apache Tribe of our concurrence with your determinations, and we encourage you to invite the Bureau of Indian Affairs to review your proposed action.

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 new information on the distribution or abundance of listed species or critical habitat becomes available, we may need to reconsider your determination. In all future correspondence on this project, please refer to the consultation number 2023-0052629-S7-001.

Please contact Michelle Durflinger, Fish and Wildlife Biologist, Environmental Review Branch, Ecological Services, at 505-248-6664 or Michelle_Durflinger@fws.gov, if you have questions or need further assistance.

Sincerely,

MARTIN TUEGEL

Digitally signed by MARTIN TUEGEL
Date: 2023.03.15 15:20:57 -06'00'

Program Lead,
Division of Environmental Review

Attachment

(Electronic Copy)
cc: Director, Recreation and Wildlife Department, San Carlos Apache Tribe, San Carlos, AZ
Director, San Carlos Tribal Historic Preservation and Archaeology, San Carlos, AZ
Attorney General, 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
Field Manager, Safford Field Office, Gila District, Bureau of Land Management, Safford, AZ
Native American Liaison, Southwest Region, Fish and Wildlife Service, Albuquerque, NM
Assistant Field Supervisor, Arizona Ecological Services Office, Fish and Wildlife Service, Flagstaff and Phoenix, AZ (Attn: S. Hedwall, J. Miller, J. Nystedt, G. Beatty, R. Gordon)
Assistant Field Supervisor, Arizona Ecological Services, Fish and Wildlife Service, Tucson, AZ (Attn: C. Crawford, E. Fernandez, M. Alanen)

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

In Reply Refer to:
AESO/SE
2023-0052283-S7-001

March 6, 2023

Mr. Dewey W. Murray, Domestic Program Coordinator
Plant Protection and Quarantine
Animal and Plant Health Inspection Service (APHIS)
U.S. Department of Agriculture
3640 East Wier Avenue
Phoenix, Arizona 85040

Dear Mr. Murray:

Thank you for your correspondence of January 5, 2023, which we received on January 9, 2023, via email. This letter documents our review of the APHIS Rangeland Grasshoppers and Mormon Cricket Suppression Program, in compliance with section 7 of the Endangered Species Act of 1973 (Act) as amended (16 U.S.C. 1531 et seq.). Specifically, the project includes rangeland areas within the Bureau of Land Management (BLM) Arizona Strip District, Coconino and Mohave counties. Your letter concluded that the proposed project "may affect but is not likely to adversely affect" the experimental non-essential population of the endangered California condor (*Gymnogyps californianus*). We concur with your determination and provide our rationale below.

APHIS also determined there would be "no effect" to the Arizona cliffrose (*Purshia subintegra*), Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*) and its critical habitat, Jones cycladenia (*Cycladenia jonesii*), Siler pincushion cactus (*Pediocactus sileri*), Welsh's milkweed (*Asclepias welshii*) and its critical habitat, and the Mohave desert tortoise (*Gopherus agassizii*) and its critical habitat. Species with no effect determinations do not require review from the Fish and Wildlife Service (FWS), and we will not address these species further.

DESCRIPTION OF THE PROPOSED ACTION

Your January 5, 2023, biological assessment (BA) includes a complete description of the proposed action and is included herein by reference.

The purpose of the proposed action is to suppress economically damaging grasshopper and Mormon cricket populations on rangelands using chemicals within the identified project areas.

Section 7.0 of the BA (Figure 7.1) includes maps of the treatment areas. The suppression action involves a single application of one insecticide early in the life cycle of the target grasshopper species, which include *Aulocara elliotti* and *Melanoplus sanguinipes*. APHIS will begin application in early March to early April 2023. The insecticides are diflubenzuron, chlorantraniliprole, carbaryl and Malathion. The chemical control methods are the use of ultra-low volume (ULV) sprays of both insecticides and carbaryl in bait formulation, using ground or aerial equipment. APHIS will apply the chemical insecticides using the Reduced Area Agent Treatment (RAATs) techniques. RAATs treatments differ from traditional programs by applying less chemical agent to fewer acres while maintaining efficacy. On occasion, APHIS may use modified RAATs (less agent and/or treated area than conventional treatments, but more than RAATs).

