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Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

# Final Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program

Carbon, Emery, Grand & San Counties, Utah
EA Number: UT-22-1

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## Acronyms and Abbreviations

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| 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 |

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**Site-Specific Environmental Assessment**

**Rangeland Grasshopper and Mormon Cricket Suppression Program**
**Carbon, Emery, Grand & San Juan Counties, Utah**

# I. Need for Proposed Action

## *A. Purpose and Need Statement*

An infestation of grasshoppers or Mormon crickets may occur in Carbon, Emery, Grand &/or San Juan Counties, Utah. The Animal and Plant Health Inspection Service (APHIS) and any cooperating agency, based on location of infestation 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 wildlife and livestock forage destruction and benefits of treatments including crop protection or protection of sensitive species from grasshopper depredation. 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 would take place from May 1st to September 30th of the respective year in Carbon, Emery, Grand &/or San Juan Counties. This EA will be in effect for the calendar years 2022-2024. In the event, changes may be warranted, an addendum will be issued, and consultation requested.

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 2021 Control Program for Carbon, Emery, Grand &/or San Juan Counties for that given year.

## *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.,

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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 nymph 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. Baseline thresholds for Mormon crickets are two per square yard and grasshoppers are eight per square yard, though neither of those thresholds guarantees justification for treatment alone. These are all factors that are considered when determining the economic infestation level.

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

[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.

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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' authority for cooperation in this suppression program is based on Section 417 of the Protection Act otL.000 (7 U.S.C. § 7717).

The Utah Agricultural Code, Section 4-35, provides for certain actions authorized by this "Insect Infestation Emergency Control Act." It authorizes the Utah Commissioner of Agriculture to appoint members to a Decision and Action Committee who are directly affected and involved in the current insect infestation emergency. The committee establishes a system of priorities for any insect infestation emergency, and members of USDA, APHIS, PPQ in Utah have served on the committee and have been asked to help address the grasshopper/Mormon cricket problem which this document analyzes. The Commissioner of Agriculture, with the consent of the governor, has declared that this infestation jeopardizes property and recourses and has designated, with the help of APHIS surveys, the areas affected. He has initiated operations to control the problem in those designated areas and has request APHIS to enter into a cooperative agreement with the Utah Department of Agriculture and Food (UDAF) in order to cooperatively attack the infestations and mitigate consequences related thereto.

In January 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 and Mormon crickets on BLM 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 proposed measures to suppress economically damaging grasshopper and Mormon cricket 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 prepare a Pesticide Use Proposal (Form FS-2100-2) 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 prepares and approves the Pesticide Use Proposal.

In November 2019, APHIS and the Forest Service (FS) signed an MOU detailing cooperative efforts between the two groups on the suppression of grasshoppers on FS system lands (Document # 19-8100-0573-MU, November 06, 2019). This MOU clarifies that APHIS would prepare and issue to the public site-specific environmental documentations that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents would be prepared under the APHIS NEPA implementation procedures with cooperation and input from the FS.

The MOU further states that the responsible FS official would request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on FS land is necessary The FS must also prepare a Pesticide Use Proposal (Form: FS-2100-2) 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 prepares and approves the Pesticide Use Proposal.

In September 2016, APHIS and the Bureau of Indian Affairs (BIA) signed an MOU detailing cooperative efforts to suppress grasshoppers on Tribal lands. This MOU clarifies that APHIS would 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 would be prepared under the APHIS NEPA implementing procedures with cooperation and input from the BIA.

The MOU further states that the responsible BIA official would 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 of grasshoppers or Mormon crickets. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and the BIA 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 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 was 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, including Utah, 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.

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

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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 Draft EA will be made available to the public for a 30-day comment period. Draft EAs available for comment will be posted in local newspapers as well as the APHIS webpage: https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/ea/grasshopper-cricket-ea/grasshopper-cricket-by-state. Comments may be submitted by mail or electronically to the addresses on the title page of this EA.

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 1860 W. Alexander St., Suite B, West Valley City, UT 84119. These documents are also available at the Rangeland Grasshopper and Mormon Cricket Program web site, 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 1 to this EA.

This 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 Carbon, Emery, Grand & San Juan Counties, Utah, and therefore the environmental baseline should describe a no treatment scenario.

## *A. No Suppression Program Alternative*

Under Alternative A, the No Action alternative, APHIS would not conduct a program to suppress grasshopper infestations within Carbon, Emery, Grand & San Juan Counties. 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, diflubenzuron, and malathion. These chemicals have varied modes of action. Carbaryl and malathion 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 treatment season 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, as a result 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, diflubenzuron or malathion would be considered under this alternative, typically at the following application rates:

- 8.0 – 16.0 fluid ounces (0.25 lb a.i.) of carbaryl ULV spray per acre;
- 10.0 pounds (0.20 lb a.i.) of 2 or 5percent carbaryl bait per acre;
- 0.75 or 1.0 fluid ounce (0.012 lb a.i.) of diflubenzuron per acre; or
- 4.0 – 8 fluid ounces (0.31 lb a.i.) of malathion per acre.

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. For aerial applications, the skipped swath width is typically no more than 20 feet for malathion, 100 feet for carbaryl and 200 feet for diflubenzuron. 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.

Applicators ensure that pesticides are sprayed only in the treatment blocks. For example: Contractors' use of Trimble GPS Navigation equipment (e.g., Sat-loc or Ag-Nav) is used to navigate and capture shapefiles of the treatment areas. All sensitive sites are buffered out of the treatment area using the navigation equipment or flagging, which is highly visible to the applicator. In addition, APHIS personnel monitor all project activities to help contractors maintain treatment integrity. All sensitive sites are reviewed in the daily briefing with APHIS personnel and the applicator working on the treatment site.

Typical treatment decisions result from consultations between APHIS personnel and land managers to determine the best economically and biologically-sound strategy to protect impacted range and wildlife resources. Treatment designs attempt to include as much of the grasshopper or Mormon cricket infestation as possible in order to minimize re-infestation potential. RAATs is always implemented in Utah in order to reduce treatment costs and environmental exposure.

For example, an aerial spray project took place in Millard and Beaver Counties, Utah to suppress an infestation of Mormon crickets which threatened private agricultural areas and BLM-managed and state range forage. The total project area included nearly 21,000 acres and took place in early June of 2012. APHIS and BLM range specialists determined to apply Dimilin (diflubenzuron) at 1 ounce per acre at 50% RAATs coverage to suppress the cricket infestation of 2 or more per square yard. Due to the implementation of the RAATs method, more than 10,000 acres within the block remained untreated.

Utah recognizes no minimum treatment area to suppress grasshoppers or Mormon crickets so long as the objective to protect range forage and sensitive species is achieved. Normally larger blocks are needed to encompass entire infestations, but small incipient populations which threaten sensitive resources may be treated.

**The typical suppression treatment design will be 1.0 ounce of diflubenzuron per acre applied at 50% coverage.**

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, diflubenzuron or malathion would cover all treatable sites within the designated treatment

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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 (0.62 lb a.i.) of malathion per acre.

The potential generalized environmental effects of the application of carbaryl, diflubenzuron, and malathion, 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.

# III. Affected Environment

## *A. Description of Affected Environment*

The proposed suppression program area included in the EA encompasses 10,745,192 acres (16,789 sq. miles) within southeastern Utah. This represents 21.3% of the land in Utah. Approximately 79.7% of the land within the four- county area is classified as federal, 9.7% of the acreage is state and the remaining 10.6% of the land is private.

Carbon and Emery Counties lie within the Green River drainage which consists of semi-arid lowlands, the Tavaputs Plateau and Roan Cliffs in the northeast, and the high elevation (10,000 ft.) Wasatch Plateau on the west. The Green River forms the eastern boundary of both counties and is approximately 4,100 ft. in elevation. The general area of concern is 5,500 ft. in elevation, primarily level to gently sloping to the east. The area has diverse topography of Mancos shale lowlands and open country with low-lying rolling hills and the Wasatch Plateau escarpment to the west.

Grand and San Juan Counties are located in the upper Colorado River Region and have diverse topography ranging from Mancos shale lowlands to fertile valleys dominated by high plateaus and mesa tops with deep gorges and gullies and include unique rock formations.

Within Carbon and Emery Counties, the area is semi-arid with an average rainfall of 6 to 11 inches per year in the lowlands and averages of up to 30 inches at mountain elevations. In Grand and San Juan Counties, the average rainfall is 5 to 10 inches per year in the lowlands and 12-16 inches in the higher elevations.

Within the four-county area, the length of the growing season is related to elevation, ranging 20-160 days. The climate is characterized by low relative humidity, rapid evaporation, generally clear skies and daily and annual fluctuations in temperatures (i.e., cold winters and hot summers).

The soils in Carbon and Emery Counties are of sedimentary origin and are in climatic soil groups including desert, semi desert, Upland Mountain and High Mountain, with some riparian groups and some badlands, rock outcroppings and irrigated soils. Some have been identified as saline, usually associated with the Mancos formation or some older marine sediments around the San Rafael Swell.

Grand and San Juan Counties are generally characterized within the Colorado Plateau. The soils are mainly arid soils and are relatively fertile; they support forested areas. Soils derived from the Mancos Shale formation (portions of the Cisco desert) are susceptible to erosion, have saline-alkali characteristics and low site productivity. Once the soils are disturbed, the impact is generally long- lasting.

Within Carbon, Emery, Grand and San Juan Counties, native vegetation is primarily desert saltbush including greasewood, blackbrush, saltbushes and shad scale, with some sagebrush steppe vegetation mixed with pinyon-juniper and mountain browse as the elevation increases. A small portion of higher elevation mountain slopes contain stands of aspen, mountain shrubs and Douglas fir.

Agricultural areas include native and improved rangeland, irrigated pastures and cropland and some orchards.

Surface water resources in Grand and San Juan counties generally consist of the upper Colorado River basin with other portions located in the Delores and Green River Basins. Typically the headwaters in the Book cliffs meet State Class C water quality standards. The lower reaches often exceed one or more parameters. Parameters typically exceeded are total dissolved solids and sodium. Flash flooding often follows the intense summer and fall thunderstorms that occur in the area. Sediments and salts are transported to the Colorado River during these periods of high runoff and intermittent flows. Most of the Perennial streams are found in Bookcliffs and La Sal Mountain drainages.

Within Carbon and Emery Counties, surface water resources consist of the Green, Muddy, Price and San Rafael Rivers, some intermittent live streams, ponds, reservoirs, stock tanks and troughs, seeps and springs. The Green River provides excellent recreational opportunities. Many of the rivers and streams support fisheries. The water resources provide adequate water for wildlife and domestic livestock use as well as habitat for wildlife.

## *B. Site-Specific Considerations*

### 1. Human Health

The major population centers within Carbon, Emery, Grand and San Juan Counties are sparse. The total population of the four counties is approximately 55,600 (less than three percent of the entire population of Utah).

The 2002 EIS and 2019 EIS contains detailed hazard, exposure, and risk analyses for the chemicals available to APHIS. Impacts to workers and the general public were analyzed for all possible routes of exposure (dermal, oral, inhalation) under a range of conditions designed to overestimate risk. The operational procedures and spraying conditions examined in those analyses conform to those expected for operations. The following discussion summarizes the hazards, potential exposure, and risk to workers and the general public for operations in Utah. Operational procedures identified in Appendix 1 would be required in all cases and further mitigation measures are identified in this section, as appropriate.

No treatment will occur over congested areas, recreation areas, or schools and if appropriate, a buffer zone will be enacted and enforced.

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

Malathion and carbaryl are cholinesterase inhibitors. Cholinesterases (including AChE) are enzymes that function at the nerve synapse. The nerve synapse is the point where information in the form of electrical impulses is relayed or transmitted by chemical messengers (called transmitters) from one nerve cell to another. Cholinesterase then inactivates or destroys the transmitter chemical (like acetylcholine) after it completes its job, otherwise the transmitter would continue indefinitely, and precise control of the enervated tissue (muscle or organ) would be lost.

No human health effects are likely from exposure to diflubenzuron if it is used according to label instructions. A human exposure assessment was done in detail for diflubenzuron and can be found in APHIS's "Chemical Risk Assessment for Diflubenzuron Use in Grasshopper Cooperative Control Program".

## 2. Nontarget Species

Wildlife in Carbon, Emery, Grand and San Juan Counties is of special concern (see Appendix 3 for mitigation measures pertaining to wildlife). The Cisco Desert/Delores Triangle treatment area along the Utah/Colorado border and the Dry Valley/Lisbon Valley treatment area north of Monticello, lie within Biogeographic Area F. This biogeographic area could be inhabited by 421 species of wildlife (31 fishes, 10 amphibians, 28 reptiles, 262 birds, and 90 mammals). Many of these species of wildlife inhabiting the biogeographic area are considered to be of high interest to the State of Utah.

Upland game birds (sage grouse, ruffed grouse, blue grouse, and chukar partridge) and game fish (trout and catfish) are known to inhabit the general area. Mule deer, elk, pronghorn antelope, Rocky Mountain bighorn sheep and an introduced moose population all occur within the combined four-county area. In addition, pronghorn antelope inhabit the Cisco Desert, while mule deer and elk inhabit the Delores Triangle area. Deer are present the entire year; however, their population increases during the winter.

Candidate species for federal listing, state-listed species, and/or other sensitive species identified by state or federal agencies within the area include: white- faced ibis, long-billed curlew, western snowy plover, Williamson's sapsucker, Lewis' woodpecker, Grace's warbler, Mexican vole, , burrowing owl, ferrnginous hawk, Swainson's hawk, western bluebird and the purple martin.

## 3. Socioeconomic Issues

Recreation use is moderate over most of the affected area. There are several dispersed camping sites. Hunting seasons increase recreation use in the form of dispersed camping and general hunting activity. Hunting season occurs later in the year during a time when grasshopper and cricket populations have begun to dwindle such that fewer insects are present. Hunters probably will not be affected. ATV use is fairly prevalent throughout.

The presence of high densities of grasshoppers or Mormon crickets will result in fewer people engaging in recreational activities during the spring and summer within the affected areas. High insect densities in a campsite detract considerably from the quality of the recreational experience. Crickets tend to get into unsecured tents and food.

The quality of the recreational experience for ATV users and horseback riders also will be indirectly impaired by high densities of grasshoppers and/or crickets. Such numbers crossing roads and trails are killed by vehicle traffic, leaving wind rows of dead insects in the travel way as well as providing a vehicular safety hazard by leaving slick residues on local roads.

People who normally recreate in areas that are heavily infested will likely relocate to areas that are not infested. Displacement of users will be more of an inconvenience to the public than an actual effect on the recreational values of the area. Displacement will also increase pressure on other public lands as people move to new locations to camp and to engage in other recreational activities. Social capacity tolerances will be impacted. The potential for user

conflict will increase, in particular as motorized recreationists displace to other already heavily used areas. Such locations will experience more pressure and may experience site degradation. Areas currently not impacted or used by dispersed campers may become subjected to use and development as people look for areas for recreation which are not infested with insects.

Small towns near the affected areas receive limited business from recreationists who visit public lands. Many local gas stations/public stores rely fairly heavily on summer business to support their operations.

Livestock grazing is one of the main uses of most of the affected area, which provides summer range for ranching operations. Permittees may run cattle, sheep and/or horses for a season that runs generally from the first of June to the end of September, weather and vegetation conditions permitting.

A substantial threat to the animal productivity of these rangeland areas is the proliferation of grasshopper/Mormon cricket populations. These insects have been serious pests in the Western States since early settlement. Weather conditions favoring the hatching and survival of large numbers of insects can cause outbreak populations, resulting in damage to vegetation. The consequences may reduce grazing for livestock and result in loss of food and habitat for wildlife.

Livestock grazing on public lands contributes important cultural and social values to the area. Intertwined with the economic aspects of livestock operations are the lifestyles and culture that have co-evolved with Western ranching. Rural social values and lifestyles, in conjunction with the long heritage of ranching and farming continue to this day, dating back to the earliest pioneers in Utah, who shaped the communities and enterprises that make up much of the state. The rural Western lifestyle also contributes to tourism in the area, presenting to travelers a flavor of the West through tourist-oriented goods and services, photography of sheep bands or cattle in pastoral settings and scheduled events.

Ranchers displaced from public lands due to early loss of forage from insect damage will be forced to search for other rangeland, to sell their livestock prematurely or to purchase feed hay. This will affect other ranchers (non- permittees) by increasing demand, and consequently, cost for hay and/or pasture in the area. This will have a beneficial effect on those providing the hay or range, and a negative impact on other ranchers who use these same resources throughout the area. In addition, grazing on private lands resulting from this impact will compound the effects to vegetation of recent drought conditions over the last six years (e.g., continual heavy utilization by grasshoppers/crickets, wildlife and wildfire), resulting in longer-term impacts (e.g., decline or loss of some preferred forage species) on grazing forage production on these lands.

The lack of treatment would result in the eventual magnification of grasshopper/Mormon cricket problems resulting in increased suppression efforts, increased suppression costs and the expansion of suppression needs onto lands where such options are limited. For example, control needs on crop lands where chemical options are restricted because of pesticide label restrictions.

Under the no action alternative, farmers would experience economic losses. The suppression of grasshoppers and/Mormon crickets in the affected area would have beneficial economic impacts to local landowner, farmers and beekeepers. Crops near infested lands would be protected from devastating migrating hordes, resulting in higher crop production; hence, increased monetary returns.

## 4. Cultural Resources and Events

Federal and state public lands that are part of the region's visual and cultural resources include the Arches National Park, Canyonlands National Park, Glen Canyon National Recreation Area, Fishlake National Park, and the Manti-La Sal National Forest. Also in the area are the Hovenweep, Natural Bridges, and Rainbow Bridge National Monuments and the Grand Gulch and Dark Canyon Primitive Areas. State parks within the area include: Scofield State Park, Price Canyon Recreation Area, Huntington State Park, Millsite State Park, Goblin Valley Park, Dead Horse Point State Park, Green River State Park, Newspaper Rock State Park, Goosenecks State Park and Edge of the Cedars State Park.
The Uintah and Ouray and Navajo Indian Reservations occupy a portion of Grand and San Juan Counties.

A variety of activities have occurred throughout the area of concern that affect cultural resources. These activities and any cumulative impacts associated with them will occur regardless of whether or not grasshoppers/Mormon crickets are treated.

Use of motorized equipment off existing roads could impact surface artifacts by damaging them or displacing them in their overall juxtaposition with other artifacts. Maintaining the integrity of a historical site is important to understanding the significance of the site and the artifacts found therein. Non-treatment of infested land will likely later result in more intensive and extensive treatment of that infested land. Most of the non-public lands that will be affected have already been heavily disturbed and any artifacts on them likely impacted. Consequently, it is unlikely that additional treatments will result in additional impacts on cultural properties.

With no treatment of grasshoppers or crickets on public lands, aerial application of insecticides off public lands will likely increase. Though this should not disturb or displace cultural artifacts, carrying agents in the spray could damage artifacts (USDA, APHIS EIS, 2002, p. 71). However, most if not all of the areas likely to be treated have been heavily disturbed in the past, and any artifacts on them likely impacted. Consequently, it is unlikely that these aerial treatments will result in additional impacts on cultural properties.