APHIS will employ buffer zones, within which no pesticide applications will occur, and will implement other conservation measures from the nine biological opinions issued by the FWS for the APHIS control program in 18 western states, and subsequently consolidated in an October 3, 1995, letter from the FWS - Mountain Prairie Region, to the Deputy Director, APHIS. APHIS will also employ buffer zones and other conservation measures from "Recommended Protection Measures for Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service" (USFWS 2007) for species not covered in the aforementioned consultations or whichever buffer is greater. APHIS will buffer all waters to prevent contamination. APHIS will confer with FWS five days before applications and implementation of any protective measures recommended by the local FWS office.

Treatments may occur near Vermillion Cliffs on the Arizona Strip District of BLM, which is an area that condors use.

DETERMINATION OF EFFECTS

California condor

We concur with your determination that the proposed action "may affect, but is not likely to adversely affect" the experimental non-essential population of the endangered California condor for the following reasons:

- No treatments will occur near the release site or in any areas or terrain considered habitat for nesting or roosting by condors. APHIS will use a 0.25-mile buffer from occupied nests, roosts, or the release site for ground applications, and a 1.5-mile buffer for aerial applications.
- Applicators will maintain a minimum altitude of 3,000 feet near any condor nests and ensure that pesticide sprayers or spreaders are shut-off.
- The likelihood of any direct or indirect exposure of California condors to insecticides is extremely low because APHIS will target applications and the grasshoppers will take up the insecticides quickly; therefore, any effects to this species would be discountable.

In keeping with our trust responsibilities to American Indian Tribes, by copy of this letter we are notifying potentially affected Tribes of this proposed action and encourage you to invite the

Bureau of Indian Affairs to participate in the review of your proposed action. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

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 consultation number 2023-0052283-S7-001. If you require further assistance or have any questions, please contact Shaula Hedwall (Shaula_Hedwall@fws.gov) or Mary Richardson (Mary_Fugate@fws.gov).

Sincerely,

JULIE MCINTYRE

Digitally signed by JULIE MCINTYRE
Date: 2023.03.06 13:50:35 -07'00'

for Heather Whitlaw
Field Supervisor

cc (electronic):
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Kingman, AZ
District Manager, Arizona Strip District Office, St. George, UT
Honorable Chairperson, Kaibab Band of Paiute Indians, Fredonia, AZ
Director, Hopi Cultural Preservation Office, Kykotsmovi, AZ
Director, Zuni Heritage and Historic Preservation Office, Zuni, NM
Director, Historic Preservation Department, Navajo Nation, Window Rock, AZ
Environmental Specialist, Environmental Services, Western Regional Office, Bureau of Indian Affairs, Phoenix, AZ

Appendix F: APHIS response to public comments on the Arizona draft EAs (EA Number: AZ-23-01 and EA Number: AZ-23-02)

Center for Biological Diversity Comments

1. **All comments from last year and the years before are equally applicable this year as the 2023 draft EAs suffer from the same or similar deficiencies as the 2022, 2021 and 2020 ones, and are incorporated by reference. Also, comments on these EAs by the Xerces Society for Invertebrate Conservation joined by the Center and others from 2023, 2022, 2021 and 2020 are equally applicable and incorporated by reference. All these documents have been submitted to your office.**

APHIS Response:
The commenter submitted similar comments for the 2022, 2021 and 2020 EA's, see response to comment #19 of the 2022 EA. See response to comment #1 of the 2021 EA. The responses for comments 1 through 161 are found in the 2020 EA's. These responses are equally applicable for the 2023 EA's.

2. **In addition to the matters raised in those comments, we wanted to raise a few additional concerns. The first is noting that this winter and spring have been extraordinarily cool and wet, leading to widespread speculation and early indications that we are in for a boom year for many species, including many species of butterflies, native bees, and birds. Periodic boom years are vital for the health of many species, especially given the droughts of recent years, and spraying insecticides during this vital time could result in significant population level impacts for species, including those listed under the Endangered Species Act (ESA), several that have been petitioned for under the ESA that exist in Arizona and are currently under review by the U.S. Fish and Wildlife Service, and countless imperiled pollinator species. We implore APHIS to exercise extreme caution to ensure that species that have taken a hit in recent years can use this year to recover.**

Arizona Response:
This comment is similar in nature to comments from the 2022 EA, see responses to comment #23 and 24, see response to comment # 4,5,8, and 11 of the 2021 EA. See also APHIS responses to comments 10, 12, 14, 19, 20, 25, 28 and 37 in the 2020 EA's. The commenter has expressed these concerns repeatedly, and APHIS has addressed them previously. Section 7 consultation with local FWS resulted in concurrence to APHIS protective measures to T&E species listed in proposed action areas. These concurrence letters were received March 6, 2023, and April 1, 2023, from Region 2 office.

3. **Also, just over a week after you released these EAs, the U.S. Environmental Protection Agency (EPA) published a draft biological opinion issued by the National Marine Fisheries Service (NMFS) on carbaryl, one of the chemicals authorized for use in these EAs. While Arizona is not home to any of the species protected by NMFS, the draft biological opinion's findings of the extreme harm carbaryl poses to ESA listed species is troubling, and much of the analysis done by NMFS should be utilized to better understand the potential impacts of carbaryl on plants and animals in Arizona. Most disturbingly, NMFS found that carbaryl is likely to jeopardize the continued existence of 37 listed species, and adversely modify 36 designated critical habitats. These findings make plain that APHIS cannot continue to claim that carbaryl can be lawfully used in this program without entering into formal consultation with the U.S. Fish and Wildlife Service, as the gravity of this single pesticide's harm and the likelihood that it will take or even jeopardize ESA listed species if used within their range is almost certain.**

APHIS Response:
The commenter referenced the draft Biological Opinion published by EPA, issued by NMFS concerning the use of carbaryl is likely to jeopardize 37 listed species and critical habitat. This document lists the carbaryl species conclusions are for 37 species that either are salmon, sockeye, steelhead, sturgeon, grouper, coral, and killer whale. All these species do not occur in Arizona and are a moot point. The commenter failed to describe the Reasonable and Prudent Alternatives (RPA) issued in the Biological Opinion to be used to decrease the risk of exposure to listed species. NMFS believes the RPMs described below are necessary and appropriate to minimize the impacts of incidental take on threatened and endangered species:

RPM 1. Revise and approve all carbaryl and methomyl product labels and develop relevant EPA Endangered Species Protection Plan Bulletins to conserve ESA-listed species.
RPM 2. Improve ecological incident reporting, develop ESA educational materials, and report label compliance.

*On November 22, 2022, the EPA issued an interim registration review for Carbaryl. The following requirement was added to the label which was recommended by NMFS in their Reasonable and Prudent Alternatives section of the BiOp. "**Direction for Use: Endangered Species Protection Requirements.** Before using this product, you must obtain a Bulletin at any time within six months of the day of application. To obtain Bulletins, consult http://www.epa.gov/espp".*

APHIS acquired EPA bulletins for all T&E species in February 2023, even though the older labels on carbaryl products do not require this direction. According to EPA bulletins," no pesticide use limitations exist within the action areas (listed in the EA's), for the month/year and product selected, beyond the instructions specified on the pesticide label. Follow the use instructions on your label." APHIS is in compliance with EPA and the RPA issued in the BiOP.

Xerces Society Comments

4. **The EAs Fail to Adequately Involve the Public, Fail to Disclose Areas Likely for Treatment to Involved Stakeholders, and Do Not Adequately Describe the Affected Environment or Analyze Impacts to the Affected Environment.**

APHIS Response:
This is a similar comment from the 2022 EA's. See response to comment #1 of the 2022 EA's. The commenter does not have an accurate understanding of program funding timelines and procedures. APHIS explained the reason why treatment maps cannot be provided in the draft Environmental Assessments in the 2020, 2021 and 2022 EA's. Please see APHIS response to comment # 2 in the 2021 EA and APHIS responses to comments 1, 2, 3, 4, 5, 6, 8, 55, 91,92, 96, 99 and 158 in the 2020 EA's.

The exact area for a treatment map is made at the time a treatment takes place using GPS navigational equipment and cannot be known and provided in a map form for public review in the EA process. The map of the proposed action areas described in the EA is sufficient for public review. These action areas have been refined over the years for the benefit of the commenter. Any further refinements of the action area which a treatment may or may not occur within is not relevant, the exact boundaries within the action area will not change the assessments and what is described in the EA documents. The description and environment of any treatment within this area has been sufficiently addressed in the EA. Many times, this has been explained to the commenter over the last few years. Especially, any Tribal treatment areas will not be released to the public. It is tribal information. In the future, any further requests concerning Tribal data will not be addressed.