Motorized vehicles (pick-up trucks and/or ATV's) may be used to treat portions of the affected areas. This will create a risk of impacting cultural properties. The risk is small given that the off-road use of vehicles will create only minor soil disturbance, and the areas involved are not likely to contain significant sites of which public officials are not already aware. Known sites will be avoided to mitigate impacts. Any sites located during treatment activities will be reported, then avoided during continuing operations. Past similar grasshopper/cricket treatments throughout the state have not resulted in any known impacts to cultural properties.

In addition to the treatments proposed under this alternative, a broad variety and number of activities throughout the project area could affect, or have affected, cultural resources. These activities and any cumulative impacts associated with them will occur, regardless of whether or not grasshoppers/crickets are treated. No direct, indirect or change in cumulative impacts on cultural resources in the area will occur due to implementation of the treatment alternative.

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 BLM, Forest Service or other appropriate land management agency on a local level to protect these areas of special concern. APHIS also will 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, such as sun dances, on tribal lands.

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## 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 human population around grasshopper programs is diverse and lacks any special characteristics that implicate greater risks of adverse effects for any minority or low-income populations. A demographic review in the APHIS EIS 2002 revealed certain areas with large populations, Spanish-speaking populations and some with large American Indian tribal populations. Low-income farmers and ranchers would comprise, by far, the largest group affected by APHIS program efforts in this area of concern.

When planning a site-specific action related to grasshopper/Mormon cricket infestations, APHIS considers the potential for disproportionately high and adverse human health or environmental impacts of its actions on minority and low-income populations before any proposed action. In doing so, APHIS program managers will work closely with representatives of these populations in the locale of planned actions through public meetings.

APHIS intervention to locally suppress damaging insect infestations will stand to greatly benefit, rather than harm, low-income farmers and ranchers by helping them to control insect threats to their livelihood. Suppressing grasshopper or Mormon cricket infestations on adjacent public or private rangelands will increase inexpensive available forage for their livestock and will significantly decrease economic losses to their crop lands by invading insects. Such would obviate the need to perform additional expensive crop pesticide treatments or to provide supplemental feed to their livestock which would further impact low-income individuals.

In past grasshopper programs, the U.S. Department of the Interior's (USDI) Bureau of Land Management or Bureau of Indian Affairs (BIA) have notified the appropriate APHIS State Plant Health Director when any new or potentially threatening grasshopper infestation is discovered on BLM lands or tribal lands held in trust and administered by BIA. Thus, APHIS has cooperated with BIA when grasshopper programs occur on Indian tribal lands. For local Indian populations, APHIS program managers will work with BIA and local tribal councils to communicate information to tribal organizations and representatives when programs have the potential to impact the environment of their communities, lands or cultural resources.

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**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).

Treatments used for grasshopper programs are primarily conducted on open rangelands where children would not be expected to be present during treatment or enter during the restricted entry period after treatment. Based on review of the insecticides and their use in programs, the risk assessment concludes that the likelihood of children being exposed to insecticides from a grasshopper or Mormon cricket program is very slight and that no disproportionate adverse effects to children are anticipated over the negligible effects to the general population.

APHIS also institutes program measures (i.e., 500-foot buffers around homes, schools and occupied buildings and campgrounds) and notification of residents that mitigates the potential for exposure of program insecticides to children.

# 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.

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## 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, diflubenzuron or malathion, 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).

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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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### b) 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.

### c) Malathion

Malathion is a broad-spectrum organophosphate insecticide widely used in agriculture on various food and feed crops, homeowner yards, ornamental nursery stock, building perimeters, pastures and rangeland, and regional pest eradication programs. The chemical's mode of action is through AChE inhibition, which disrupts nervous system function. While these effects are desired in controlling insects, they can have undesirable impacts to non-target organisms that are exposed to malathion. The grasshopper program currently uses the malathion end-use product Fyfanon® ULV AG, applied as a spray by ground or air.

Volatility is not expected to be a major pathway of exposure based on the low vapor pressure and Henry's Law constant that have been reported for malathion. The atmospheric vapor phase half-life of malathion is five hours (NIH, 2009b). Malathion's half-life in pond, lake, river, and other natural waters varied from 0.5 days to ten days, depending on pH (Guerrant et al., 1970), persisting longer in acidic aquatic environments. The reported half-life in water and sediment for the anaerobic aquatic metabolism study was 2.5 days at a range of pH values from 7.8 to 8.7 (USEPA, 2006). The persistence of malathion in soils depends primarily on microorganism activity, pH, and organic matter content. The persistence of malathion is decreased with microbial activity, moisture, and high pH (USEPA, 2016a) and the half-life of malathion in natural soil varies from two hours (Miles and Takashima, 1991) to 11 days (Neary, 1985; USEPA, 2006).

Malathion and associated degradates, in general, are soluble and do not adsorb strongly to soils (USEPA, 2000a). Inorganic degradation of malathion may be more important in soils that are relatively dry, alkaline, and low in organic content, such as those that predominate in the western program areas. Adsorption to organic matter and rapid degradation make it unlikely that detectable quantities of malathion would leach to groundwater (LaFleur, 1979). Malathion degradation products also have short half-lives. Malaoxon, the major malathion degradation product of toxicological concern, has half-lives less than one day in a variety of soil types (USEPA, 2016a). The half-life of malathion on foliage has been shown to range from one to six days (El-Refai and Hopkins, 1972; Nigg, 1986; Matsumara, 1985; USDA FS, 2008).

While livestock and horses may graze on rangeland the same day that the land is treated with malathion, the products used by the grasshopper program are labeled with rates and treatment intervals that are meant to protect livestock. Tolerances are set for the amount of malathion that is allowed in cattle fat (4 ppm), meat (4 ppm), and meat byproducts (4 ppm) (40 CFR Parts 180.111). The grasshopper program would treat at application rates indicated on product labels or lower, which would ensure approved residues levels. In addition, the program would make only one application a year.

USEPA found malathion moderately toxic to birds on a chronic basis, slightly toxic to mammals through dietary exposure, and acutely toxic to aquatic species (including freshwater as well as estuarine and marine species) (USEPA, 2000b, 2016b). Toxicity to aquatic vertebrates such as fish and larval amphibians, and aquatic invertebrates is variable based on test species and conditions. The data available on impacts to fish from malathion suggest effects could occur at levels above those expected from program applications. Consumption of contaminated prey is not expected to be a significant pathway of exposure for aquatic species based on expected residues and malathion's BCF (USEPA, 2016a; USDA APHIS, 2018d). Indirect effects to fish from impacts of malathion applications to aquatic plants are not expected (USDA APHIS, 2018d).

USEPA considers malathion highly toxic to bees if exposed to direct treatment on blooming crops or weeds. The Fyfanon® ULV AG label indicates not to apply product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment area (USEPA, 2012a). Toxicity to other terrestrial invertebrates is variable based on the test organism and test conditions however malathion is considered toxic to most terrestrial invertebrates (USEPA, 2016b).

Indirect risks to mammals resulting from the loss of plants that serve as a food source would also be low due to the low phytotoxicity of malathion. The other possible indirect effect that should be considered is loss of invertebrate prey for those mammals that depend on insects and other invertebrates as a food source. Insects have a wide variety of sensitivities to malathion and a complete loss of invertebrates from a treated area is not expected because of low program rates and application techniques. In addition, the aerial and ground application buffers and untreated swaths provide refuge for invertebrates that serve as prey for insectivorous mammals and would expedite repopulation of areas that may have been treated.

APHIS expects that direct avian acute and chronic effects would be minimal for most species (USDA APHIS, 2018d). The preferred use of RAATs during application reduces these risks by reducing residues on treated food items and reducing the probability that they will only feed on contaminated food items. In addition, malathion degrades quickly in the environment and residues on food items are not expected to persist. Indirect effects on birds from the loss of habitat and food items are not expected because of malathion's low toxicity to plants and the implementation of RAATs that would reduce the potential impacts to invertebrates that serve as prey for avian species. Several field studies did not find significant indirect effects of malathion applications on avian fecundity (Dinkins et al., 2002; George et al., 1995; Howe, 1993; Howe et al., 1996; Norelius and Lockwood, 1999; Pascual, 1994).

Available toxicity data demonstrates that amphibians are less sensitive to malathion than fish. Program malathion residues are more than 560 times below the most sensitive acute toxicity value for amphibians. Sublethal effects, such as developmental delays, reduced food consumption and body weight, and teratogenesis (developmental defects that occur during embryonic or fetal growth), have been observed at levels well above those assessed from the program's use of malathion (USDA APHIS, 2018d). Program protection measures for aquatic water bodies and the available toxicity data for fish, aquatic invertebrates, and plants suggest low indirect risks related to reductions in habitat or aquatic prey items from malathion treatments.

Available data on malathion reptile toxicity suggest that, with the use of program measures, no lethal or sublethal impacts would be anticipated (USDA APHIS, 2015). Indirect risk to reptiles from the loss of food items is expected to be low due to the low application rates and implementation of preferred program measures such as RAATs (USDA APHIS, 2018d).

The risk to aquatic vertebrates and invertebrates is low for most species; however, some sensitive species that occur in shallow water habitats may be at risk. Program measures such application buffer zones, drift mitigation measures and the use of RAATs will reduce these risks.

Risks to terrestrial invertebrate populations are anticipated based on the available toxicity data for invertebrates and the broad spectrum activity of malathion (Swain, 1986; Quinn et al., 1991). The risk to terrestrial invertebrates can be reduced by the implementation of application buffers and the use of RAATs, which would reduce exposure and create refuge areas where malathion impacts would be reduced or eliminated. Smith et al. (2006) conducted field studies to evaluate the impacts of grasshopper treatments to non-target terrestrial invertebrates and found minimal impacts when making reduced rate applications with a reduced coverage area (i.e. RAATs) for a ULV end-use product of malathion. Impacts to pollinators have the potential to be significant, based on available toxicity data for honeybees that demonstrate high contact toxicity from malathion exposures (USDA APHIS, 2018d). However, risk to pollinators is reduced because of the short residual toxicity of malathion. In addition, the incorporation of other mitigation measures in the program, such as the use of RAATs and wind speed and direction mitigations that are designed to minimize exposure, reduce the potential for population-level impacts to terrestrial invertebrates.

Adverse human health effects from ULV applications of malathion to control grasshopper are not expected based on the low mammalian acute toxicity of malathion and low potential for human exposure. Malathion inhibits AChE in the central and peripheral nervous system with clinical signs of neurotoxicity that include tremors, salivation, urogenital staining, and decreased motor activity. USEPA indicates that malathion has “suggestive evidence of carcinogenicity but not sufficient to assess human carcinogenic potential” (USEPA, 2016c).

Adverse health risks to program workers and the general public from malathion exposure are also not expected due to low potential for exposure. APHIS treatments are conducted in rangeland areas consisting of widely scattered, single, rural dwellings in ranching communities, where agriculture is a primary industry. Label requirements to reduce exposure include minimizing spray drift, avoidance of water bodies and restricted entry interval. Program measures such as applying malathion once per season, lower application rates, application buffers and other measures further reduce the potential for exposure to the public.

#### d) Reduced Area Agent Treatments (RAATs)

The use of RAATS is the most common application 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

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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.

No APHIS experimental treatments are planned for 2021.

## *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, the vast majority 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.

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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.

APHIS does not anticipate that any federal or non-federal pest control actions to coincide with any grasshopper or Mormon cricket treatments which might occur within the project areas. Such would preclude any negative issues that would arise due to cumulative pesticide application impacts.

### 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."

When planning a site-specific action related to grasshopper or Mormon cricket infestations, APHIS will consider the potential for disproportionately high and adverse human health or environmental impacts of its actions on minority and low-income communities in a program area. 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.

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.

### 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 conduct consultations with USFWS field offices at the local level.

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.

APHIS has completed since 1988 informal consultation with the USFWS regarding the Program at the State level. Since then, agreed-upon mitigation measures for all T&E and Proposed T&E species relative to GH/MC suppression projects in Utah have been maintained as the T&E list has evolved. The USFWS has most recently concurred with APHIS's assessment that the Utah GH/MC suppression program is not likely to adversely affect species of concern in 2021.

## 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 principle food source, fish, are not expected because insecticide treatments will not be conducted over rivers or lakes. Buffers protective of aquatic biota are 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. Grasshopper densities in excess of 8 per square yard could initiate treatment project planning. 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.

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APHIS will work with BLM, the state of Utah and any other appropriate agencies when grasshopper treatments are proposed in areas where sage grouse are present, or any other species that is known to be of special interest or concern to federal or state agencies or the public.

### 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.

APHIS, prior to any treatment project, will consult with the appropriate landowner, the State Historic Preservation Office, any affected National Trail's administrative office or other appropriate agencies, to ensure minimal impacts to cultural and historical resources.

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# VI. Listing of Agencies and Persons Consulted

## *A. Bureau of Land Management*

Nebeker, Glenn, Field Manager, Fillmore, UT Field Office

Riding, Trevor, Range Specialist, Fillmore, UT Field Office

Robbins, Josh, State Weed Coordinator, State Office

## *B. Utah Department of Agriculture and Food*

Hougaard, Robert, Director of Plant Industry

Watson, Kristopher, State Entomologist, Plant Industry

## *C. USDA, APHIS, PPQ*

Caraher, Kai, Biological Scientist – Staff Officer

Sullivan, Melinda, GH/MC National Operations Manager

Warren, Jim, Environmental Protection Specialist/Environmental Toxicologist

Wild, Alana, Utah/Nevada State Plant Health Director

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### *D. USDA, Forest Service*

Partridge, Art, Range Conservationist, Beaver Ranger District, Fishlake NF

Ethan Hooper, Range Conservationist, Dixie NF

### *E. USDI, Fish and Wildlife Service*

Novak, Kate, T&E Specialist, Utah

Romin, Laura, Acting Field Supervisor, Utah

### *F. Utah Division of Wildlife Resources*

Mumford, Vance, Southern Region Biologist

### *G. Utah State University Extension Service*

Nelson, Mark, Beaver

Cooper, Troy, Duchesne

Gale, Jody, Sevier County Agriculture Agent

Greenhalgh, Linden, Tooele

Hadfield, Jacob, Cache

Kitchen, Boyd, Uintah

Palmer, Matt, Sanpete

Wilde, Trent, Piute & Wayne

### *H. County Commissioners*

Brown, Ralph, Sevier County

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Draper, Dean, Millard

Talbot, Will, Piute

## *I. Utah State Legislators*

## *J. Federal Legislators*

# Appendix A - APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program
# FY-2022 Treatment Guidelines
# Version 02/15/2022

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 availability, the Federal government will bear the cost of treatment up to 100 percent on Federal and

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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:

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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.

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# Appendix B:  Map of the Affected Environment

PPQ GH UT 2021
8.5x11 Map.pdf

PPQ MC UT 2021
8.5x11 Map.pdf

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## Appendix C: FWS Correspondence

**THREATENED & ENDANGERED SPECIES DETERMINATIONS FOR UTAH APHIS 2022 GRASSHOPPER/MORMON CRICKET SUPPRESSION PROJECTS**

1. Canada lynx (*Lynx canadensis*) (Threatened): The preferred habitat of the Canada lynx is montane coniferous forest. The proposed APHIS suppression program will have no effect on or cause no jeopardy to any population of Canada lynx since projects will avoid known or historic species habitat areas.

2. Black-footed ferret (*Mustela nigripes*) (Threatened): Possibly found in Carbon, Daggett, Duchesne, Emery, Grand, Rich, San Juan, Summit and Uintah Counties. Black-footed ferrets live in underground prairie dog burrows and eat prairie dogs as their primary food source. The black-footed ferret is, therefore, closely associated with prairie dog towns. For this reason, the major threat to the species is the decimation of prairie dog colonies through plague, poisoning and habitat loss. The only known population occurs in Coyote Basin, Uintah County. Direct toxic effects from carbary bait are low since plant-based baits are not sought-after food items for ferrets. Indirect effects by consumption of contaminated insects or prairie dogs might occur. Though prairie dogs may ingest carbaryl bait, and therefore, transfer that consumed carbaryl to a predator like the ferret, the potential for adverse effects remains low due to the unlikelihood of encountering significant quantities. Ten pounds of 2 percent active ingredient per acre maximum application rates preclude ingestion of sufficient toxin by insects or prairie dogs, themselves, to cause undesirable effects to ferrets. Direct toxic effects from Dimilin are low since diflubenzuron is slightly to very slightly toxic to mammals (Maas *et al.*, (1981). There would be few if any indirect effects from the use of Dimilin. The proposed APHIS suppression program is not likely to adversely affect this species. PROTECTIVE MEASURES: No aerial application of Dimilin within 1 mile and no ground applications within 0.25 mile of the edge of identified habitat.

3. Utah prairie dog (*Cynomys parvidens*) (Threatened): Found in Beaver, Garfield, Iron, Kane, Millard, Piute, Sanpete, Sevier and Wayne Counties. Direct toxic effects from carbaryl bait are moderate since prairie dogs may ingest it. However, 10 pounds per acre maximum application rates preclude ingestion of sufficient toxin to create behavioral anomalies, let alone mortality, due to the unlikelihood of encountering significant quantities. Since prairie dogs may consume insects, indirect effects from carbaryl bait are possible, but large quantities of contaminated insects would have to be consumed for such to occur. Rapid decomposition rates of dead insects, quickly making them unpalatable as food items, coupled with low application rates, minimize the risk of adverse effects on prairie dogs from carbaryl bait treatments. Direct toxic effects from Dimilin are low since diflubenzuron is slightly to very slightly toxic to mammals (Maas *et al.,* (1981). There would be no indirect effects from the use of Dimilin. The proposed APHIS suppression program would not likely adversely affect this species. PROTECTIVE MEASURES: Avoid using any pesticide within 1 mile of occupied habitat.

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4. <u>California condor</u> (*Gymnogyps californianus*) (Endangered): California condors were released as part of Recovery Program efforts in northern Arizona beginning in the late 1990's. Sightings of the birds that were released have since been made almost statewide. Condors prefer mountainous country at low and moderate elevations, especially rocky and brushy areas near cliffs. California condors eat carrion, usually feeding on large items such as dead sheep, cattle and deer. Due to their foraging habits and preferences, the proposed APHIS grasshopper/Mormon cricket suppression program is unlikely to affect California condors. In addition, condors to date are occasional and temporary visitors to the state and are unlikely to contact suppression activities.