5. **Use of "Emergency" Explanation to Avoid More Site-Specific Assessment of Impacts is Indefensible and Groundless.**

APHIS Response:
This is a similar comment from the 2022 EA's see response to #2 from the 2022 EA's, see response to comment # 2 of the 2021 EA. Please see the APHIS responses to comments 1, 2, 3, 4, 5, 6, 8, 55, 91,92, 96, 99 and 158 in the 2020 EA's.
See also responses to comment #11 and #26 of the 2023 EA's.

The commenter suggests that APHIS did not consider impacts ecological, scientific, or recreational resources, which could include National Parks, Wilderness Areas, National Wildlife Refuges, other important public lands, and tribal and sacred land. The commenter already mentioned Special status of lands, which APHIS gave a response to in comment #26. As to Tribal lands EA#AZ-23-01 covers a specific tribe. The tribe has requested APHIS to suppress grasshopper populations to help manage the damage which occurs to their lands each year from outbreaks. APHIS consults closely with the tribe throughout the season regarding sacred, sensitive and cultural sites. APHIS will not disclose any specifics to the public regarding specific information as part of the MOU which APHIS locally has with the tribe. Any future attempts by the commenter for Tribal information will not be addressed.

6. **Rate for Carbaryl Bait is Erroneous.**
   The 2023 EA includes rates of application for each of the insecticides that might be used. For carbaryl, the 2023 EA states: *5-10.0 pounds (0.20 lb a.i.) of 2 percent carbaryl bait per acre*
   This needs correction. For 5 lbs of 2 percent carbaryl bait, that would represent 0.1 lb ai/acre. For 10 lbs of 2 percent carbaryl bait, that would represent 0.2 lb ai/acre. Perhaps since the 5-10 lb application rate is presented as a range, it should be corrected to read from 0.1—0.2 lb ai/acre.

APHIS Response:
APHIS agrees with the commenter that there was a mistake in the rate of application listed in the Draft EA's. It was a typographical error and has been corrected to read," 10.0 pounds (0.20lb.a.i.) of 2% carbaryl bait per acre.

7. **APHIS baselessly claims that it protects pollinators through the use of program insecticides that are not broad-spectrum.**

APHIS Response:
This is the same comment from the 2022 EA's. See response to comment #4 from the 2022 EA's, see response to comment # 5,8, and 11 of the 2021 EA.

8. **APHIS includes only a single action alternative for suppressing grasshoppers. APHIS fails to analyze other reasonable alternatives that could address any harm experienced by rangeland producers, such as buying substitute forage for affected leaseholders. In addition, the single action alternative combines conventional and RAATs applications in one alternative, while the consequences do not fully explore and explain the relative impacts of these two methods.**

APHIS Response:
The commenter's suggested reasonable alternative for APHIS to purchase substitute forage for affected ranchers throughout the 17 Western grasshopper states is not an alternative that can be realistically considered. The alternatives described in the EA's are presently the only viable alternatives available for APHIS to consider. The RAAT's treatment alternative is preferred over conventional treatments. The RAAT's treatment method has been explained in the EA's.

9. **Impacts are described as "reduced" in many portions of the environmental consequences section but APHIS rarely describes "reduced" in comparison to anything else.**

APHIS Response:
The commenter did not consider the described RAAT's rates of application which was explained in the 2023 EA's under the RAAT's alternative. For example, the rates of application of carbaryl bait as per EPA label rate is 20-40 pounds per acre compared to the RAAT's rate of 10 pounds per acre. This is a 50% reduction in the rate of application which is 50% less chemical in the environment. The area of

coverage in a conventional treatment would include 100% of all the area in a treatment block. The RAAT's coverage area is 50% less than a conventional treatment block thus the area is reduced by 50% along with a 50% decrease in the application rate. The RAAT's methodology is a 50% reduction in exposed environment compared to the EPA label rate and a 100% conventional treatment.

10. **APHIS ignores the significance of Arizona to native pollinators, which as a group are put at risk by the proposed action, despite widespread reports of insect decline and affirmative federal obligations for federal agencies put into place several years ago.**

APHIS Response:
This is a similar comment from the 2022 EA, see response to comment #4 from the 2022 EA's, see response to comment # 5,8, and 11 of the 2021 EA.

11. **APHIS has not demonstrated that treatments in Arizona in 2023 meet the "economic infestation level." No site-specific data or procedures are presented in the EAs to satisfy APHIS' own description of how it determines that the "economic infestation level" is exceeded.**

APHIS Response:
This is a similar comment from the 2022 EA's, see response to comment # 5 of the 2022 EA's, see response to comment # 2 of the 2021 EA. Please see the APHIS responses to comments 1, 2, 3, 4, 5, 6, 8, 55, 91,92, 96, 99 and 158 in the 2020 EA's.

APHIS has explained many times the fact that Tribal survey data will not be shared with the public. The fact that the commenter seems to have a need to analyze APHIS survey data and operational methods is beyond the scope of this EA. The fact that the commenter uses information such as the vacant allotments in the Grand Canyon Parashant National Monument Area on the Arizona Strip to validate the idea that treatments are of no economic value to taxpayers has no merit. First, as described in the EA's regarding T&E species, the Mohave Desert Tortoise all designated habitat is excluded. Thus, the commenter failed to realize that the major vacant allotments they described are excluded and the commenter would have no knowledge that the terrain is not suitable for APHIS to treat. These vacant allotments are either within boundaries of a National Monument, National Park or are forested or the terrain excludes the allotments. These allotments are very poor examples of valuable rangeland in Arizona. These categories are of Special Status Lands which APHIS addressed in comment #26.

12. **The EAs understate the risks of the broad-spectrum insecticide diflubenzuron for exposed bees and other invertebrates. Diflubenzuron is toxic to pollinators and a broad range of invertebrates as demonstrated in lab studies coupled with exposure models and also in field studies. APHIS mischaracterizes or minimizes studies that have demonstrated risk, while overemphasizing studies that found little risk.**

APHIS Response:
This a similar comment from the 2022 EA's, see response to comment #6 of the 2022 EA, see response to comment # 4 of the 2021 EA, and APHIS responses to comments 10, 12, 14, 19, 20, 25, 28 and 37 in the 2020 EA's.

13. **The EAs understate the risks of the broad-spectrum insecticide chlorantraniliprole for a range of exposed terrestrial invertebrates.**

APHIS Response:
This comment in similar to comment #4 in the 2022 EA, see also response to comment # 5,8, and 11 of the 2021 EA. This is a similar comment from the 2021 EA's, see response to comment #8 of the 2021 EA. The commenter made similar comments addressed in the 2020 EA's. Please see the APHIS responses to comments 10, 12, 14, 19, 20, 25, 28 and 37 in the 2020 EA's.

Available laboratory toxicity data for technical and formulated chlorantraniliprole suggests that the product is practically non-toxic to honeybees in acute oral or contact exposures (EFSA, 2013; USEPA, 2008). In another laboratory study, the 48-hour median lethal concentration (LC50) was reported as greater than 100 micrograms (µg) a.i./bee, classifying chlorantraniliprole as practically non-toxic to honeybees (Zhu et al., 2015). Smagghe et al. (2013) reported that contact and pollen exposure to chlorantraniliprole had no effect on bumble bee survival, but exposure to dosed sugar water resulted in a 72-hour LC50 of 13.0 mg/L and a 7-week LC50 value of 7.0 mg/L. Gradish et al. (2010) reported no acute or sublethal impacts to the bumble bee, Bombus impatiens, at recommended application rates for pest control on vegetables in greenhouse applications.

Semi-field studies with two different formulations reported NOECs ranging from 52.5 to 156.16 g a.i. chlorantraniliprole/hectare (ha) (Dinter et al., 2009; USEPA, 2008). Three semi-field honeybee tunnel tests demonstrated no behavioral or flight intensity effects, nor were any hive-related impacts noted at a dose of 52.5 g/ha (Dinter et al., 2009). A similar lack of effects was noted in the bumble bees B. terrestris and B. impatiens, at an application rate of 40 g chlorantraniliprole/ha. In a field study, no effects on honeybee foraging, colony health and queen production were noted at chlorantraniliprole application rates of 230 g a.i./ha (Larson et al., 2013). The lowest reported NOEC from these studies is approximately four times the proposed RAATs application rate for chlorantraniliprole and two times the proposed full rate. Similar NOECs reported for honeybees and bumble bees have also been observed for other invertebrates such as the hover fly Episyrphus balteatus, ladybird beetle larvae Coccinella septempunctata, green lacewing Chrysoperla carnea, the plant bug Typhlodromus pyri, and predatory mite Orius laevigatus (USEPA, 2008, 2012). The low toxicity to nontarget terrestrial invertebrates has also been observed in greenhouse and field applications. Gradish et al. (2011) reported low acute toxicity of formulated chlorantraniliprole to the parasitoid Eretmocerus eremicus, the pirate bug Orius insidiosus, and the predatory mite Amblyseius swirskii, in 48-hour exposures. Brugger et al. (2010) evaluated lethal and sublethal impacts of formulated chlorantraniliprole to seven parasitic hymenopterans and found no negative impacts on adult survival, percentage parasitism, or emergence when compared to controls at rates well above the full and RAATs program rates. Tome et al. (2015) observed low toxicity of a formulation of chlorantraniliprole to two native species of stingless bees,