5. <u>Gunnison Sage-Grouse</u> (*Centrocercus minimus*) (Threatened): Found in Grand and San Juan Counties. Male Gunnison sage-grouse conduct an elaborate display when trying to attract females on breeding grounds, or leks in the spring. Nesting begins in mid-April and continues into July. Gunnison sage-grouse require a variety of habitats such as large expanses of sagebrush with a diversity of grasses and forbs and healthy wetland and riparian ecosystems. It requires sagebrush for cover and fall and winter food. Direct toxic effects from carbaryl bait are low (Peach *et al.,* 1994), but there may be minimal indirect effects since the young of this species depend upon arthropod groups for food. The use of carbaryl baits temporarily may lower the insect food base in the immediate area, though certainly not sufficiently to create adverse consequences to immature sage-grouse. Direct toxic effects from Dimilin are low since diflubenzuron is slightly to very slightly toxic to birds, but there may be minimal indirect effects such as a slight reduction in available prey items. The proposed APHIS suppression program will not likely adversely affect this species. PROTECTIVE MEASURES: No ground/aerial application will occur within 1 mile of known leks between March and July. Otherwise, no ground/aerial applications within 100/500 ft. of the edge of occupied habitat.

6. <u>Mexican spotted owl</u> (*Strix occidentalis lucida*) (Threatened): Possibly found in Carbon, Emery, Grand, Garfield, Iron, Kane, San Juan, Washington and Wayne Counties. In Utah spotted owls occupy and nest in rocky canyon habitats. Nests are located on cliffs and in caves. Mexican spotted owls feed mainly on small rodents, but also consume rabbits and other small vertebrates, including birds, reptiles and insects. Direct toxic effects from carbaryl bait are low since owls do not directly ingest it and since they do not depend on arthropod groups for food or seed dispersal. (George *et al*., 1992). Indirect toxic effects from carbaryl bait are low due to low application rates (10 pounds per acre or less) and small bait particle sizes, which preclude birds and small mammals from encountering sufficient quantities of toxin to cause adverse consequences to them or to owls which might consume them. APHIS only applies baits to areas of high grasshopper or Mormon cricket densities (8 or more per square yard), so any bait treatment is quickly and nearly totally consumed by the insects. Any remaining bait rapidly degrades from exposure to the elements (dew and higher soil pH's). Birds and rodents may prey upon debilitated insects, but rapid decomposition rates quickly make dead insects unpalatable. That, coupled with low application rates, makes it unlikely that spotted owls would be adversely affected by eating birds or small mammals that may prey upon insects debilitated by carbaryl bait treatments. APHIS ground baiting protocol excludes

treatment near the canyon habitats that spotted owls use for nesting. Direct and indirect toxic effects from Dimilin are also low since diflubenzuron is slightly to very slightly toxic to birds (Wilcox and Coffey, 1978). The proposed APHIS suppression program will not likely adversely affect this species. PROTECTIVE MEASURES: No aerial application will occur within 1 mile of suitable nesting habitat, and ground applications will be no closer than 0.25 mile to nesting habitat.

7. Southwestern willow flycatcher (*Empidonax traillii extimus*) (Endangered): Possibly found in Kane, San Juan and Washington Counties. The southwestern willow flycatcher utilizes dense riparian habitats. Forage items include insects, seeds and berries. Direct toxic effects from carbaryl bait are low (Peach *et al.,* 1994), but there may be minimal indirect effects since this species depends on arthropod groups for food. The use of carbaryl baits may temporarily lower the insect food base in the immediate area, though certainly not sufficiently to create adverse consequences to flycatchers. Direct toxic effects from Dimilin are low since diflubenzuron is slightly to very slightly toxic to birds, but there may be minimal indirect effects such as a slight reduction in available prey items. The proposed APHIS suppression program will not likely adversely affect this species. PROTECTIVE MEASURES: No aerial application will occur within 1 mile of suitable nesting habitat, and ground applications will be no closer than 0.25 mile to nesting habitat.

8. Yellow-billed Cuckoo (*Coccyzus americanus*) (Threatened): Found throughout Utah. The yellow-billed cuckoo uses wooded habitat with dense cover and water nearby. Its nests in the West are often placed in willows along streams and rivers, with nearby cottonwoods serving as foraging sites. They sometimes lay their eggs in other birds' nests. Cuckoos feed on insects (especially caterpillars), spiders, frogs, lizards, fruits and seeds. Direct toxic effects from carbaryl bait are low (Peach *et al.,* 1994), but there may be minimal indirect effects since this species depends upon arthropod groups for food. The use of carbaryl baits may temporarily lower the insect food base in the immediate area, though certainly not sufficiently to create adverse consequences to cuckoos. Direct toxic effects from Dimilin are low since diflubenzuron is slightly to very slightly toxic to birds, but there may be minimal indirect effects such as a slight reduction in available prey items. The proposed APHIS suppression program will not likely adversely affect this species. PROTECTIVE MEASURES: No aerial application will occur within 1000 ft. and no ground application will occur within 500 ft. of the edge of known locations of yellow-billed cuckoos or their critical habitat.

9. Bonytail (*Gila elegans*) (Endangered): Found in Carbon, Emery, Garfield, Grand, Kane, San Juan, Tooele, Uintah, Wayne and possibly Duchesne and formerly Daggett Counties. Bonytail are opportunistic feeders, eating insects, zooplankton, algae and higher plant matter. Although bonytail spawning in the wild is now rare, spawning occurs in the spring and summer over gravel substrate. Most bonytail are now produced in hatcheries and released into the wild as adults. Direct toxic effects from carbaryl bait are low since APHIS ground applicators remain at least 50 feet from water which precludes any bait from entering a water body, even during and after heavy rains. Carbaryl rapidly decomposes in the presence of water and soils with higher pH's. Indirect effects from

carbaryl bait are also low. Insects that ingest the bait are incapacitated by it within a matter of a minute or so; therefore, few could hop or fly into water bodies after bait consumption (APHIS personal experience). The use of bait near streams would not likely create an unnatural influx of contaminated grasshoppers or crickets into the water, so that fish might prey on them. Direct toxic effects from diflubenzuron are also low since it is only slightly toxic to fish (Willcox and Coffey, 1978; Julin and Sanders, 1978). Indirect effects from either carbaryl bait or Dimilin are minimal due to APHIS's standard practice of maintaining 50 foot buffers with ground applications of bait and 500 foot buffers with aerial sprays around water. The proposed APHIS suppression program will not likely adversely affect this species. PROTECTIVE MEASURES: No aerial applications within 1 mile of habitat or no ground treatments within 500 feet of habitat.

10. Colorado pikeminnow (*Ptychocheilus lucius*) (Endangered): Found in Carbon, Daggett, Emery, Garfield, Grand, San Juan, Uintah, Wayne and possibly Duchesne and formerly Kane Counties. Colorado pikeminnows are primarily piscivorous (they eat fish), but smaller individuals also eat insects and other invertebrates. The species spawns during the spring and summer over riffle areas with gravel or cobble substrate. Eggs are randomly broadcast onto the bottom, and usually hatch in less than one week. The proposed APHIS suppression program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 9.

11. Greenback cutthroat trout (*Oncorhynchus clarki stomias*) (Threatened): Found in San Juan County. The greenback cutthroat trout is a member of the Salmonidae family and is a subspecies of *O. clarki*. The subspecies feeds on aquatic insects as well as terrestrial invertebrates. It spawns in the spring in riffle areas when water temperatures reach 5-8 degrees C. It requires clear, swift-flowing mountain streams with cover such as low, overhanging banks and vegetation. The proposed APHIS suppression program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 9.

12. Humpback chub (*Gila cypha*) (Endangered): Found in Carbon, Daggett, Emery, Garfield, Grand, San Juan, Uintah, Wayne and possibly Duchesne and formerly Kane Counties. Humpback chub primarily eat insects and other invertebrates, but algae and fishes are occasionally consumed. The species spawns during the spring and summer in shallow, backwater areas with cobble substrate. Young humpback chub remain in these slow, shallow, turbid habitats until they are large enough to move into white-water areas. The proposed APHIS suppression program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 9.

13. Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) (Threatened): The Lahontan cutthroat trout is a race of the cutthroat trout native to the Lahontan Basin of Oregon, California, and western Nevada. It has been introduced and become established in the Pilot Peak Range of western Box Elder County, Utah. Like other cutthroat races, the Lahontan cutthroat is an opportunistic feeder, with the diet of small individuals dominated by invertebrates, and the diet larger individuals composed primarily of fish. The proposed APHIS suppression program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 9.

14. June sucker (*Chasmistes liorus*) (Endangered): Found in Box Elder, Salt Lake, Utah and Weber Counties. June suckers are members of the sucker family, but they are not bottom feeders. The jaw structure of the June sucker allows the species to feed on zooplankton in the middle of the water column. June sucker adults leave Utah Lake and swim up the Provo River to spawn in June of each year. Spawning occurs in shallow riffles over gravel or rock substrate. Fertilized eggs sink to the stream bottom, where they hatch in about four days. The proposed APHIS suppression program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 9.

15. Razorback sucker (*Xyrauchen texanus*) (Endangered): Found in Carbon, Daggett, Emery, Garfield, Grand, San Juan, Uintah, Wayne and possibly Duchesne and formerly Kane Counties. The razorback sucker eats mainly algae, zooplankton and other aquatic invertebrates. The species spawns from February to June, and each female may deposit over 100,000 eggs during spawning. The proposed APHIS suppression program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 9.

16. Virgin chub (*Gila seminuda*) (Endangered): Found in Washington County. Virgin chub are opportunistic feeders, consuming zooplankton, aquatic insect larvae, other invertebrates, debris and algae. Interestingly, the diet of many adults is composed primarily of algae, whereas the diets of younger fish contain more animal matter. The species spawns during late spring and early summer over gravel or rock substrate. The proposed APHIS suppression program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 9.

17. Woundfin (*Plagopterus argentissimus*) Endangered): Found in Washington County, the species is now restricted to the Virgin River system. Woundfin diets are quite varied, consisting of insects, insect larvae, other invertebrates, algae, and detritus. The species spawns during the spring in swift shallow water over gravel substrate. The proposed APHIS suppression program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 9.

18. Desert tortoise ( *Gopherus agassizii*) (Threatened): Found in Washington County. Within its range, the desert tortoise can be found near water in deserts, semi-arid grasslands, canyon bottoms and rocky hillsides. Desert tortoises often construct burrows in compacted sandy or gravelly soil. Females nest under a large shrub or at the mouth of a burrow and lay one to three clutches of two to fourteen eggs from May to July; eggs hatch in late summer or fall. Burrows, which may contain many tortoises at once, are used for hibernation during cold winter months. The typical diet of the desert tortoise consists of perennial grasses, cacti, shrubs and other plant material. Historically APHIS has never received a request to treat in areas inhabited by desert tortoises, but if asked to do so, there would exist the threat of direct take by running over small tortoises with ground equipment. Direct toxic effects from the use of carbaryl bait are unknown, but

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the tortoises would not likely consume the bait at low application rates (10 pounds per acre) and given the small size and consistency of bait particles. Indirect effects are low since they do not depend on insects for food. No information was located about diflubenzuron's toxicity to reptiles, but it is likely that it is low, based on the selective nature of its toxic mode of action (i.e., it interferes with the synthesis of chitin in those organisms that produce exoskeletons). The relative toxicity of diflubenzuron to reptiles is expected to be similar to that of mammals and birds (APHIS EIS, 2002). Indirect effects are also expected to be low since desert tortoises do not depend on insects for food. It is unlikely that grasshoppers or Mormon cricket populations would ever reach outbreak levels and require APHIS treatments in desert tortoise habitat. The proposed APHIS suppression program will not likely adversely affect this species. PROTECTIVE MEASURES: No aerial or ground applications will occur in the Beaver Dam Slope, the Tortoise Preserve or other occupied habitats of Washington County. If APHIS does receive a request to treat using ground equipment, then APHIS would re-consult with the USFWS.

19. Kanab ambersnail (*Oxyloma kanabense*) (Endangered): Found in Kane County. Pilsbry (1948), in the type description of this taxon, noted that it was found "on a wet ledge among rocks and cypripediums." Clarke (1991) reported the habitat of the Three Lakes population as a marsh dominated by *Typha* in its wettest portion. Grasses, *Carex*, violets, plantains and alders were also present. The densest snail aggregations were found under fallen *Typha* stalks, at the edges of thick *Typha* stands. The snails were also frequently observed just within the mouths of vole burrows. The presence of standing water appeared to be important to their local distribution. Clarke (1991) found that the habitat of the small population that existed along Kanab Creek also included *Mimulus guttatus*, *Dodocatheon pauciflorum*, *Aquilegia micrantha*, a tall grass species and *Juncus*. Direct toxic effects of carbaryl bait are high, but mitigation measures would insure that this species would not come in contact with the toxin. Indirect effects are low since the susceptible insects are not likely food items. Direct toxic effects from Dimilin are none to slight - the median lethal concentration of diflubenzuron in water to the snail is greater than 125 mg/L (Willcox and Coffey, 1978) - especially given the low application rates and the self-imposed water/spring buffers of APHIS programs. Indirect effects are also expected to be low since susceptible insects are not likely food items. The proposed APHIS suppression program will not likely adversely affect this species. PROTECTIVE MEASURES: No aerial applications within 1 mile of occupied habitat, and no ground treatments within 500 feet of occupied habitat.

20. Autumn buttercup (*Ranunculus aestivalis*) (Endangered): Found in Garfield County. Autumn buttercup produces abundant yellow flowers that can be seen from late-July to early October. It is found in low, herbaceous, wet meadow communities on islands of drier peaty hummocks, and sometimes in open areas, at elevations ranging from 1940 to 1965 meters. There are no direct toxic effects from carbaryl bait to this species. Indirect effects to plant pollinators from the use of carbaryl bait are low since insects must consume the bait in order to succumb to it. Target insects are unlikely pollinators of this species. There are no direct toxic effects from Dimilin, and the indirect effects to pollinators from the use of diflubenzuron are low since it is not toxic to adult insects.

APHIS's low application rate of one ounce per acre, coupled with the practice of treating not more than every other swath, preclude significant adverse impacts to larval insects as well. Only insect nymphs that undergo incomplete metamorphosis (i.e., grasshoppers/crickets) manifest significant adverse effects at the low doses of APHIS projects. The proposed APHIS program will not likely adversely affect this species. PROTECTIVE MEASURES: No aerial applications within 3 miles of occupied habitat, and no ground treatments within 300 feet of occupied habitat.

21. Barneby reed-mustard (*Schoenocrambe barnebyi*) (Endangered): Found in Emery and Wayne Counties. Specimens have a branched woody base that gives rise to purple veined, white, or lilac flowers from late April to early June. Barneby reed-mustard grows in xeric, fine textured soils on steep eroding slopes of the Moenkopi and Chinle formations. It grows in sparsely-vegetated sites in mixed desert shrub and pinyon-juniper communities, at elevations ranging from 1460 to 1985 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 20.

22. Barneby ridge-cress (*Lepidium barnebyanum*) (Endangered): Found in Duchesne County. This species grows in cushion-shaped tufts, has a thickened, branched woody base and produces abundant white to cream colored flowers that bloom in May and June. It grows along semi-barren ridges in pinyon-juniper woodlands, at elevations ranging from 1860 to 1965 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 20.

23. Clay phacelia (*Phacelia argillacea*) (Endangered): Found in Utah County. It is a narrow endemic to Spanish Fork Canyon, Utah County, Utah. A member of the waterleaf family, it has a scorpion tale-like inflorescence that continues, as it unrolls, to produce blue to violet flowers from June to August. This species is a winter annual and is found in fine textured soil and fragmented shale derived from the Green River Formation. It grows on barren, precipitous hillsides in sparse pinyon-juniper and mountain brush communities, at elevations ranging from 1840 to 1881 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect toxic effects and PROTECTIVE MEASURES same as # 20.

24. Clay reed-mustard (*Schoenocrambe argillacea*) (Threatened): Found in Uintah County. It is a plant that occurs in the Uinta Basin, Uintah County, Utah. A member of the mustard family, this species is a hairless perennial with a stout, woody base. It produces lilac to white, purple-veined flowers that bloom from mid-April through mid-May. Shrubby reed-mustard grows on the Evacuation Creek Member of the Green River Formation, where it is on substrates consisting of at-the-surface bedrock, scree, and fine-textured soils. It occurs on precipitous slopes in mixed desert shrub communities, at elevations ranging from 1439 to 1765 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

25. Deseret milkvetch (*Astragalus desereticus*) (Threatened): Found in Utah County. This plant occurs at a single site in Utah County, Utah. A member of the bean family, this species is a perennial herb with gray-silvery leaves four to five cm long and white to pinkish petals with evident lilac-colored keel-tips. It blooms from late April to early June. Deseret milkvetch grows exclusively on sandy-gravelly soils weathered from conglomerate outcrops of the Moroni Formation. It likes steep south and west (rarely north) facing slopes and does well on larger, west-facing road-cuts. It is grows in an open pinyon-juniper-sagebrush community, at elevations ranging from 1645 to 1740 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

26. Dwarf bear-poppy (*Arctomecon humilis*) (Endangered): Found in Washington County. This plant is a narrow endemic to (occurs only in) Washington County, Utah. A member of the poppy family, this species is a perennial herb that produces abundant white flowers. The flowers bloom from mid-April through May, and are quite showy next to the red soils in which the plant grows. Dwarf bearclaw-poppy is found on gypsiferous clay soils derived from the Moenkopi Formation. It occurs on rolling low hills and ridge tops, often on barren, open sites in warm desert shrub communities, at elevations ranging from 700 to 1402 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

27. Gierisch mallow (*Sphaeralcea gierischii*) (Endangered): Found in Washington County. A member of the mallow family, this species is a flowering perennial which is only found on gypsum outcrops associated with the Harrisburg Member of the Kaibab Formation in northern Mojave County, AZ and Washington County, UT. It has a woody base and dies back to the ground during the winter and re-sprouts from the base during late winter and spring depending on daytime temperatures and rainfall. How its flowers are pollinated, seed-dispersal mechanisms and the conditions under which seeds germinate are not yet known. Young plants have been observed on reclaimed portions within gypsum mining areas. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

28. Graham beardtongue (*Penstemon grahamii*): Found in Carbon, Duchesne and Uintah Counties. It is endemic to (occurs only in) the Uinta Basin in Carbon County, Duchesne County and Uintah County, Utah, and in immediately adjacent Rio Blanco County, Colorado. A member of the figwort family, this species is a perennial herb that is 5 to 20 cm tall, with thick leathery leaves, and large, tubular, light to deep lavender flowers that bloom from late May to early June. Graham beardtongue grows on semi-barren knolls, ridges and steep slopes in a mix of fragmented shale and silty clay soils closely associated with the Mahogany zone (oil shale bearing) of the Green River Formation. It grows in sparsely vegetated communities of pinyon-juniper, desert shrub and Salina wildrye, at elevations ranging from 1430 to 2060 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

29. Heliotrope milkvetch (*Astragalus montii*) (Threatened): Found in Sanpete and Sevier Counties. This is a plant that occurs on the southern Wasatch Plateau in Sanpete County

and Sevier County, Utah. A member of the bean family, this species is a dwarf tufted perennial herb with pink purple petals that have white wing-tips. It blooms from June to August. Heliotrope milkvetch grows in barren areas on shallow and very rocky soils derived from Flagstaff Limestone, at elevations ranging from about 3230 to 3322 meters. It grows in subalpine communities of cushion plants and other low-growing species that are scattered within more extensive conifer, tall-forb, and grass communities. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

30. Holmgren milkvetch (*Astragalus holmgreniorum*) (Endangered): Found in Washington County. It occurs in Washington County, Utah, and in immediately adjacent Mohave County, Arizona. A member of the bean family, this species is a dwarf, tufted, stemless perennial herb. It has pinkish-purple flowers with unique white-tipped wings; it blooms in April and May. Holmgren milkvetch grows in topographic sites where water runoff occurs and where the soil surface is covered by a stony or gravelly erosional pavement. The soils are derived from the Moenkopi Formation. Holmgren milkvetch grows in warm desert shrub communities, at elevations ranging from 805 to 914 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

31. Jones cycladenia (*Cycladenia humilis var. jonesii*) (Threatened): Found in Emery, Garfield, Grand and Kane Counties. This plant is restricted to the canyonlands of the Colorado Plateau in Emery County, Garfield County, Grand County, and Kane County, Utah, as well as in immediately adjacent Coconino County, Arizona. A member of the dogbane family, this species is a rhizomatous herb with round, somewhat succulent leaves, and small rose-pink hairy flowers that bloom from mid-April to early June. Jones' cycladenia grows in gypsiferous soils that are derived from the Summerville, Cutler, and Chinle formations; they are shallow, fine textured, and intermixed with rock fragments. The species can be found in Eriogonum-ephedra, mixed desert shrub, and scattered pinyon-juniper communities, at elevations ranging from 1219 to 2075 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

32. Kodachrome bladderpod (*Lesquerella tumulosa*) (Endangered): Found in Kane County. It is a plant that is a narrow endemic to (it occurs only in) Kane County, Utah. A member of the mustard family, this species is a perennial herb that forms densely matted and depressed mounds. It has a many-branched woody base with persistent leaf bases, has star-shaped hairs, and produces yellow flowers that bloom in May and early June. Kodachrome bladderpod is found on shallow soils that are fine textured, intermixed with shale fragments, and derived from the Winsor Member of the Carmel Formation. Kodachrome bladderpod grows on bare shale knolls and slopes in scattered pinyon-juniper communities, at elevations ranging from 1719 to 1845 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

33. <u>Last Chance townsendia</u> (*Townsendia aprica*) (Threatened): Found in Emery, Sevier and Wayne Counties. This plant is a member of the sunflower family, and is a stemless perennial herb with flower heads submersed in its ground-level leaves. The flowers bloom in late April and May, and have yellow to golden petals. Last Chance townsendia is found in clay, clay-silt, or gravelly clay soils derived from the Mancos Formation; these soils are often densely covered with biological soil crusts. The species grows in salt desert shrub and pinyon-juniper communities, at elevations ranging from 1686 to 2560 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

34. <u>Maguire primrose</u> (*Primula maguirei*) Threatened): Found in Cache County. plant that is a narrow endemic to (it occurs only in) Logan Canyon, Cache County, Utah. A member of the primula family, this species is a perennial herb with broad, spatula-shaped leaves. Stems are approximately four to fifteen cm tall, with each bearing one to three showy rose to lavender-colored flowers that bloom in late April and May. Maguire primrose is found on either north-facing or well shaded south-facing moss covered sites on damp ledges, in crevices, and on over-hanging rocks along the walls near the bottom of the canyon. It grows at elevations ranging from 1550 to 2012 meters. The propose APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

35. <u>Navajo sedge</u> (*Carex specuicola*) (Threatened): Found in San Juan County, Utah, and in immediately adjacent Coconino County, Arizona. A member of the sedge family, this species is a loosely tufted perennial, 25 to 40 cm tall, with grass-like leaves that droop downward. Its flowers, seen in late June and July, are arranged in spikes, two to four spikes per stem. Navajo sedge is restricted to seep, spring, and hanging garden habitats in Navajo Sandstone, at elevations ranging from 1150 to 1823 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects of treatment are the same as # 20. PROTECTIVE MEASURES: No aerial applications within 3 miles of occupied habitat and no ground applications within 300 feet of springs, seeps and hanging gardens.

36. <u>Pariette cactus</u> (*Sclerocactus brevispinus*) (Threatened): Found in Duchesne and Uintah Counties. A member of the cactus family, this taxon is a Uinta Basin endemic in northeast Utah, Duchesne County. It is known from "a series of small scattered populations…near Myton (Heil and Porter (1994)." It inhabits "stoney, gravelly, low hilly terrain, growing with desert grasses or low vegetation (Hochstätter 1993)"; the soils on which it grows are derived from the Uinta Formation (Specht, pers. comm. 2005). The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

37. <u>San Rafael cactus</u> (*Pediocactus despainii*) (Endangered): Found in Emery and Wayne Counties. A member of the cactus family, this species is a small, subglobose to ovoid cactus with usually solitary stems; the crown of the stem is at or very near ground level. Its flowers are born near the tip of the stem, are yellow bronze to peach bronze, rarely pink in color, and bloom during April and May. San Rafael cactus is found in fine textured soils rich in calcium derived from the Carmel Formation and the Sinbad Member

of the Moenkopi Formation. It occurs on benches, hill tops, and gentle slopes in pinyon-juniper and mixed desert shrub-grassland communities, at elevations ranging from 1450 to 2080 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

38. Shivwitz or Shem milkvetch (*Astragalus ampullarioides*) (Endangered): Found in Washington County. It occurs in only Washington County, Utah. A member of the bean family, Shivwits milkvetch is a perennial herb. Specimens are 20 to 45 cm tall, each with an underground, branching woody base and an erect flower stalk bearing yellow-white flowers that bloom from late April to early June. Shivwits milkvetch grows on the unstable clay soil of Chinle Shale in warm desert shrub and pinyon-juniper communities, at elevations ranging from 872 to 1116 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

39. Shrubby reed-mustard (*Schoenocrambe suffrutescens*) (Endangered): Found in Duchesne and Uintah Counties. A member of the mustard family, this species is a perennial clump-forming herb that produces yellow flowers that bloom from May through June. Shrubby reed-mustard grows along semi-barren, white-shale layers of the Green River Formation (Evacuation Creek Member), where it is found in xeric, shallow, fine textured soils intermixed with shale fragments. It grows in mixed desert shrub and pinyon-juniper communities, at elevations ranging from 1554 to 2042 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

40. Siler pincushion cactus (*Pediocactus sileri*) (Threatened): Found in Kane and Washington Counties. It is a plant that occurs in adjacent Coconino and Mohave counties, Arizona; the center of its distribution is in Mohave County. A member of the cactus family, this species is a small, globose cactus with solitary, occasionally clustered, stems typically 10 cm tall (as great as 45 cm), and spines that become white with age. Its flowers are yellow with purple veins, and bloom during March and April. Siler pincushion cactus is found on the white, occasionally red, gypsiferous and calcareous sandy or clay soils derived from the various members of the Moenkopi Formation. It is sometimes found, however, on the nearly identical Kaibab Formation. Siler pincushion cactus occurs on rolling hills, often with a badlands appearance, in warm desert shrub, sagebrush-grass, and, at its upper limits, pinyon-juniper communities, at elevations ranging from 805 to 1650 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

41. Uintah basin hookless cactus (*Sclerocactus wetlandicus*) (Threatened): Found in Carbon, Duchesne and Uintah Counties, Utah and in Delta, Garfield, Mesa, and Montrose counties, Colorado. A member of the cactus family, this species is a perennial herb with a commonly solitary, egg-shaped, three to twelve cm long stem that produces pink flowers late from April to late May. Uinta Basin hookless cactus is found on river benches, valley slopes, and rolling hills of the Duchesne River, Green River, and Mancos formations. It is

found in xeric, fine textured soils overlain with cobbles and pebbles, growing in salt desert shrub and pinyon-juniper communities, at elevations ranging from 1360 to 2000 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

42. Ute ladies'-tresses (*Spiranthes diluvialis*) (Threatened): Found in Daggett, Duchesne, Garfield, Juab, Salt Lake, Tooele, Uintah, Utah, Wasatch, Wayne and formerly Weber County. It also occurs in the states of Colorado, Idaho, Montana, Nebraska, Nevada, Washington, and Wyoming. A member of the orchid family, this species is a perennial herb with a flowering stem, 20-50 cm tall that arises from a basal rosette of grass-like leaves. The flowers are ivory-colored, arranged in a spike at the top of the stem, and bloom mainly from late July through August. Ute ladies'-tresses is found in moist to very wet meadows, along streams, in abandoned stream meanders, and near springs, seeps, and lake shores. It grows in sandy or loamy soils that are typically mixed with gravels. In Utah, it ranges in elevation from 1311 to 2134 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

43. Welsh's milkweed (*Asclepias welshii*) (Threatened): Found in Kane County, Utah as well as in immediately adjacent Coconino County, Arizona. A member of the milkweed family, this species is a stout, rhizomatous perennial herb with large oval leaves and spherical clusters of flowers that are cream-colored with pink-tinged centers. It blooms from June to August. Welsh's milkweed grows on dunes derived from Navajo Sandstone. It is found in sagebrush, juniper, and ponderosa pine communities, at elevations ranging from 1542 to 1993 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

44. Winkler cactus ( *Pediocactus winkleri*) (Threatened): Found in Emery and Wayne Counties. A member of the cactus family, this species is a small, subglobose cactus with solitary or clumped stems; the crown of the stem is at or very near ground level. Its flowers are born near the tip of the stem, are peach to pink in color, and bloom late March to May. Winkler pincushion cactus is found in fine textured soils derived from the Dakota Formation and the Brushy Basin Member of the Morrison Formation. It occurs on benches, hill tops, and gentle slopes on barren, open sites in salt desert shrub communities, at elevations ranging from 1490 to 2010 meters. The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

45. Wright fishhook cactus (*Sclerocactus wrightiae*) (Endangered): Found in Emery, Sevier and Wayne Counties. A member of the cactus family, this species is a perennial herb with a solitary, hemispheric, ribbed, 6 to 12 cm tall stem that produces nearly-white to pink flowers from late April through May. Wright fishhook cactus is found in soils that range from clays to sandy silts to fine sands, typically in areas with well-developed biological soil crusts. Wright fishhook cactus grows in salt desert shrub and widely scattered pinyon-juniper communities, at elevations ranging from 1305 to 1963 meters.

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The proposed APHIS program will not likely adversely affect this species. Direct and indirect effects and PROTECTIVE MEASURES same as # 20.

## Appendix D: APHIS Responses to Public Comments on the Utah Draft EAs (EA Numbers: UT-22-1, UT-22-2, UT-22-3, UT-22-4, UT-22-5, & UT-22-6)

USDA APHIS received two public responses to the publication of the 2022 Draft EA. Public comments were received from the Xerces Society and the Center for Biological Diversity.

### Responses to the Xerces Society 2022

**Comment 1**
USDA-APHIS received 1 comment concerning:

**The EAs Fail to Disclose Areas Likely for Treatment and Do Not Adequately Describe the Affected Environment or Analyze Impacts to the Affected Environment**

APHIS states in the EAs:
*"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.*

In this age of information, when the entire world can be informed of a decision via the push of a button, such an explanation for failing to inform the public--in advance--of treatment locations, acres, and methods falls rather flat. As APHIS explains in the EAs, APHIS only conducts treatments after receiving requests, which also help guide nymphal survey efforts. Moreover it is our understanding that a state's treatment requests must be submitted for funding approval to headquarters in Washington D.C., and that this budget requesting work occurs during the winter. Therefore, this information must exist in APHIS files. We believe this information should be used to disclose maps of requested and higher probability treatment areas, together with an estimate of acres to be treated and the likely method of treatment and chemical to be used -- in the Draft EA and certainly by the Final EA. We find it hard to imagine a good reason for not disclosing more specific treatment maps, together with acreage estimates and proposed method and chemical – as soon as such information is available, certainly by the Final EA or as an Addendum to the Final EA.

As published, the Draft EAs provide almost no solid information about where, how, and when the treatments may actually occur in 2022 (or in subsequent years). As a result, it is impossible to determine if applications might occur to sensitive areas or species locations within the specified counties. Similarly, the EAs do not contain information regarding whether grasshopper numbers are rising or falling relative to historic patterns. Much more meaningful would be a description of the average size of treatments in this state and a map of such treatments over a credible period, such as 2-3 decades, accompanied by detailed nymphal information and treatment request maps.

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APHIS' lack of transparency about proposed and historical treatment areas, particularly on public lands, is a disservice to the public and prevents citizens from reviewing sufficient information to be able to gauge the justification for and the risks involved in the suppression effort. Furthermore, as a result of the lack of specificity in the EA, it is impossible to determine whether effects would actually be significant or not. Obviously, final treatment decisions should hinge on a firm understanding of species-specific nymphal densities as well as other conditions related to the economic threshold, as described by APHIS, and it could be that APHIS would decide not to treat an area that was included in a budget request. Nonetheless, in order to adequately inform the public, describe the affected environment, and ascertain impacts to critical ecological and social resources, APHIS should provide the treatment request areas with the EA, even if actual treatments end up less than these.

**Recommendation:** We urge APHIS to delay the publication of a FONSI until all treatment areas have been delineated and are identified to the public, using maps and providing acreage. Site-specific information related to the resources and values of these locations should then be included. This would provide the public with a much better understanding of the justification for the treatment, the actual number of acres to be treated and their location, the method to be used, and the scale of potential effects to local resources. This specific information should be posted at the APHIS website as soon as it is available, sent to interested parties, and made available for public comment.

As soon as available, we request to receive a copy of maps and acreages of all final treatment areas for 2022, whether or not a supplemental determination is published. Should a supplemental determination be published, please send a copy to us. If APHIS chooses to finalize its EAs and publish a FONSI earlier, it should at least provide its best estimate of where treatments will occur based on requests, nymphal survey information and historical treatment data, and describe the affected environment and anticipated environmental consequences in those areas with greater detail. In future years, we urge APHIS to delay release of EAs until after treatment requests are received and all treatment areas have been delineated and are identified to the public.

*Thank you for your engagement on this program. APHIS values criticism of the program to ensure that it meets the highest possible environmental standards as demanded by the public at large and recommended by non-profit environmental advocacy groups such the Xerces Society. The commenter has expressed similar concerns in the past. Please read APHIS's response to Comment 1 in the Xerces section of Appendix D of our 2021 EAs for the rangeland grasshopper suppression in Utah.*

*The EAs do not fail to disclose the treatment request locations. The treatments can occur at any location within the action areas described in the EAs. The EAs describe geographically similar action areas which may have populations that require suppression. Any populations outside these action areas will not be treated. The commenter requests the exact locations to be treated - this level of detail is not necessary for a thorough risk analysis for significant impacts as required by NEPA. APHIS must remind the Xerces Society that their comments should suggest how program activities could have significant impacts to the human environment. The NEPA public review process is not a forum to tell the agency how to conduct its surveys and suppression activities.*

*The proposed treatment locations become known only after the nymphal survey has taken place. The EAs describe that any blocks within the action area which have outbreak populations could be potential treatment areas. The 2021 statewide survey maps enclosed within each EA indicates those "likely" treatment areas. The timeline suggested by the commenter would not allow the draft EA to be published until after the exact infestation has been delimited, starting the 30-day public comment at that time. If this*

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*was the case, no outbreak populations would ever be treated, and farmers, ranchers, wildlife and sensitive species would suffer the effects of forage loss from Orthopteran depredation.*

**Comment 2**
USDA-APHIS received 1 comment concerning:

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

APHIS claims that its grasshopper suppression efforts are akin to an "emergency." For example, the following is stated in the EAs:
*The emergency response aspect is why site-specific treatment details cannot be known, analyzed, and published in advance.*

The emergency explanation does not hold water when this program is given an annual budget and when grasshopper outbreak dynamics are reasonably well known. The Grasshopper IPM Project and subsequent studies did much to advance knowledge about grasshopper cycles and areas more prone to outbreak. For example see Cigliano et al. (1995) which identified areas most prone to outbreak in Montana, and Schell and Lockwood (1997) which did the same in Wyoming. Also see Oregon's EA, which provides a map of similar historic information.

Even armed with this information, APHIS did not bother to take a closer look at the areas within Utah that might be most likely to be affected by grasshopper sprays. Nor did APHIS consider impacts to these areas' ecological, scientific, or recreational resources, which are considerable, including Important Bird Areas, Sagebrush Focal Areas and Greater Sage-Grouse Priority Habitat Management Areas, National Wildlife Refuges which support breeding migratory birds and many other wildlife species - such as Warhorse National Wildlife Refuge, UL Bend National Wildlife Refuge, Lake Mason National Wildlife Refuge - and various Wilderness Study Areas, such as the Terry Wilderness Study Area, and reservoirs that support fishing and camping.

While APHIS may reasonably assert the need to respond quickly, that does not excuse ignoring existing information or refusing to do required environmental disclosures as required by NEPA.

**Recommendation:** See above.

*The commenter has expressed similar concerns in the past. Please read APHIS' response to Comment 1 above and Comment 1 in the Xerces section of Appendix D of our 2021 EAs for the rangeland grasshopper suppression in Utah.*

*APHIS regularly engages with the public about areas experiencing outbreak grasshopper and Mormon cricket populations. Previous year adult surveys can be used to predict areas of high populations, but one year's survey data does not always directly correlate to current populations. High variability of abiotic factors at a local level can significantly impact developing nymphal populations. Furthermore, Mormon cricket populations are mobile and can migrate into areas that were not forecasted to have outbreak populations.*

*APHIS, beginning with public meetings, is open and transparent with the public about what surveys revealed the previous year, where current year outbreaks might occur and areas that potentially could be impacted by grasshoppers or Mormon crickets. Throughout the nymphal*

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*survey season, APHIS works with the Utah Department of Agriculture and Food (UDAF) and responds to public reports of areas with high densities. With the limited resources available to the Grasshopper and Mormon cricket program, APHIS can focus survey and treatment areas with high public involvement, areas with economically significant resources and on areas with known densities of grasshoppers or Mormon crickets that exceed treatment criteria.*

*The EA analyses cover most areas in the state that have the criteria outlined above. However, it is impossible to know exactly where these treatments will occur in advance. The need for rapid response is akin to an emergency for rural communities who are significantly impacted by the economic damage caused by these pests. APHIS uses the EAs to capture the variability in these rural locations and can then work with local governments, conservation districts, state and federal partners to rapidly respond to the public needs for treatments. Areas which meet the criteria, express a desire for treatments and collaborate with APHIS have the potential to receive rapid response emergency treatments when funds are available. The public are notified of treatments via radio and television announcements, meetings with local governments and direct notice to those in the immediate treatment areas. APHIS does not keep the public in the dark, rather it actively seeks interaction from the public during the treatment planning process.*

## Comment 3

USDA-APHIS received 1 comment concerning:

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

APHIS claims in its EAs that it reduces the risk to native bees and pollinators through several measures including preference for insecticides that are not broad-spectrum. For example the following statement is included:
*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.*

Yet APHIS identifies three potential insecticides in its preferred Alternative B: carbaryl, malathion, and diflubenzuron.
It is common knowledge that carbaryl and malathion are both broad-spectrum chemicals that interfere with transmission of neural signals. (Use of baits can reduce exposure to certain insects; this option is available with carbaryl as used in the program).