Partamona helleri and Scaptotrigona xanthotrica. The lack of toxicity in other insect groups at rates that are toxic to grasshoppers is related to the activity of chlorantraniliprole, which is primarily through ingestion. Insects such as grasshoppers and larval Coleoptera and Lepidoptera would receive a larger dose from consuming treated plant material compared to many of the nontarget pests that have been evaluated.

Chlorantraniliprole has low toxicity to most soil borne invertebrates, with the springtail being the most sensitive test species. Lavtižar et al. (2016) evaluated the chronic effects of chlorantraniliprole to the springtail (Folsomia candida) in 28-day exposures with estimated half median effective concentration (EC50) values ranging from 0.16 to 0.76 mg/kg in various soil types. Similar studies using the isopod Porcellio scaber), the enchytraeid Enchytraeus crypticus, and oribatid mite Oppia nitens showed no sublethal effects at concentrations of 1,000 mg/kg. Other soil borne invertebrates, such as earthworms, have low sensitivity to chlorantraniliprole in acute and chronic exposures with NOEC and EC50 values, at, or greater than 1,000 mg/kg (EFSA, 2013).

14. **APHIS fails to acknowledge the high risks of carbaryl to a wide variety of species (even when applied as bait).**

APHIS Response:
APHIS published in 2019 the Final Human Health and Ecological Risk Assessment for Carbaryl in Rangeland Grasshopper and Mormon Cricket Suppression Applications. The assessment analyzes risk of carbaryl in this program. The EPA published a review November 2022, for the label of carbaryl and the response to public comments regarding the use of carbaryl.

The EPA's response to comments regarding the use of carbaryl in APHIS grasshopper program are as follows. "The Agency's Biological and Economic Analysis Division (BEAD) has reviewed technical literature relevant to the USDA APHIS programs aimed at managing grasshoppers, crickets, as well as Forest Service and Park Service management programs aimed at wood-boring beetles in western US regions. The review concluded that for these uses carbaryl provides important pest control benefits and is one of a very limited set of effective control tactics available. For more information on the consideration of benefits, please see Assessment of Carbaryl (PC Code 056801) Usage, Benefits, and Risk Mitigation Impacts in Non-Crop Use Sites available in EPA's public docket (EPA-HQ-OPP-2010-0230). The Agency also discusses the resistance management role of carbaryl in its memorandum on agricultural uses; for that, please see Assessment of Carbaryl's (Chemical Code 056801) Benefits and Impacts of Potential Mitigation Measures in Agricultural Use Sites also available in EPA's public docket (EPA-HQ-OPP-2010-0230)."

15. **APHIS relies too heavily on broad assertions that untreated swaths will mitigate risk. Untreated swaths are presented as mitigation for pollinators and refugia for beneficial insects, but drift from ULV treatments into untreated swaths at typical aircraft heights is not fully disclosed, while studies are mischaracterized.**

APHIS Response:
This is a similar comment to the 2022 EA's, see response to comment #7 of the 2022 EA's, see response to comment # 5 of the 2021 EA, and see APHIS responses to comments 10, 12, 14, 19, 20, 21, 23, 24, 25, 28, 37 of the 2020 EA. As stated in the EA's Arizona treatments are with ground equipment only, drift associated with aircraft treatments is beyond the scope of the Arizona EA and will not be addressed.

16. **APHIS must strengthen its collection of environmental monitoring data.**

APHIS Response:
All environmental monitoring is detailed in the March 2023 Environmental Monitoring Plan for the 2023 Rangeland Grasshopper and Mormon Cricket Suppression Program. A final report is prepared by the Environmental Compliance Unit.

17. **APHIS never analyzes the possibility that its suppression effort may actually worsen future outbreaks of grasshoppers.**

APHIS Response:
This is a similar comment to the 2022 EA's, see response to comment #8 of the 2022 EA, see response to comment #6 of the 2021 EA, and see APHIS responses to comment #20 of the 2020 EA.