Diflubenzuron is the most commonly used insecticide under APHIS' grasshopper suppression program. Diflubenzuron is an insect growth regulator and functions by disrupting synthesis of chitin, a molecule necessary to the formation of an insect's cuticle or outer shell. An insect larva or nymph exposed to diflubenzuron is unable to successfully molt and thus dies. Chitin is not limited to insect cuticles, but is also, for example, a component of mollusk radula, fish scales and fungi cell walls. The label for diflubenzuron itself calls the insecticide "broad-spectrum" (see Durant 2L label); therefore APHIS' statement is not credible. Additionally the EIS disclosed that under some circumstances, Dimilin may be quite persistent; field dissipation studies in California citrus and Oregon apple orchards reported half-live values of 68.2 to 78 days.

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**Recommendation:** APHIS should cease claiming that it preferentially uses selective chemicals. This is untrue and misleading. An accurate assessment regarding the impacts of these non-selective chemicals must also be included.

*The commenter has expressed similar opinions and concerns in the past. The program description provided by APHIS in the EAs is neither untrue nor misleading. Please read APHIS' response to Comment 6 in the Xerces section of Appendix D of our 2021 EAs for the rangeland grasshopper suppression in Utah.*

*The commentor is incorrect when stating the Durant 2L (EPA Reg. No.: 91234-103) label states it is a "broad-spectrum" insecticide. While the company may market it as such, it is used at highly variable rates. Rates used to suppress insects that undergo complete metamorphosis are well above those used in the Grasshopper and Mormon cricket Suppression Program.*

*The commenter asserts the EA does not provide information on the possible effects of program chemicals on bees and pollinators. That information is provided under the Environmental Consequences section of the EA on pages 16 through 27. The Draft EA is tiered to more extensive analysis in the 2019 EIS (page 45-46, 55-57, and 65) and the HHERAs for carbaryl (page 21 and 44), malathion (pages 14-15, and 34) and diflubenzuron (pages 13-14, 29-30) that addresses risk to pollinators including bees and their larval stages.*

*APHIS recognizes that there may be exposure and risk to some pollinators at certain times of the application season from liquid insecticide applications used to control grasshopper and Mormon cricket populations. APHIS reduces the exposure and risk to pollinators by using rates well below those labeled for use by EPA. Current labeling for grasshopper treatments also allows multiple applications per season. APHIS uses one application per treatment season, further reducing the risk to pollinators when compared to the current number of applications that can be made to rangeland in a year.*

*As stated by the commentor, diflubenzuron is the most commonly used insecticide under APHIS's grasshopper suppression program in Utah. When used at rates below those recommended on the label and by alternating treated and untreated swaths, risks and impacts from exposure to non-targets are reduced when compared to full label rates at conventional 100% coverage.*

## Comment 4

USDA-APHIS received 1 comment concerning:

**APHIS includes only a single action alternative and fails to analyze other reasonable alternatives, 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.**

As described in the 2019 EIS, potential outcomes of forage loss on a leaseholder's plot of land, should it be untreated, could be the rancher seeking to buy alternative sources of forage, leasing alternative lands, or selling livestock. The EIS did not fully evaluate these options, so it is important that the EAs go

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further. For example, a reasonable alternative that could be examined would be for the federal government to subsidize, fully or partially, purchased hay. But in its current form, the EA includes no discussion of a reasonable alternative such as this.

Instead, the EAs contain a single action alternative that encompasses suppression treatments using either the "conventional" method (i.e. full rates, blanket coverage) or the RAATs method (i.e. reduced rates, skipped swaths). Given that these two options are combined into a single alternative the consequences section should be careful to fully analyze the impact of the treatments at the conventional rates with blanket coverage. However in many cases APHIS focuses simply on the RAATs method and does not discuss impact from the "conventional" method. As an example, this language is included for the discussion of carbaryl impacts on pollinators: *"In areas of direct application where impacts may occur, alternating swaths and reduced rates (i.e., RAATs) would reduce risk."* In other cases, APHIS provides an assessment but does not indicate if its risk conclusion applies to the conventional method and the RAATs method, or one or the other.

**Recommendation:** APHIS should include a reasonable alternative to chemical suppression, such as buying alternate forage for affected landowners. Given the many other values of, and ecosystem services provided by, public lands, it only makes sense to consider such an alternative. Another reasonable alternative is not treating public lands. In addition, APHIS should separate the conventional from the RAATs method into two different alternatives and analyze them accordingly.

*The commenter has provided similar suggestions in the past. Please read APHIS' response to Comment 2 in the Xerces section of Appendix D of our 2021 EAs for the rangeland grasshopper suppression in Utah.*

*"Buying substitute forage for affected leaseholders" is not a viable alternative for grasshopper or Mormon cricket infestations considered for treatment. Untreated infestations seriously damage available rangeland forage, and though livestock might fare well with "alternate forage," resident wildlife would not. Neither would native bee nor fly pollinators which depend upon flowers for food.*

## Comment 5

USDA-APHIS received 1 comment concerning:

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

APHIS liberally employs relative language to create an impression of low risk. For example, in numerous locations in the environmental consequences section of the EAs, APHIS described risk as "reduced." Reduced compared to what, exactly? The inexactness and lack of specificity of such statements make the EAs of little utility for a citizen trying to determine the actual predicted impacts of insecticide spray on large blocks of Western rangelands and do not provide an accurate scientific assessment.

**Recommendation:** APHIS must be more clear, specific, and careful about how it describes risk. The use of relative terms such as "reduced" should be avoided unless APHIS is very clear about the factors and results being compared.

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*The commenter has provided similar suggestions in the past. Please read APHIS' response to Comment 3 in the Xerces section of Appendix D of our 2021 EAs for the rangeland grasshopper suppression in Utah.*

*The comment is a vague critique of the risk analysis provided by APHIS in the EAs. Often in the EA the term Reduced Agent Area Treatment (RAAT), typically described as the RAATs treatment method, is used. Compared to conventional full coverage applications of pesticide, the RAATs strategy uses a reduced rate by alternating treatment swaths in a spray block, reducing application rates or both.*

*APHIS certainly considers relative risk to the ecosystem when determining whether or not to treat damaging Orthopteran infestations. If the infestation is not reduced, what is the threat to available wildlife and livestock forage as well as to sensitive plant species. The priority question in all these cases is, "Will treatment suppression of depredators provide significant reduction of risk to range forage and its associated ecosystem?"*

## Comment 6

USDA-APHIS received 1 comment concerning:

**APHIS ignores the significance of Utah 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.**

The geographic area covered by this EA may be home to 500-1,000 species of native bees (McKnight et al. 2018, Figure 1). Perhaps this is not surprising since the majority of rangeland plants require insect-mediated pollination. Native, solitary bee species are important pollinators on western rangeland. Hence, pollinators are important not only for their own sake but for the overall diversity and productivity of native rangelands, including listed plant species. However, this essential role that pollinators play in the conservation of native plant communities is given very short shrift in the EAs.
Many of the pollinators that call Utah home are already considered at-risk. See lists of at risk pollinators found in Utah in our comment letter submitted in 2020 (Attachments 1 and 2). We ask you to incorporate those attachments by reference.

Pollinators, including bumble bee species that occur in Utah and are within the range of historic and possibly future treatments, are facing significant declines (National Research Council 2007; Cameron et al. 2011). Bumble bees as a group, and several bumble bee species endemic to western states are perhaps the best known examples of pollinators in serious decline. Bumble bees are known to be important pollinators on many rangeland plants, including listed plant species such as Ute Ladies' Tresses. Scientists recognize serious information gaps about the relative and interacting effects of stressors to bumble bee populations, especially the effects of pathogens, pesticides, climate change and habitat loss (see Graves et al. 2021).

Potential spray areas in Utah are within the range of at least three bumble bee species that have experienced declines in abundance and range contractions: *Bombus fervidus* , *B. occidentalis,* and *B. suckleyi*. Their decline statistics and range contractions are captured in a valuable IUCN overview of North American bumble bee species (Hatfield et al. 2015). *B. occidentalis* relative abundance compared to historic values is only 28.5%, while the current abundance of *B. fervidus* relative to historic values is 38%. For *B. suckleyi,* its relative abundance is less than 10% of its historic values. *B. occidentalis* and *B. suckleyi* have been petitioned for listing under the Endangered Species Act, and have each received a positive 90-day finding by the USFWS, a fact not disclosed in the APHIS EA.

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*B. pennsylvanicus*, another declining species also historically occurred in Utah. According to Hatfield et al. 2015, it has experienced a range loss of ~50% along with a 50% drop in persistence and 88.56% drop in relative abundance. It also has received a positive 90-day finding by the USFWS, a fact not disclosed in the APHIS EA.

Unfortunately, documented declines for pollinators are just echoes of a larger ominous development facing insects as a whole. Recent reports suggest that insects are experiencing a multicontinental crisis that is apparent as reductions in abundance, diversity, and biomass (Forister et al. 2019).

Despite this very real crisis in biodiversity, the EAs do not consider the threats that treatments could pose to these dwindling bumble bees or other native bees that are dwindling but not yet on the Endangered Species List. The EAs further fail to disclose which, if any, invertebrates within the geographic area are listed as sensitive by federal land management agencies or as Species of Conservation Concern, or whether the state of Utah designates any invertebrates as species of greatest conservation need.

Specific risks to bees from the insecticides diflubenzuron, carbaryl, and chlorantraniliprole, as exemplified by studies and models using honey bees, are described elsewhere in this letter. But concerningly, researchers have outlined the many ways in which risk assessments may underestimate risk to native bees by relying exclusively on honey bee studies (see, for example Gradish et al. 2019). Native bees and honey bees have significant life history differences, including the following:

• Honey bee queens do not forage; native bee queens do
• Honey bee larvae do not eat raw pollen; native bee larvae do
• Honey bees nest above the ground in hives; native bees mostly nest in the ground
• Honey bees have well-defined caste systems and very large sizes; most native bees have little or no social organization and nests are very small.
• Foraging exposure is different, for example foraging bumble bee adults may experience higher exposure due to their ability to be active during weather conditions and at times that honey bees do not forage, and because bumble fee foragers visit more flowers per day.

APHIS stands to worsen the plight of pollinators and of insects as a group through implementation of its grasshopper suppression program as described in the EAs. In particular, the status of at-risk native bees and at-risk native butterflies may worsen as a result of insecticide treatments for grasshopper control.

In addition, the EAs make no mention of the fact that there are affirmative obligations incumbent on federal agencies with regard to protection of pollinators, regardless of whether they are federally listed. Federal documents related to pollinator health were described in our previous comment letters (see those).

***Recommendation:*** In the face of declining pollinator and insect populations and the existence of federal directives for agencies to support and conserve pollinators and their habitat, APHIS must not conduct business as usual. APHIS should identify the at-risk pollinator species potentially present in the geographic area of the EAs and map their ranges prior to approving any treatment requests. Please see tables of at-risk bee and butterfly species potentially located within the project area in our 2020 comment letter. Prior to treatment, APHIS should ensure that it has identified specific, actionable measures it will take to protect the habitat of at-risk pollinator species from contamination that may occur as a result of exposure to treatment.

Some ways to enact protections for at-risk pollinators above and beyond those included in the EA include:

● Survey for butterfly host plants and avoid any applications to host plants.
● Time pesticide applications to avoid exposure to at risk species.

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● Do not apply pesticides (especially insecticides) when pollinators (adult and immature) are present or expected to be present.
● Avoid aerial applications.
● Avoid using malathion and liquid carbaryl.
● Include larger buffers around all water sources, including intermittent and ephemeral streams, wetlands, and permanent streams and rivers, as well as threatened and endangered species habitat, honey bee hives, and any human-inhabited area. Buffers should be sufficient to reduce potential drift deposition to insignificant levels. For example, Tepedino (2000) recommends a three-mile buffer around rare plant populations, as many of these are pollinated by solitary bees that are susceptible to grasshopper control chemicals.

See McKnight et al. (2018) and Pelton et al. (2018) for more.

*The commenter submitted similar comments for the 2021 EAs. See responses to comments #5, 6, 9 and 13 of the 2021 EAs.*

*Currently, APHIS does not foresee treatment of large areas or grasshoppers or Mormon crickets in Utah during 2022. If treatments were necessary, the size of the treatment blocks would be miniscule (substantially less than 1%) compared to the amount of rangeland in Utah. The commenter has stated that pollinator populations are suffering significant declines, which APHIS does not dispute. However, the agency does not agree the proposed grasshopper treatments will significantly contribute to those declines.*

*APHIS believes the use of RAATs mitigates the risk of significant impacts to non-target insects and pollinator populations in Utah. However, APHIS does not solely rely on the reduced deposition of pesticides in the untreated swaths to determine the potential harmful effects of grasshopper treatments will not cause significant impacts. The environmental consequences risk analysis of carbaryl and diflubenzuron treatments using conventional methods (total area coverage and higher application rates) is provided on pages 20-28 of the 2021 EA. Additional descriptions of APHIS' analysis methods and discussion of the toxicology can be found in the 2019 EIS.*

## Comment 7

USDA-APHIS received 1 comment concerning:

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

The APHIS grasshopper suppression program draws its authority from the Plant Protection Act of 2000 (7 U.S.C § 7717). The statute authorizes APHIS to exclude, eradicate, and control plant pests, including grasshoppers. Specifically, language in the PPA provides authority for APHIS to protect rangeland from "economic infestation" of grasshoppers. In its recent EIS updating the program (APHIS 2019), the Agency describes its determination of an economic infestation as follows:

*The "level of economic infestation" 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*

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*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 a treatment.*

Such a measure is in accordance with general IPM principles that treatments should only occur if it is judged that the cost of the treatment is less than the revenues expected to be received for the product. APHIS should have undertaken such an analysis in the EIS or the site-specific EAs—or at least model it—so as to determine whether the treatments might be justified because they have reached a "level of economic infestation." Yet none of the variables are discussed in the EAs at all, nor is site-specific data presented for any of these factors, nor are procedures shown that APHIS intends to abide by to determine when an economic threshold is exceeded. Instead the reader is left to simply assume that all treatments obviously meet the economic threshold.

On public lands, from a taxpayer point of view, it makes sense that—as the grasshopper suppression effort is a federally supported program—costs of the treatment **to** the taxpayer should be compared to the revenues received **by** the taxpayer for the values being protected (livestock forage) on public lands.

Typical costs per acre can be obtained from previous treatments. For example, according to an Arizona 2017 Project Planning and Reporting Worksheet for DWP# AZ-2017-02 Revision #1 (Post treatment report) the cost of treatment amounted to $8.72/treated acre, or $3.99/"protected acre."[1] In 2019, similar post-treatment reports report the costs as $9.39 per treated acre and $4.41 per "protected acre". Note that these costs summaries only include what appear to be the direct costs of treatment (i.e. salaries and per diem of the applicators, chemical, etc.). Administrative costs do not appear to be included in these cost estimates, nor do nymph or adult survey costs.

1 The first figure applies to the cost for areas directly sprayed, the latter figure calculates a larger "protected acre" figure assuming that treatment effects radiate out into untreated swaths. This report was obtained through a FOIA request.

Information from a FAIRS Report (obtained through FOIA, not from APHIS' environmental documents) for aerial applications in Wyoming appear to indicate that aerial contracts cost between $9.76-$14.61/acre. However, the report is not easy to interpret and it is unclear if these are correct costs/acre.

Information from a summary of treatments conducted across Western states in 2017, 2018, and 2019 shows treatment costs for treatment costs for treated acres ranging from $4.43-$35.00 (2107); $9.34-$45.44 (2018), and $2.70-$35.60 (2019).

In determining whether a treatment is economically justified, one must ask what is the revenue expected to be received for the product? CARMA, the model used by APHIS to determine if a treatment should occur, shows that in Utah, it takes from 1-30 acres of rangeland to support one animal unit-month (AUM). Currently, on federal BLM and Forest Service lands, the US taxpayer receives $1.35 per AUM. As a rough estimation, taking the median value within the carrying capacity range (10 acres per AUM), and calculating the value of the forage per acre as paid to the American taxpayer, the US taxpayer currently receives an estimated $0.09 per acre for the forage value on BLM or USFS federal rangelands in Utah.

Given that the direct costs of grasshopper treatments to the taxpayer appear to range from $2.70 up to $45.44/acre, it is clear that the economic threshold is nowhere near being met, at least on federal lands. The program makes no economic sense from the point of view of the taxpayer.

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The ecological costs of treatment are not quantified in the EAs, but as we have pointed out, are numerous, and there is no evidence that they are not significant. It is unclear if the economic analysis that the PPA appears to require from APHIS is intended to include a quantitative assessment of ecological costs.

APHIS claims that treatments can reduce the likelihood of future outbreaks but this claim is not supported by evidence. Treatments are unreliable at thwarting outbreaks in subsequent years (Blickenstaff et al. 1974; Smith et al. 2006; Cigliano et al. 1995). At best, insecticide treatments may stem damage to forage and crops in the current year.
The EAs did not include APHIS' protocol for delineation surveys which occur in spring and summer to identify treatment areas. We know that APHIS encourages landowners to "sign up" for treatments, in an effort, it appears, to attract contract bids for the aerial effort, and perhaps to lower the per acre cost overall. Without inclusion of information about how APHIS selects nymphal survey points, how it determines which nymphal survey points are at an "economic" threshold, and how APHIS delineates treatment blocks and accounts for areas between survey points, we have legitimate concern that unjustified treatment may be occurring, with repercussions for sensitive ecological systems.

***Recommendation:*** Available data suggest that APHIS does not have adequate support to demonstrate that it treats only after lands reach an "economic infestation" according to its own definition. In addition, there appears to be insufficient support to demonstrate that APHIS will meet an economic threshold before treating. APHIS must disclose its procedures for determining when a spray block has been identified as meeting the level of economic infestation according to its definition, and APHIS must demonstrate in its EAs, that each treatment area is justified and meets the economic threshold. On federal lands, costs of protecting the forage must be compared to the revenues received for the program. If site-specific data such as rangeland productivity are not available or current, APHIS should use known values from recently available comparable data. In addition, if insecticide applications are proposed to suppress grasshoppers, APHIS should also explore other options as an Alternative in the EA, such as buying substitute forage. We are aware that public lands are sometimes treated as a way to protect adjoining private lands. This is troubling; public lands should not be subjected to large-scale treatments to protect private interests.

*Please see APHIS' responses to comments 1 & 4 above.*

*This comment is similar in nature to comments in the 2020 EAs, please see the APHIS responses to comments 3, 4, 5, 6, 7, 8 from the Xerces section of Appendix D in the 2020 EAs.*

*The analysis provided by the commenter assumes all lands treated by APHIS in Utah are public. This is not the case. Private lands are often included in treatments in order for them to make biological sense. The private landowners pay a direct portion of treatment costs as well as a cost share with the Utah Department of Agriculture and Food. Therefore, the assumptions made in the analysis provided by the commenter are an overestimate to the taxpayer. The value of the forage is not based only on the grazing fees assessed by BLM or FS. There are a range of additional costs associated with replacement feed, the cost of hay, the cost to ship the hay, the cost and labor to move the hay to the rangeland, the cost of moving the cattle from the grazing allotments, the cost to provide or build a hay barn to store the hay, the cost of forage loss to wildlife, etc. The replacement feed costs in Utah greatly outweigh any treatment costs accrued by the agency. Furthermore, the Plant Protection Act of 2000 does not give authority to APHIS to purchase replacement feed for ranchers, only provides funding, when available, to suppress outbreak populations of grasshoppers to save forage. In Utah there are no overhead or*

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*administrative costs associated with the ground treatment costs provided by APHIS. The administrative costs associated with contractors providing aerial treatments are minimal due to pre-treatment efforts and permanent staffing hours not included in the costs. In Utah only the direct costs are associated with ground treatments. The IPM Manual prepared by USDA discusses the cost benefit analysis for grasshopper suppression programs.*

**Comment 8**
USDA-APHIS received 1 comment concerning:

**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.**
In its EAs, APHIS states:

*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.*

Common practice in risk assessment includes use of models to understand potential environmental concentrations, and comparing these to known toxicity endpoints for species or taxa of interest. Another method is the use of field studies, with controls and/or pre and post treatment assessments to understand treatment effects.

APHIS did not utilize models of exposure in concert with toxicity endpoints to bolster its statement. Models do raise concern for bee mortality and for sublethal effects. As we described in our comments on the 2021 EAs, at either the higher or lower application rates allowed by APHIS, diflubenzuron deposition on flowers and pollen (in the absence of drift or wind) is estimated to range from 1.32 – 1.76 mg/kg (equivalent to 1320-1760 ppb). Adults will collect contaminated pollen and place it in nests for consumption by developing juveniles. Comparing these deposition rates with EPA-reported toxicity endpoints, we determined that diflubenzuron at these rates would pose an acute dietary risk quotient of 4.9 and a chronic dietary risk quotient of 33.99. (A threshold value is 1.0.) Risk quotients this high above 1.0 indicate a high concern for exposed bees.

We also utilized deposition values using the point zero and point 500 feet analyses presented in the APHIS drift analysis included in its 2010 BA to NMFS. Even at 500 feet from the spray, we estimate acute dietary larval RQ as 2.4 and chronic dietary RQ larval RQ as 16.6.

An acute risk quotient (RQ) of 1.0 (or higher) indicates that the estimated environmental concentration is sufficient to kill 50% of exposed bees. The Level of Concern (LOC) is an interpretation of the RQ. Normally the LOC is established at RQ=1.0. However for acute risk to bees, because of bees' great ecological and agricultural importance, combined with concern about the risks posed to them by pesticides, EPA sets the LOC value at RQ=0.4. Using the deposition estimates above, larval acute RQs range from 2.8 – 4.9 (7-12X the EPA LOC threshold) within sprayed swaths, depending on drift. Outside of sprayed swaths, even 500 foot distant from a spray, the RQ estimate is 2.4, which is 6X the EPA Level of Concern.

Chronic risk to bees is evaluated with an LOC at RQ=1.0 (USEPA 2014). As indicated in our comment letter from 2021, even at 500 feet from the application site, using APHIS predictions for deposition,

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chronic RQ is estimated at 16.6. At the release site, assuming drift, the chronic RQ is estimated to be 19.1, assuming no drift it would be 34 at the full rate. RQs are thus 17-34X the EPA Level of Concern. **Risk quotients this many times the LOC values indicate a potential for mortality and chronic harm to exposed bee larvae.**

Managed bees may also be at risk; data shows that the alfalfa leafcutting bee (*Megachile rotundata*) and the alkali bee (*Nomia melanderi*) are both considered more susceptible than honey bees or *Bombus to* diflubenzuron. APHIS acknowledges the risk to managed bees in the 2022 EAs by by including notification to all apiarists before a treatment. However, APHIS then provides a contradictory and misleading statement that diflubenzuron is expected to have “minimal risk” to pollinators.
APHIS left out or misrepresented important studies examining pollinator impacts. For example, APHIS misrepresented an important study of diflubenzuron on bumble bees (Mommaerts et al. 2006). The Mommaerts study found drastic reproductive failure at concentrations that would be expected from program rates.
Other studies that have examined diflubenzuron impacts to pollinators are also left out or not adequately treated in the EAs. For example, Camp et al. (2020) found that *Bombus terrestris* microcolonies fed with diflubenzuron resulted inhibited of drone production. Litsey et al. (2021) examined the impact to honey bee workers that had been exposed as larvae to chronic sublethal doses of insect growth disruptors. Bees developmentally exposed to diflubenzuron had lower adult survival relative to controls.

APHIS also left out the results from one of the most important field studies examining diflubenzuron, Graham et al. (2008), the largest field study of diflubenzuron ever conducted in Western rangelands. Graham et al. (2008) found that treated areas resulted in significantly lower abundance of non-ant Hymenoptera (this group includes bees) at two of the three treated sites compared to untreated areas. Lepidoptera (butterflies and moths) also showed lower abundances in sprayed zones. Other groups that also perform pollination were affected as well. For example, the study reported that flies and predatory and parasitic wasps were significantly lower in treated areas shortly after treatments and one year post-treatment.

Many of the effects noted in Graham were observed 1-year post treatment, a lag effect which is not unexpected since diflubenzuron acts to impede arthropod development, rather than killing adults directly.

Nearly all of the other studies of diflubenzuron impacts on non-targets cited by APHIS that were conducted in Western rangelands were of very small scale (40 acres or less) or were barrier treatments (not a method used in APHIS rangeland grasshopper suppression). Small acreage studies are of little use in gauging treatment impacts especially to more mobile invertebrates since small tested acres can be easily recolonized from the edges.

Considering that bumble bees (and other native bees) have inherently low fecundity, recovery may be slow in and near suppression areas. As a result, we have concerns that population level impacts could occur to already declining native bees, resulting in potential impact to other species, such as flowering plants.

Lepidoptera also pollinate, if incidentally. Adults consume nectar while larvae eat leaf tissue. Lepidopteran larvae are not relatively protected in nests while developing (like bees are) but are fully exposed to the elements.
While studies of diflubenzuron effects to non-pest lepidopteran species can be hard to find, several studies of this chemical on pest species are identified in Eisler (1992). Eisler identified the following concerning results from published studies:
• In studies on Gypsy moth, all larvae died when exposed at 100 ug/kg food (100 ppb)
• Cabbage moth (*M. brassicae*), 90% larvae died when exposed to 2200 ppb in spray (3rd instar)

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• Large white butterfly (P. brassicae), 50% of larvae died at 390 ppb.

The results from the gypsy moth and large white butterfly studies were conducted with exposures expected from applications under this grasshopper suppression program, while the cabbage moth study utilized a rate slightly higher than what would be expected from a full rate application with no drift (Table 1).

These results, which were not identified in the EAs when APHIS discussed risk to pollinators, lend additional urgency to the need for APHIS to seriously reconsider the effects of diflubenzuron on pollinators.

***Recommendation:*** Faced with significant and concerning pollinator declines, APHIS must better take into account the risk to native bees and butterflies from these treatments. APHIS should be presenting a more thorough and accurate analysis on the impacts of selected pesticides to pollinators and other beneficial insects. Research findings do portend worrying results for native pollinators and other beneficial insects exposed in the treated areas, even for diflubenzuron. APHIS should constrain its treatments to take into account pollinator conservation needs—especially where species of greatest conservation need are located—and improve its monitoring capability to try to understand what non-target effects actually occur as a result of the different treatment.

*This is the same comment from the 2021 EAs, see response to comment # 9 & 13 of the 2021 EA, and APHIS responses to comments #10, 12, 14, 19, 20, 25, 28, 37 and 40 in the 2020 EAs.*

*APHIS understands the commenter's concern that using diflubenzuron to control rangeland grasshoppers could affect populations of non-target insects. The U.S. Geological Survey study cited (Graham et al. 2008) did not find direct effects of diflubenzuron on arthropod communities. The researchers concluded, "At the order level, no consistent patterns of difference in proportional representation between treated and untreated sites at any of the three study areas indicate that treatment with diflubenzuron affects nontarget arthropods." The researchers collected data at three rangeland field sites. At one of these study areas, Grouse Creek, they were able to conduct pre-treatment and post-treatment surveys. The other two study areas had been treated the prior year, and so only post-treatment data was collected. At Grouse Creek no significant differences in pre- and post-treatment arthropod numbers occurred within the sprayed zone. Total arthropods did not differ in the sprayed zone. Only Orthoptera showed a decrease from pre- to post-treatment numbers in the sprayed zone, indicating that diflubenzuron did accomplish the management goal of decreasing Orthoptera numbers in the sprayed zone. APHIS appreciates the commenter sharing this study that further affirms the use of diflubenzuron to selectively control grasshoppers and Mormon crickets.*

*The commenter may have noted the researcher's post-treatment comparisons of unsprayed and sprayed zones showed that spiders and non-ant Hymenoptera were significantly more abundant in the unsprayed zone following application of diflubenzuron. However, there were statistically significant differences in average abundance for the Hemiptera, non-ant Hymenoptera, and Orthoptera in the untreated and treated zones before the treatments.*

*APHIS wishes to clarify that while the researchers found the average numbers of Lepidoptera, Scorpions, and total arthropods differed markedly in the sprayed and unsprayed zones, but not to*

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*the point of statistical significance. The commenter expressed concern that Lepidoptera were more abundant in the unsprayed zone, but the researchers attributed this post-treatment difference to inherent differences in the Lepidoptera communities of the two zones. Based on the findings of this research, APHIS does not believe rangeland grasshopper treatments using diflubenzuron will have significant impacts on the environment.*

## Comment 9

USDA-APHIS received 1 comment concerning:

**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.**

This EA and the EIS suggest that the use of untreated swaths will mitigate impacts to natural enemies, bees, and other wildlife. For example:

● Final EIS p. 34: *"With less area being treated, more beneficial grasshoppers and pollinators will survive treatment."*
● Final EIS P. 57: "*The use of RAATS provide additional benefits by creating reduced rates and/or untreated swaths within the spray block that will further reduce the potential risk to pollinators."*
● Final EIS p. 26. *"Studies using the RAATs strategy have shown good control (up to 85% of that achieved with a traditional blanket 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).*
● Utah 2021 EAs: *"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."*

However, the width of the skipped swaths is uncertain, as there is no minimum width specified. APHIS' citation of a study by Lockwood et al. (2000) to claim that RAATS treatments result in "a markedly higher abundance of non-target organisms following application" appears to be far too rosy an assessment. We note that:

• The study authors make clear that reduced impact to non-target arthropods was "*presumably due to the wider swath spacing width* [which measured 30.5 and 60 m in the study]"**.** Obviously, these swath widths are on the high end of what could be used under the EAs.
• APHIS leaves out one of the key findings of the study: For carbaryl, the RAATs treatment showed *lower* abundance and biomass of non-targets after treatment compared to the blanket treatments on one of the two ranches at the end of the sampling period (28 days). Also, on both ranches, abundance and biomass reached their lowest points at the end of the study after treatment with carbaryl, so we don't know how long it took for recovery to occur.

Moreover, many features of the study make it less than useful for predicting impacts under APHIS' current program. We note that:

• This study only investigated RAATs effects to non-targets for carbaryl, malathion, and fipronil, not on diflubenzuron.
• In addition, the study measured highest wind speeds at 6.0 mph, well below the maximum rate allowed under the operating guidelines indicated in the 2022 Treatment Guidelines (10 mph for aerial applications, no maximum wind speed specified for ground applications).

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• The experimental treatment areas in the study (243 ha or 600 acres) were quite small compared to aerial treatment sizes that occur in reality (minimum 10,000 acres for aerial treatments). This could have allowed for recolonization from around the edges that would result in more rapid recovery, compared to a real-world treatment, some of which measure tens of thousands of acres.

APHIS also cited Deneke and Kyser (2011) to justify its statement that RAATs results in a "markedly higher abundance of non-target organisms following application." Deneke and Kyser's publication is an extension publication, not a research publication, and contains absolutely no data to show that RAATs conserves non-targets.

Neither the EAs nor the 2019 EIS presented estimated environmental concentrations (EECs) in the untreated swaths and simply included statements that untreated swaths would reduce risk to nontargets. To fully understand expected environmental concentrations in treated swaths, it is important to have a clear assessment of drift under the conditions that occur under the APHIS grasshopper program. While APHIS' 2019 EIS described its use of a quantitative analysis of drift anticipated from ULV aerial applications (see HHERA for diflubenzuron) to estimate deposition into **aquatic areas**, the information presented in the EIS and HHERA is insufficient to fully understand expected environmental concentrations **in untreated swaths**. To better understand this issue, we looked more closely at several drift analyses and studies to better understand the potential for drift.

a) EPA (2018) in its most recent ecological risk assessment for diflubenzuron, included a low volume aerial drift analysis using the model AgDrift. EPA assumed a volume mean diameter (VMD) of 90 µm [note that this is approximately 2/3 of the VMD used in the APHIS analysis]. Under EPA's analysis, the drift fraction comprises 19% at 150 ft. However, this analysis is likely not helpful for most aerial APHIS grasshopper program applications, as the EPA analysis is based on a boom height of 10 feet while APHIS aerial release heights are typically much higher.

b) Schleier et al. (2012) performed field studies to measure environmental concentrations of ground-based ULV-applied insecticides. Sites contained little vegetative structure and a flat topography. The authors observed that an average of 10.4% of the insecticides sprayed settled out within 180 m (591 ft.) of the spray source. According to the authors, these results are similar to measurements in other studies of ground-based ULV applications using both pyrethroid and organophosphate insecticides, which found 1 to 30% of the insecticide sprayed deposits on the ground within 100 m (328 ft) of the spray source.

c) According to information APHIS provided to NMFS in a 2010 Biological Assessment (obtained through a FOIA request), aerial release heights may reach 75' above the ground (APHIS 2010). Modeling of drift using aerial methods and a 75' release height was conducted using the model AgDISP in this BA; modeling using ground methods was conducted using the model AgDRIFT. In both cases the droplet size was set as "very fine to fine" which corresponds to a Volume Mean Diameter (VMD) of 137.5 um.

Outputs from the models are very difficult to interpret from the information in the BA which is only presented as a chart with the y-axis at a scale too coarse to adequately interpret the results and decline at different points distant from the spray. However, for the aerial diflubenzuron application, it appears that the model predicts deposition at point zero (below the treated swath) to be approximately 1 $mg/m^2$. APHIS states subsequently that the model predicts deposition at 500 feet to measure 0.87 mg/m2. Translated into lb/acre this means a deposition of 0.009 lb/A at point zero and 0.0078 lb/acre at 500 foot distance, with approximately a straight line of decreasing deposition between those two points.[2]

[2] We use these figures later in estimating the effect of these estimated environmental concentrations on non-target pollinators.

According to drift experts, the most important variables affecting drift are droplet size, wind speed, and release height (Teske et al. 2003). In analyzing these three drift analyses, we note that neither the Dimilin

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2L label nor the Sevin XLR Plus label requires a minimum droplet size for ULV applications on grasslands and non-crop areas, for the control of grasshoppers and Mormon crickets. However, other uses of ULV technology for pest control assume much smaller droplet sizes than what APHIS has assumed (VMD of 137.5). For example, for ULV applications used in adult mosquito control operations, VMD measures between 8 and 30 µm and 90% of the droplet spectrum should be smaller than 50 µm (Schleier et al. 2012). EPA estimates VMD for ULV applications as 90 µm (USEPA 2018).

The EPA analysis is of very limited utility based on the release height, as pointed out above. And while it is helpful to have the APHIS AgDISP analysis, we believe it—and the EIS and EAs that appear to rely on it—likely underestimates drift, and the resulting risk to non-targets within skipped swaths, as a result of several factors:

• The APHIS AgDISP analysis only analyzed deposition at the lower end of the application rate corresponding to 0.75 oz/acre (0.012 lb/A) rather than the upper end of the application rate that corresponds to 1 oz/acre (0.016 lb/A) which is a rate often specified in contracts.

• The APHIS aerial AgDISP analysis was conducted with a VMD of 137.5, far larger than those predicted for other ULV analyses. APHIS never explains exactly why.

• The number of flight lines are not specified in the input, yet according to the AgDrift user guide, "*the application area (swath width multiplied by the number of flight lines) can potentially have a major impact*" on drift (Teske et al. 2003).

• APHIS Program operational guidelines (included as an appendix in the EAs) do not specify any minimum or maximum droplet size therefore it is unknown what nozzles are actually being used and what droplet sizes are actually being emitted.

In conclusion, APHIS has not presented evidence that its RAATs method, even with skipped swaths 200 feet, will "provide additional benefits" or significantly increase the survival of pollinators or other beneficials within the treated blocks. Given the enormous size of many treated blocks (a minimum size for aerial treatments is typically 10,000 acres, while treatment blocks of 100,000-150,000 acres are not uncommon in some states) and the limited mobility and small home ranges of many terrestrial invertebrates, it is essential that AHIS conduct a rigorous assessment of drift into untreated swaths and compare that to toxicity endpoints for representative species.

**Recommendation:** APHIS should commit to minimum untreated swath widths wide enough to meaningfully minimize exposure to bees and other beneficials. APHIS must use science-based methodologies to assess actual risk from the proposed treatments and institute untreated swaths that would ensure meaningful protections for bees and other beneficials. APHIS should disclose its quantitative analysis and the EECs it expects--by distance-- into untreated swaths for each application method it proposes. APHIS must also specify in its operational procedures the use of nozzles that will result in droplet spectra that accord with its analysis.