18. **APHIS fails to meaningfully analyze the risk to grassland birds, many of which are declining.**

APHIS Response:
This is a similar comment from the 2022 EA's, see response to #9 comment from the 2022 EA's, see response to comment #7 of the 2021 EA.

19. **It is unrealistic to assume that APHIS can comply with mitigation measures designed to protect bees on pesticide labels.**

APHIS Response:
This is a similar comment from the 2022 EA's, see response to comment #10 of the 2022 EA, see response to comment #8 of the 2021 EA. The commenter made similar comments addressed in the 2020 EA's. Please see the APHIS responses to comments 10, 12, 14, 19, 20, 25, 28 and 37 in the 2020 EA's.

20. **Key Endangered Species Act information is missing and proposed buffers are inconsistent with last year's buffers without explanation.**

APHIS Response:
The commenter fails to explain what the key information is that is missing. The ESA section 7 consultations with FWS were completed in 2023. The Biological Assessment for 2023 received concurrence from FWS on March 6, 2023, and March 15, 2023, on all protective measures to be employed by APHIS to protect the T&E species were concurred with by FWS.

21. **The monarch butterfly is now a candidate species under the Endangered Species Act, but the APHIS provides only very limited protection for their host plant, milkweed.**

APHIS Response:
This is a similar comment from the 2022 EA's, see response to comment #12 of 2022 EA's, see response to comment #1 of the 2021 EA. Please see the APHIS responses to comments #81 in the 2020 EA's.

Current Tribal management practices are to remove any milkweed plants from Tribal rangeland pastures, this safeguards livestock from the toxicity of milkweed plants. Due to the lack of milkweed on Tribal rangeland the monarch butterfly exposure to pesticide treatments in Arizona is greatly reduced.

22. **Recent Biological Opinions for carbaryl effects to listed species show the potential for widespread harm and even jeopardy.**

APHIS Response:
Please see APHIS response to comment #3.

23. **Aquatic areas are not adequately protected with the existing buffers.**

APHIS Response:
This is a similar comment from the 2022 EA's, see response to comment #15 of the 2022 EA, see response to comment #13 of the 2021 EA. Please see the APHIS responses to comments #41,42 and 43 in the 2020 EA's. As noted in table 2, (Proposed application buffers to protect listed T&E species and habitat), of the 2023 EA the buffers are adequate. The commenter again fails to realize in Arizona the proposed treatments are with ground equipment thus eliminating the risk of drift from aircraft. The table states that rivers and tributaries would be excluded or buffered by 1 mile depending on the case. As stated in previous EAs all stock tanks are buffered by 500 feet. The buffers which will be implemented in aquatic areas are adequate and FWS has concurred with APHIS protective measures.

24. **APHIS dismisses water quality concerns, includes misleading information about the potential for its chemicals to contaminate water and includes no information about whether an NPDES permit has been obtained, and what provisions it includes.**

APHIS Response:
APHIS is not required to have a NPDES permit in Arizona.

25. **Freshwater mussels are at risk across the country and need particular attention.**

APHIS RESPONSE
This is a similar comment from the 2022 EA's, see response to comment #14 of the 2022 EA, see response to comment #12 of the 2021 EA. Please see the APHIS responses to comments #40 and 41 in the 2020 EA's.

26. **Special status lands.**

APHIS Response:
This is a similar comment from the 2022 EA's, see response to comment #16 of the 2022 EA, see response to comment #14 of the 2021 EA. Please see the APHIS responses to comments #50 in the 2020 EA's. Treatments which have occurred, or which may occur have never been in any of these designated areas. First, there are no areas which have these designations in the areas which are described in the EA's if there were such areas, they would obviously be excluded from such a treatment especially because Arizona uses ground equipment only.

27. **Avoidance of Lands Where Organic or Transitioning Production Occurs.**

APHIS Response:
The commenter is making assumptions that there is organic farming and or transitioning production in rangeland in Arizona. This is not applicable to EAs in Arizona. The commenter in the future should make comments on applicable issues to the current EA and within the State that the EA covers. APHIS has described many times ground treatments used in Arizona. The commenter continually provides remarks and comments regarding drift from aerial treatments.

28. **Extent of treatment to private lands.**

APHIS Response:

The EA# AZ-23-01 and AZ-23-02 refer to the site-specific areas of San Carlos Apache Reservation and the BLM, Arizona Strip District. These EA's do not address private lands since private land is not a

part of the scope of these EA's. APHIS has given technical assistance to private landowners in Arizona which have had infestations of grasshoppers in previous seasons. In Arizona, we have never treated private lands and any private lands adjacent to federal lands. This comment is beyond the scope of the Arizona EA's.