*The commenter provided the same comment for the 2021 EAs. 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.*

*The commenter is correct that APHIS believes the use of RAATs mitigates the risk to non-target insects including pollinators. However, APHIS does not solely rely on the reduced deposition of pesticides in the untreated swaths to determine the potential harm of grasshopper treatments will not cause significant impacts. The environmental consequences risk analysis of carbaryl and diflubenzuron treatments using conventional methods (total area coverage and higher*

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*application rates) is provided on pages 18-24 of the 2022 EAs. Additional descriptions of APHIS' analysis methods and discussion of the toxicology can be found in the 2019 EIS.*

*The commenter has expressed concern that APHIS' analysis modelling drift does not use the same variables values as similar analysis conducted by the US EPA. APHIS must explain that the EPA analysis is for general use of ULV pesticides while APHIS' analysis is based on multiple conservative estimations of operational procedures and variables for the grasshopper program. The commenter also cites a study (Schleier et al., 2012) and asserts the insecticide drift modelled and measured by the authors for ultra-low volume mosquito treatments are representative of the potential drift between treated and untreated swaths during a grasshopper suppression treatment using the RAATs method. APHIS disagrees with the commenter's understanding of the study based on the text of the article that states, "Ground-based ULV applications used for adult mosquito management are very different than agricultural pesticide applications because the nozzles produce an aerosol (droplets < 100 µm) and are pointed at a + 45° angle from the horizon. Ultra-low-volume applications used for adult mosquito management are most effective when the insecticide remains airborne and moves through the target area; in contrast, applications for agricultural pests are designed to minimize the movement of droplets (Hiscox et al., 2006)."*

*The commenter appreciates the graphical representation of spray drift provided by APHIS for the purpose of estimating pesticide deposition at various distances from the treated swath. The graphs are intended to explain how APHIS derived no-treatment distances for buffers intended to prevent harm to species protected by the Endangered Species Act. APHIS does not assert that spray drift is reduced to zero in untreated swaths, and that is not represented by the graphs or assumed by the risk analysis cited by the commenter (APHIS EAs, EIS, HHERAs). If the commenter agrees the graphs are reasonable representations of spray drift and wishes to extrapolate the modeling to deposition resulting from APHIS' use of the RAATs method, the exponential drop of pesticide deposition close to the release point is more informative.*

*The skip swath size in the studies are relevant to Utah treatments. For larger treatments, a class C or D aircraft is required, and a standard treatment width would be 150 feet. This means that skip swaths at 50% coverage would be 150 feet and at 33% coverage up to 300 feet. The latter method would have a larger skip than the largest measured in the study but would only be applied on the largest scale infestation, specifically for Mormon crickets.*

*For the safety of the applicator, it is a practice in Utah not to treat when the wind is blowing greater than 10MPH to avoid potential exposure as well as minimize incidental drift. Regular environmental measurements (wind speed, wind direction, air temp) are taken before and during a treatment. The minimum swath width for treatments has been described in past EAs as well as under section "II. Alternatives, B. Insecticide Applications at Conventional Rates or Reduced Agent Area Treatments with Adaptive Management Strategy (Preferred Alternative)" of the 2022 EA. The swath width has been described in detail in the above discussion.*

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## Comment 10

USDA-APHIS received 1 comment concerning:

**APHIS fails to acknowledge the high risks of carbaryl (even when applied as baits) to a wide variety of species, including sage-grouse.**

According to EPA (2017b), carbaryl is considered highly toxic by contact means to the honey bee, with an acute adult contact LD50 of 1.1 ug/bee. The APHIS 2019 EIS describes the oral LC50 value as 0.1 ug/bee.[3] Larval bee toxicity was not available from the APHIS 2019 EIS.

[3] Honey bee toxicity values for technical-grade carbaryl are used here since the APHIS EA did not include information on the toxicity of the formulated product that it uses.

We conducted a similar analysis of risk to liquid carbaryl to bees in our 2021 comment letter. Even at the deposition rate APHIS expects at 500 feet away from the spray line with a lower nominal application rate of 0.375 lb ai/acre (we have already noted that these predicted deposition rates could be underestimates at that distance, based on empirical data), APHIS would exceed the acute toxicity Level of Concern designated by EPA by 150X. All of the other deposition values have similarly disturbing exceedences of EPA's acute dietary LOC, while contact exposure also shows potential to exceed the LOC. Nowhere within the EA or the EIS is this made clear.

Given the lack of disclosure and the unacceptably high acute risk quotients reached with these deposition rates, carbaryl spray is an unacceptable option. A study by Abivardi et al. (1999) looked at the effect of carbaryl contact toxicity to recently emerged adult codling moths (*Cydia pomonella*), finding that at 187.5 ng/cm$^2$ (which is equivalent to 0.016 lb/ac—the same as the highest application rate under the grasshopper program), more than 70% of exposed male moths died within 24 hours, while these rates killed 30% of the females within 24 hours.

Carbaryl baits are thought to pose less exposure to bees as the large size of the flakes means most particles would not be collected deliberately. Still, the potential for the bait to dissolve in nectar or for small particles to be picked up incidentally and mixed with pollen exists. Peach et al. (2008) found significant mortality to larval alfalfa leafcutter bees fed with pollen-nectar provisions (30% at 2 mg carbaryl; 18% at 1 mg carbaryl; control had 11% mortality). It is unknown how bait that may fall into ground nests affect bees. This is yet another study that APHIS left out of its analysis.

Carbaryl baits pose risks to other insects. Quinn et al. (1991) examined the effects of large scale aerial treatments of carbaryl bait on carabid ground beetles (many of these are predaceous, others eat weed seeds). Baits resulted in large effects on ground beetles, with the most abundant species (*Pasimachus elongatus*, a predator species) declining by 75% in baited areas, while remaining unchanged in untreated areas. The second most abundant species (*Discoderus parallelus, unknown food habits)* also declined by 81% in the treated areas, while increasing in the untreated areas. Effects disappeared by the 2nd year. The authors attributed the lack of a carryover effect in the second year to the timing of the control treatments, (they surmised that the beetles had reproduced prior to treatments), and to in-migration into the treated areas.

Coleoptera (beetles) are important for a variety of ecological roles - food for sage-grouse and other species, as well as dung burial and recycling, and some are also predators on other insects. Peterson (1970) identifies Coleoptera, Orthoptera (grasshoppers), Hymenoptera (primarily ants), and a variety of unidentified and immature insects as the most frequent components of sage-grouse chick diets based on crop analysis in Montana. Thus impacts to beetles and grasshoppers from carbaryl baits raise important concerns for effects to declining sage-grouse.

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There is evidence that Mormon cricket do not pose a significant risk to rangelands (McVean 1991). Therefore, bait treatments for Mormon crickets on rangelands are likely not justified, particularly given the likely large impact to sensitive species such as sage-grouse.

**Recommendation:** APHIS must recognize the ecological impacts of applications of carbaryl bait, which remains in widespread use in several states. To more effectively target non-mobile species such as Mormon crickets, APHIS should avoid block treatments and focus on barrier treatments. In addition, APHIS should limit its treatments to only areas near cropland, and work with landowners on proven methods to protect their crops as outlined in many extension documents.

*The commentor submitted similar comments to the 2021 EAs. See responses to comments #6, 8, 10, 11, and 12.*

*The commenter cites their previous risk analysis which APHIS did not find convincing. APHIS invites them to share their modelling assumptions and inputs in their EA comments so the agency can properly respond. APHIS notes that as is appropriate for a Tier 1 risk screening tool, BeeREX is a very conservative method for estimating residues on pollen and nectar.*

*APHIS recognizes that there may be exposure and risk to some pollinators at certain times of the application season from liquid insecticide applications used to suppress grasshopper and Mormon cricket populations. APHIS reduces the exposure and risk to pollinators by using rates well below those labeled for used by EPA. Current labeling for grasshopper treatments also allows multiple applications per season. APHIS uses one application per season, further reducing the risk to pollinators when compared to the current number of applications that can be made in a year to rangeland. Currently, APHIS does not foresee treatment of large areas or grasshoppers or Mormon crickets in Utah during 2022. If treatments were necessary, the size of the treatment blocks would be miniscule (substantially less than 1%) compared to the amount of rangeland in Utah. APHIS believes the commenter's concerns about the direct and indirect effects of carbaryl on vertebrate species are exaggerated, and do not represent realistic potential significant impacts to the human environment.*

## Comment 11

USDA-APHIS received 1 comment concerning:

**Impacts to Greater Sage-grouse are not sufficiently explored nor is sage-grouse and their habitat sufficiently protected under the EAs.**

Greater Sage-Grouse has seen its range cut in half and its population decreased 93 percent from historic numbers. An agreement is in place to prevent ESA listing through implementation of state-based conservation strategies. Large areas of Utah are designated as Greater Sage-Grouse Management Areas.

Sage grouse chicks are dependent upon several orders of insects until they mature enough to eat sagebrush. Peterson (1970) identifies Coleoptera, Orthoptera (grasshoppers), Hymenoptera (primarily ants), and a variety of unidentified and immature insects as the most frequent components of sage-grouse chick diets based on crop analysis in Montana. Greg and Crawford (2009) identified Lepidoptera as important components associated w/ chick survival.

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Protecting habitat within 4 miles of the leks is especially important. After coming to the leks to mate, the females nest in the general vicinity of the leks, depending on the availability of suitable habitat. According to www.sagegrouseinitiative.com, most nesting occurs within 3 miles of leks, though some nests may be as far as 12 miles from the nearest lek.

Under the 2022 EAs it is clear that leks are not adequately protected in Utah from aerial application of insecticides, even though these and surrounding areas are where most of the chicks are produced and where it is especially important that food sources include the insects that sage grouse chicks most need (grasshoppers, beetles, Lepidoptera, ants, and other insect species).

The EA states that RAATs treatments would be permitted in designated sage-grouse core areas, but the RAATS as described in Appendix B is defined very loosely. It could mean reduced area, but we do not know how much reduced. It could mean reduced rates, or it may not. To add to this confusion, APHIS does not cite any data or studies to back up its assertion that effects to nontarget insects would be "reduced" in a way meaningful to sage grouse conservation.
APHIS does not disclose that studies do suggest effects to sage-grouse from grasshopper treatments. Johnson (1987) found that insect reduction as a result of rangeland grasshopper control reduced brood sizes in a wild sage-grouse population

Other studies show that several of the groups of insects relied on by chicks, especially grasshoppers, beetles, and Lepidoptera, are adversely affected by diflubenzuron sprays, even when RAATs are employed. The most robust studies of diflubenzuron (Graham et al. 2008) and carbaryl bait (Quinn et al. 1991 and 1992) replicated real-world APHIS treatments and tested the chemicals across thousands or tens of thousands of acres, sampled comparable unsprayed areas as controls, and conducted sampling a year after treatment to test for lag effects and recovery. These studies found that orders of insects important to sage-grouse (and other species) were diminished due to the effects of grasshopper suppression. For example:

*Carbaryl bait:* Quinn et al. (1991) examined the effects of large scale aerial treatments of carbaryl bait on carabid ground beetles (many of these are predaceous, others eat weed seeds). Baits resulted in large effects on ground beetles, with the most abundant species (*Pasimachus elongatus*, a predator species) declining by 75% in baited areas, while remaining unchanged in untreated areas. The second most abundant species (*Discoderus parallelus, unknown food habits)* also declined by 81% in the treated areas, while increasing in the untreated areas. Effects disappeared by the 2nd year. The authors attributed the lack of a carryover effect in the second year to the timing of the control treatments, (they surmised that the beetles had reproduced prior to treatments), and to in-migration into the treated areas).

*Diflubenzuron*. Graham et al. (2008) found that treated areas resulted in significantly lower abundance of bees compared to untreated areas. Lepidoptera (butterflies and moths) also showed lower abundances in sprayed zones. Overall, the authors concluded that Coleoptera, Diptera, Hemiptera, non-ant Hymenoptera, Lepidoptera, Orthoptera, and Scorpiones, may be more susceptible to diflubenzuron. Differences between sprayed and unsprayed zones were greater when sampled a year after diflubenzuron application, suggesting that the effect may lag behind application. Non-ant Hymenoptera (including bees and predatory and parasitic wasps) were significantly lower in treated zones at two out of three treated sites. Ants showed differences at the genus level in their responses to diflubenzuron treatment. Some genera (for example, *Forelius*) had higher numbers in sprayed zones, while the abundance of other genera (for example, *Tapinoma*) was lower in sprayed zones. *Formica* and *Tapinoma* tended to have lower numbers in treated zones, while *Forelius* and perhaps *Pheidole* tended to increase in treated zones.

**Recommendation*:*** APHIS should address the deficiencies in its EAs, and implement stronger protections for sage-grouse. Since most chick rearing happens within a certain distance of leks, APHIS should

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implement firm no-treatment 4-mile buffers around leks (or wider to protect against drift) that prohibit the use of any insecticide. There is too much risk from the use of diflubenzuron to allow its use within chick-rearing areas. And the risks from carbaryl bait are outlined above.

*See previous response to comment 11. The commenter assumes extensive sage brush rangeland will be treated for grasshoppers or Mormon crickets in Utah during 2022. If rangeland treatments are necessary, the size of the treatment blocks would be miniscule (substantially less than 1%) compared to the amount of rangeland in Utah. Birds are highly motive predators and will search for prey in areas within the treatment blocks where APHIS does not spray pesticides. For example, the skip swaths where the RAATs method is employed or within protective buffers established around water resources or other sensitive sites. Historically, there have not been economically damaging grasshopper populations in these large sagebrush habitat locations due to lack of grass and forb species which the grasshopper species feed on.*

*Under ESA Section 7 there is no requirement to consult on sensitive species. However, in Utah when there is concern by land management agencies (federal, state, etc.) for certain species, APHIS implements protective measures for those species of concern when warranted.*

## Comment 12

USDA-APHIS received 1 comment concerning:

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

Prior to chemical suppression of grasshoppers in the Americas, grasshoppers were regulated primarily by natural processes, including natural enemies such as birds, predatory insects, diseases, and even competition with other grasshoppers.

Chemical suppression of grasshoppers runs the very real risk of disrupting these important natural regulation processes, potentially setting the stage for worsened outbreaks in the future. This is not an idle thought – this possibility has explored by respected grasshopper researchers in a number of publications. For example, see Joern (2000) who discussed this information and concluded that large-scale grasshopper control may contribute to grasshopper problems. An analysis of adjoining Montana and Wyoming counties supported this analysis, showing that where large-scale chemical control was not regularly applied, acute problems rapidly disappeared and long intervening periods of low grasshopper density persisted. Conversely, in places where a history of control existed, chronic, long-term increases in grasshopper populations were observed (Lockwood et al. 1988).

Lockwood et al. (1996-2000) explored identified infested areas, their sizes and what happened to them in subsequent years. Data was presented for 15 untreated and 4 treated areas. Of these, only two untreated areas grew in size in their 2nd year, and most winked out by the 2nd year, not reappearing by the 3rd year. This is powerful evidence that not treating is a viable decision, or that treating is not warranted in the first year, at least for small infestations, and at least if the goal is to minimize the chance that an outbreak/hotspot would result in something worse in the following year.

APHIS often stretches science to the point beyond where it is credible. For example, APHIS cites a study by Catangui et al. (1996-2000) which investigated the effects of Dimilin on non-target arthropods at concentrations similar to those used in the rangeland grasshopper suppression program. In APHIS' characterization, the study showed that treatment with Dimilin should be of no concern since applications

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resulted in "minimal impact on ants, spiders, predatory and scavanger beetles." However, APHIS does not disclose that the plots studied by Catangui measured only 40 acres. This is a far cry from the ground treatments normally measuring thousands of acres or the aerial treatments measuring a minimum of ten thousand acres that are seen in the actual grasshopper suppression program. Small treated plots of 40 acres can be quickly recolonized from the edges. Large treated plots are quite a different story.

In contrast the field study of large scale applications by Graham et al (2008) found significant effects to important natural enemies of grasshoppers, including Diptera, and non-ant Hymenoptera. These groups contain important predators and parasitoids of grasshoppers and other organisms. These are the very organisms that help regulate grasshopper populations.

Quinn et al. (1993) examined the co-occurrence of nontarget arthropods with specific grasshopper nymphal and adult stages and densities. The study reported that nymphs of most dominant grasshopper species were associated with Carabidae, Lycosidae, Sphecidae and Asilidae, all groups known to prey on grasshoppers. The authors state that "*the results suggest that insecticides applied to rangeland when most grasshoppers are middle to late instars*[4] *will have a* ***maximum impact on nontarget arthropods****.*" [Emphasis added]

[4] Note that applying during this developmental stage is a necessity with the use of chitin-inhibiting insect growth regulators such as diflubenzuron.

Large scale treatment effects on ground beetles were investigated by Quinn et al. 1991. While this study was more akin to real-life treatments in the design, and found that initial large effects on ground beetles had disappeared by the 2nd year, this study did not investigate diflubenzuron, only malathion, carbaryl bait. The authors also state that "*the lack of a carryover effect in the second year is most likely due to the timing of grasshopper control treatments…adult ground beetles probably were very active several weeks before the treatment date and may have already reproduced before treatments were applied. Insects may also have immigrated into the evaluation plots after treatment.*"

Since diflubenzuron would kill juvenile stages of insects and is more persistent than either malathion or carbaryl, it could have quite a different effect than these two chemicals. Therefore this study cannot be relied upon to assume that recovery would be similar to recovery under a carbaryl or malathion treatment.

Researchers even warned about the potential for treatments to worsen outbreaks in the Grasshopper IPM handbook. In Section IV.8 (Recognizing and Managing Potential Outbreak Conditions) Belovsky et al. cautioned:
*"Pest managers need to consider more than the economic value of lost forage production or the outcry of individual ranchers. Grasshopper control might provide short-term relief but worsen future problems in these environments. From GHIPM findings (see VII.14), it appears that grasshopper populations in these environments have a high potential for being limited by natural enemies. Pesticide applications that reduce grasshopper numbers could also reduce natural enemy numbers directly by outright poisoning of the invertebrate natural enemies, or indirectly by lowering the numbers of vertebrate predators as their invertebrate prey are reduced. Therefore, the ultimate result of control efforts could be an increase in grasshopper numbers for the future, as they are released from the control of natural enemies."*

**Recommendation**: In its EAs, APHIS must address the role of natural enemies, their ability to regulate grasshopper populations, and the risk to these natural enemies posed by chemical treatments. APHIS must not stretch the science beyond where it is credible. APHIS should work with its research arm and research partners to conduct meaningful research exploring natural enemies, competition, and other natural processes that hold the potential of regulating grasshopper populations without the use of chemicals.

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*The commenter expressed similar concerns about the 2021 EAs. Please see the APHIS response to comment # 7 in the 2021 EAs.*

**Comment 13**

USDA-APHIS received 1 comment concerning:

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

McAtee (1953) examined 40,000 bird stomachs and reported that >200 spp prey on grasshoppers. Such avian predators of grasshoppers include species often seen in Western areas, such as kestrel, and meadowlark. Avian predators of grasshoppers also include grassland birds in decline, that merit special consideration, including sage-grouse, Swainson's hawk, Sprague's pipit, Baird's sparrow, chestnut-collared longspur, long-billed curlew, sage thrasher, and others.
According to McEwen (1987), grasshoppers are especially important for the raising of young by the majority of bird species. McEwen et al. (1996) cites a number of resources in stating that bird predation commonly reduces grasshopper densities on rangeland by 30-50 percent.

Despite this strong linkage between grasshoppers and the health of rangeland bird communities, APHIS only analyzes the direct toxic effect of insecticidal treatments to birds, and fails to analyze the indirect effects from loss of forage to these declining bird species.

APHIS claims that use of RAATS (again not strictly defined in Alternative B therefore very squishy in its possible implementation) would leave an adequate prey base for these declining bird species, even though the EAs simultaneously state that RAATS only reduces grasshopper mortality slightly compared to conventional application.
Based on the drift information we have seen and presented elsewhere in this comment letter, and the likelihood of at least short-term effects to the prey base that is documented in a variety of studies, we question the conclusion that RAATs treatments with diflubenzuron within sage grouse areas would not be likely to have a significant impact.
For example Sample et al. (1986) examined the effects of diflubenzuron exposure to nine species of songbirds. The data showed that while diflubenzuron is not directly toxic to vertebrates, birds were affected indirectly through reduced availability of Lepidoptera larvae. Birds possessed differing capabilities to compensate for these diflubenzuron-induced food reductions. Most birds adjusted by switching prey, while others consumed less food.