29. **Cumulative effects analysis.**

APHIS Response:

The proposed action areas that are described in the EA's are requested areas for APHIS to consider from the land management agencies. If they request the same proposed action areas does not mean that treatments have occurred in the exact treatment boundaries from the previous year. The commenter has incorrectly assumed that treatments occur within the exact boundaries or pastures from year to year producing some sort of cumulative effects. This is not the case. As was outlined in the example of treated areas on page 13 in the Description of the Environment Section of the EA #AZ-23-02, in 2020 there was 2,229 acres treated. In the following years of 2021 and 2022 there were zero acres treated on BLM lands. To assume that there are cumulative effects is baseless. As has been stated before data for Tribal Lands will not be shared with the public.

30. **For APHIS and its cooperative land management agencies, building resilience into the system should be the key goal.**

APHIS Response:

The commenter suggested that land management agencies should consider grazing strategies and that APHIS should consider whether reducing AUM's or no grazing strategy a possibility. APHIS is not a land management agency and has no authority to change or modify the grazing strategies implemented by a land management agency. The commenter cited Onsager (2000) work on suppressing grasshopper populations through grazing management. This study was conducted in the northern Great Plains area of Montana. The environment is very different from Arizona rangelands. In the conclusion of this study, the author outlined that infestations of grasshoppers would likely remain high and variable regardless of future weather conditions and grazing strategies implemented in rangeland with crested wheatgrass. It is also noted that the author of this study mentioned that this management practice of twice over rotational grazing could be practical only in Northern Great Plains not in arid rangeland of Arizona.

APHIS works closely with land managers to assist in management of large populations of grasshoppers only if requested by the managers. Treatments are only conducted if funding is available, populations warrant treatments and a variety of other factors.

31. **Overall Transparency of the APHIS Grasshopper / Mormon Cricket Suppression Program Must Be Improved.**

APHIS RESPONSE
This is a similar comment from the 2022 EA's, see response to comment #18 of the 2022 EA's, see response to comment #16 of the 2021 EA. The commenter made the same comment in the 2020 EA's. Please refer to APHIS responses to comments #1, 2, 3, 51 and 55 of the 2020 EA's.

Other Comments

32. **The studies cited in the 2023 Environmental Assessment ignore the fact that although the insecticides are not toxic to all arthropods, the cumulative effects of contributing toxic pesticides (to an environment that is already saturated with pesticides) is contributing to the massive decline in overall biodiversity and arthropod life. We don't have enough data to predict or prevent the detrimental long-term effects of these treatments - everything is based on a handful of studies focused on other agriculturally relevant insects, and not full samplings of the local effects on total biodiversity. Additionally, the studies this project is based on are outdated and lack critical information to execute a successful IPM initiative eradicating an entire population at this scale.**
Please consider the negative impacts of this project and your responsibility as a leader in environmental impact initiatives. Idaho set a precedent of opting out of this project and it will ultimately benefit them financially, as well as benefit the wildlife and human communities that enjoy it. Let's follow their lead and stop this outdated framework of thinking and seek more creative solutions that benefit the entire ecosystem, not just livestock.

    You may be aware of this article already but Xerces Society researchers were concise and thorough in their explanations, and you may benefit from reading this article.

APHIS Response:

The commenter references the notion that there is a lack of information for executing a successful IPM initiative in eradicating grasshopper populations. The rangeland grasshopper program is not an eradication effort. It is simply a program to help manage large populations of grasshoppers to help mitigate the damage occurring to forage in rangeland environments when populations are at outbreaks levels. The program helps to reduce outbreak populations to what would be acceptable levels or what would occur during normal seasons. APHIS only gets involved if land managers and agencies request the services of APHIS, since APHIS is required under the Plant Protection Act to respond to outbreaks of rangeland grasshoppers and Mormon cricket infestations. APHIS is not clear if the commenter was referencing that the Idaho State Dept. of Agriculture opted out of the grasshopper program. This is not relevant to what occurs in Arizona. APHIS is aware of the lawsuit referenced by the commenter. The pesticides used in this program do not bioaccumulate in the environment and are approved for use by the EPA in rangeland environments. In Arizona, APHIS only provides suppression work using ground equipment, so drift associated with aerial treatments is not a factor and will not be addressed.

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