A recent study estimated a net loss of nearly 3 billion birds since 1970, or 29% of 1970 abundance in North America (Rosenberg et al. 2019). It is critical to recognize that grassland birds—an important group of species that extends well beyond the iconic sage grouse—have suffered the largest decline (53%) among habitat-based groups since 1970, while populations of six species of grassland birds (Baird's sparrow, Cassin's sparrow, Chestnut-collared longspur, lark bunting, Sprague's pipit, and McCown's longspur) have declined by 65-94%. This is never disclosed in the EAs nor considered in the cumulative effects analysis.

Habitat loss is a huge driver of declines, yet pesticides still play a role (Hill et al. 2013), especially if their prey is affected. Birds are themselves 'free' insect control as described above (also see Bock et al. 1992), hence negative effects for birds could actually increase insect pests.

***Recommendation**:* APHIS must address the potential for indirect impacts to rangeland birds, factoring in the declines documented for birds that occupy lands subject to treatments, looking closely at how the

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scale of treatments may impact populations, and considering the cumulative impact of insecticide exposure to prey in combination with existing stressors.

*The commenter expressed similar concerns about the 2021 EAs.  Please see the APHIS response to comment # 8 of the 2021 EAs.*

**Comment 14**
USDA-APHIS received 1 comment concerning:

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

APHIS claims that it will adhere to applicable mitigations designed to protect bees that are found on product labels. For example, the Final EIS categorically states that *"Product use restrictions and suggestions to protect bees appear on US EPA approved product labels and are followed by the grasshopper program. Mitigations such as not applying to rangeland when plants visited by bees are in bloom, notifying beekeepers within 1 mile of treatment areas at least 48 hours before product is applied, limiting application times to within 2 hours of sunrise or sunset when bees are least active, appear on product labels such as Sevin® XLR Plus. Similar use restrictions and recommendations do not appear on bait labels because risks to bees are reduced. APHIS would adhere to any applicable mitigations that appear on product labels."*

It should be remembered that bumble bees fly earlier and later in the day than honey bees and limiting application times to within 2 hours of sunrise or sunset may not be protective. In addition, while diflubenzuron is toxic to larval and developing forms of numerous insects, it appears that Lepidoptera (butterflies and moths, many of which are at-risk as emphasized in Xerces' comment letter from 2020) are more sensitive, as a group, than other species.

The Dimilin 2L label instructs the user to "minimize exposure of the product to bees" and to "minimize drift of this product on to beehives or to off-site pollinator attractive habitat." The Sevin XLR Plus label instructs applicators: "Do not apply this product to target crops or weeds in bloom."

However, if treated habitat is flowering and bees are active (as would be anticipated during any of the proposed treatment months), it is not clear how applications for grasshopper/Mormon cricket control can minimize exposure to bees.
Except for reduced rates and/or untreated swath widths, the EAs are silent on how it will avoid impact to pollinators. It has already been shown that within sprayed areas, risk quotients at expected application rates would be well above 1.0. Leaving skipped widths is also not a full solution at expected widths since, due to drift, untreated swaths are highly likely to be exposed to levels above risk quotients (see above comment).
In cropland areas, applicators sometimes minimize exposure to bees by applying at night. From examination of some of the flight records from past grasshopper treatments, it is clear that this is not the norm for the program, at least for aerial treatments.

***Recommendation**:* APHIS must explain how its treatments are in compliance with the pesticide labels, and if necessary, incorporate additional mitigations to ensure that it is not in violation of federal pesticide laws.

*The commenter made similar comments addressed in the 2021 EAs.  Please see the APHIS responses to comment #9 in the 2021 EAs.*

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*The commenter is correct that APHIS believes that the use of RAATs mitigates the risk to non-target insects including pollinators and bees. APHIS does not believe the adherence to product use restrictions removes all harm to these species. APHIS has instead analyzed the benefits of relatively small grasshopper treatments against the potential for significant impact to bee populations within the large areas covered by the EAs. The threat of grasshopper depredation removing sources of pollen and other food items for pollinators and bees over an entire area of infestation will have a much greater impact upon them.*

*The environmental consequences risk analysis of carbaryl and diflubenzuron treatments is provided under the "A. Environmental Consequences of the Alternatives 2. Insecticide Applications at Conventional Rates or Reduced Area Agent Treatments with Adaptive Management Strategy" parts a) and b) on pages 18-24 of the 2022 EAs. Additional descriptions of APHIS's analysis methods and discussion of the toxicology can be found in the 2019 EIS.*

**Comment 15**
USDA-APHIS received 1 comment concerning:

**Endangered Species Act Determinations Based on Incomplete and Scant Reasoning and Some Studies are Mischaracterized.**

The EAs include *Appendix C,* which describes listed species and critical habitat, and provides determinations pursuant to consultation. We appreciate the inclusion of this information in the Utah EAs (many other states did not include such information and it is important that the public be aware of such determinations and the reasoning behind them).
However, the facts and reasoning supporting the APHIS determinations are scant or in some cases specious to the point of being absurd. For example, for the endangered flowering species Autumn buttercup (and several other listed flowering species) APHIS states*: "There are no direct toxic effects from Dimilin, and the indirect effects to pollinators from the use of diflubenzuron are low since it is not toxic to adult insects. Only insect nymphs that undergo incomplete metamorphosis (i.e., grasshoppers/crickets) manifest significant adverse effects at the low doses of APHIS projects."*

Such statements reveal the dearth of even a rudimentary understanding of bee biology and the effects of diflubenzuron on a wide variety of insects that undergo complete as well as incomplete metamorphosis (Eisler, 1992; Graham et al. 2008). The truth is that flowers exposed to diflubenzuron sprays will likely be visited by adult bees, who will bring contaminated pollen to the nest, potentially expose their eggs and larvae to this damaging chemical, potentially destroying their reproductive success for another year, and potentially indirectly harming the chances for the plant to be pollinated. . Such effects cannot be ignored for listed species

APHIS' standard buffers are only applied around water and the distance varies depending on the chemical and the formulation (500 feet is maximum, 50 feet is minimum). Based on information in APHIS' own drift analysis that we obtained through FOIA, we do not believe even a 500-ft buffer is adequate (see (1) below) for protecting listed and proposed species when they rely on arthropods for prey or pollination. Therefore, we urge APHIS to adopt stronger buffers.

With few exceptions, the determinations are not well justified. APHIS must provide better scientific data justifying their determinations, including an assessment of drift potential through the buffer area based on quantitative models or statistically sound monitoring.

Since APHIS has not discussed the potential for diflubenzuron to impact juvenile bees, and the long-term impact of this upon the persistence and viability of the various listed plants, was USFWS apprised about the risks of diflubenzuron to the viability of this species, and will its concurrence be adequately informed?

The short analysis of effects to Yellow-billed Cuckoo acknowledges that caterpillars (the larvae of Lepidoptera) are important food for this listed bird. However, the analysis never acknowledges a study by Tingle (1996) which examined the impacts of diflubenzuron on arthropods. The Tingle study discloses the following:

• analysis of effects was only done on most common taxa at family or order level and that in many cases invertebrates occurred in numbers too small to evaluate statistically.
• Tingle also reported evidence of possible effects on spiders and heteropteran bugs within barriers, lasting over 3 mo and that the relative abundance of both caterpillars [Lepidoptera] and non-target grasshoppers [Acrididae] declined within spray barriers following treatment and remained low for several months. Data from 1994 showed a severe negative impact on lepidopteran larvae within barriers lasting > 3 months.
• The author concluded that adverse impacts on spiders [Araneae] (particularly Salticidae), crickets [Orthoptera; Gryllidae] and bugs [Heteroptera] could not be discounted.

Yellow billed cuckoo also ingest prey items from a variety of other insect orders – several of which were orders, were significantly affected by diflubenzuron grasshopper sprays as noted by Graham et al. (2008). Listed species' protected locations must be mapped out for ground and aerial applicators, including all buffer widths listed in the protective measures it plans to implement to avoid impacts to listed species.

In the 2022 EAs, APHIS references buffers that will be applied to protect listed species, but does not provide any detail on how large these would be and whether they would vary by chemical, formulation or application method. As a result it is impossible for us to evaluate the adequacy of protection for listed species.

It is also unclear if APHIS will institute protections around only known occupied habitat or also around predicted suitable habitat Instituting buffers around predicted suitable habitat would be the prudent course of action for any listed species for which such modeling is available.

Finally, APHIS makes no mention of how it will consider upstream and watershed effects to species that utilize streams or rivers. The diflubenzuron label indicates that the chemical is subject to runoff for months after application. Given this, together with the vast size of APHIS' past treatment areas, numbering in the hundreds of thousands of acres in many cases, such considerations are necessary.

***Recommendation:*** APHIS should reexamine its reasoning in the cases of the plants mentioned above and the Yellow-billed Cuckoo, and ensure that all determinations are supported by thorough analysis especially if a letter of concurrence is not yet available.

In the Final EAs, the letters of concurrence must be attached. APHIS should clarify its protective measures in the Final EA. If USFWS was not aware of modeled or empirical drift calculations, APHIS must provide its information to USFWS in a revised request for consultation. All determinations must be supported by thorough, complete analysis and accurate disclosure of the scientific studies underlying their reasoning. Under the ESA there must be disclosure of potential impacts under the treatments, an analysis of whether the project would jeopardize the continued existence or modify or destroy the critical habitat for each adversely affected listed species, according to any active ingredients that may be selected. Determinations must include an analysis of direct and indirect effects to the listed species. Pesticide

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specific conservation measures for each listed species (actions to benefit or promote the recovery of listed species that are included by the Federal agency as an integral part of the proposed action), where appropriate, should be explicitly addressed and adopted.

APHIS should institute buffers around predicted suitable habitat for any listed species for which such modeling is available. APHIS should include buffers even for ground applications. APHIS should also consider upstream and watershed effects for aquatic species, and institute protections to guard against flushes of pesticide into their habitats.
For each species to be protected within the project area, APHIS must provide to applicators a set of clear directions outlining protective measures for the listed and proposed species found within this project area. In addition to these measures, APHIS should adopt the following operational guideline across all site-specific EAs: *"Use Global Positioning System (GPS) coordinates for pilot guidance on the parameters of the spray block. Ground flagging or markers should accompany GPS coordinates in delineating the project area as well as areas to omit from treatment (e.g., boundaries and buffers for bodies of water, habitats of protected species, etc.)."*

APHIS should also ensure that it has done due diligence in being aware of listed species or their habitat present on private land by asking specifically about this when gathering treatment requests.

*APHIS has been mandated by law to protect rangelands from the damaging effects on forage of Orthopteran infestations. Though project mitigation measures are taken into effect around protected species, the commenter must understand that to further exclude lands from treatment by increasing buffers will increase the risk of grasshopper destruction of protected plants.*

*APHIS must remind the Xerces Society their comments should suggest how program activities could have significant impacts, and the public review process is not a forum to tell the agency how to conduct Endangered Species Act section 7 consultations. APHIS believes sharing the consultation documents has caused the commenter to conflate the different threshold in the risk analysis determinations between the Endangered Species Act (ESA) and the National Environmental Policy Act (NEPA), the latter of which is the relevant standard here. While take of protected species or degradation of critical habitat is prohibited by ESA, the U.S. Fish and Wildlife Service consultation is not the forum for speculation about potential harmful scenarios or suggestions of extra protections measures imagined by the commenter. APHIS wishes to respectfully remind the Xerces Society to provide comments concerning potential overlooked significant impacts to the human environment resulting from the preferred alternative described in the draft EA.*

*APHIS in Utah has consulted with the USFWS for over 30 years and has developed, with their recommendations, protective measures for all T&E and proposed T&E species within the state. All grasshopper and Mormon cricket treatments used in Utah have been analyzed, described and cited in the 2019 EIS. Those treatments along with the protective measures listed for protected species have been determined by APHIS and with concurrence of the USFWS to not likely adversely affect those protected species. Contrary to the claim of the commentor, those protective measures for each listed and proposed listed species are found in Appendix C of each EA, and the buffer parameters thereof are clearly stated.*

*All water sources within any treatment area are provided 500-foot buffer zones. These buffers are sufficiently large to negate the effects of drift into water. 500-foot buffers are used when no listed or proposed listed species are present; otherwise, mitigation measures provide those "stronger buffers" recommended by the commenter.*

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*APHIS provides to all applicators a set of clear directions outlining protective measures for listed and proposed species near any project area. GPS coordinates are used to guide pilots within the parameters of the spray block, and they also provide buffers around water and protected habitats.*

**Comment 16**
APHIS received 1 comment concerning:

**The monarch butterfly is now a candidate species under the Endangered Species Act, but the EAs contain no information about impacts to or consultation for this species. Monarchs need protection from liquid insecticides.**

No information is available in the EAs about the potential for effects to the monarch butterfly, recently designated a Candidate species under the Endangered Species Act. Similarly no conservation measures are included. APHIS must address the oversight and analyze impacts to the monarch under all alternatives.

Habitat suitability modeling for monarch butterfly in the counties covered by this EA shows there are concentrations of potentially highly suitable monarch habitat in Utah potentially subject to grasshopper suppression this year (Dilts et al. 2018). In 2016 and 2017, the U.S. Department of Agriculture National Resources Conservation Service's (NRCS) developed regional Monarch Butterfly Wildlife Habitat Evaluation Guides, and discouraged placement of monarch breeding habitat within 38 m (125 ft.) of crop fields treated with herbicides or insecticides (NRCS 2016).

The risk of carbaryl applications may be unacceptably high for Lepidoptera, including the monarch, based on data from Abivardi et al. (1999) as explained earlier in this comment letter. Any of the liquid insecticides poses a concern to caterpillars of these species if exposed. Chlorantraniliprole appears to be in the queue for APHIS use in the suppression program in the near future. Chlorantraniliprole is sometimes considered non-toxic to honey bees but is very important to be aware of its high toxicity to other pollinators. Krishnan et al. (2021) tested chlorantraniliprole along with five other insecticides on monarch caterpillars, finding that chlorantraniliprole was far and away the most toxic to monarch caterpillars when consumed, even more so than the neonics tested. This causes us considerable concern if indeed chlorantraniliprole is adopted for use under the APHIS program.

In addition, lepidopteran species are often quite sensitive to diflubenzuron, as documented elsewhere in this comment letter, therefore, impacts to this highly diminished species from diflubenzuron should be specifically analyzed.

***Recommendation:*** We urge you to provide strong conservation measures for monarch butterfly. On monarch, buffering out known or potential milkweed areas would be an important conservation recommendation. Known and modeled habitat maps are available from at least three sources:
• Waterbury et al. 2019
• Dilts et al. 2019
• Western Monarch Milkweed Mapper

Any use of liquid insecticides warrants buffers from milkweed stands or areas where these may potentially occur. In order to limit harm to monarch, a species in steep decline, we recommend a 3-mile buffer from known or potential milkweed stands for aerial applications and a 1-mile buffer from known or potential milkweed stands for ground applications to provide a reasonable margin of conservation protection. Even these measures would not be able to protect migrating monarch who are nectaring outside of milkweed stands.

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*The commenter posed a similar comment in 2021. Please see the response to comment #11 in the 2021 EAs. Again, the commenter discusses chlorantraniliprole, a chemical that APHIS has not included as an alternative under this EA.*

**Comment 17**
APHIS received 1 comment concerning:

**Carbaryl has been analyzed on listed species nationwide with widespread "likely to adversely affect" determinations –but no mention of this or mitigation for its harmful effects is found in the EAs.**

The EAs do not mention a recent nationwide consultation effort on carbaryl's effect to listed species. EPA released a final BE for carbaryl in March 2021. This BE made determinations of Likely to Adversely Affect (LAA) for 1,640 species and 736 species' critical habitats. The BE includes a documentation of a variety of effects to birds, mammals, insects, bees, fish, aquatic inverts, and plants. While the consultation has yet to be fully completed, these determinations are an indicator of widespread impact from use of this chemical.

Species in Utah that are likely to be adversely affected by use of carbaryl, as determined in the BE, are nowhere mentioned in APHIS' EA.

**Recommendation:** The listed species determinations for carbaryl should be disclosed in the EAs and should preclude the use of carbaryl spray in the grasshopper suppression effort until and unless a final Biological Opinion is issued and the suppression program implements all required measures under the Opinion.

*The commentor posed similar comments in both 2020 and 2021. Please refer to APHIS response to comment 17 in the 2020 EAs and comment 12 in the 2021 EAs.*

*The Endangered Species Act section 7 pesticide consultation process between the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services, collectively) and the EPA specifically concerns FIFRA pesticide registration and reregistration in the United States, including all registered uses of a pesticide. The state-level Biological Assessments for APHIS invasive species programs are separate from any consultations conducted in association with pesticide registration and reregistration process.*

*The Agricultural Improvement Act of 2018 (Farm Bill) created a partnership between USDA, EPA, the Services, and the Council on Environmental Quality to improve the consultation process for pesticide registration and reregistration. USDA is committed to working to ensure consultations are conducted in a timely, transparent manner and based on the best available science. The Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides provides a directionally improved path to ensuring that pesticides can continue to be used safely for agricultural production with minimal impacts to threatened and endangered species.*

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*APHIS provided information about use of carbaryl to EPA for the FIFRA consultation for carbaryl. The Grasshopper Program use of carbaryl has in the past comprised substantially less than 1% of the percent crop treated (PCT) for rangeland use of carbaryl. This is the case for the reasonably foreseeable future. For rangeland, in the EPA BE, the Grasshopper Program's very low usage was rounded up to <1% PCT, which gives an overestimate of rangeland acres treated and thus endangered species risk. APHIS use of carbaryl is even smaller compared to all uses of carbaryl nationwide. Further, the Grasshopper Program consults directly with the Services to ensure program activities do not adversely affect protected species or their critical habitat.*

## Comment 18

USDA-APHIS received 1 comment concerning:

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

Given the potential for drift (outlined above and charted in the APHIS 2010 BE to NMFS) and the critical importance of aquatic areas in arid rangeland environments, the current buffers for aquatic habitats do not provide enough margin of safety. Significant drift may still occur even with buffers of 500 feet. In addition, a huge number of rangeland species depend on riparian and aquatic areas.

**Recommendation:** APHIS should increase the margin of safety for riparian and aquatic habitats. Any buffer should be measured from the edge of the riparian or wetland habitat (not the streambed itself). Buffers should be strengthened to ensure that there is no likelihood of drift into these important habitats.

*See Comment #15 above.*

**Comment 19**

USDA-APHIS has received 1 comment concerning:

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

The Dimilin label indicates that the product is toxic to mollusks. The Sevin XLR Plus label indicates that the product is extremely toxic to aquatic invertebrates.
Nationally, more than 90 mussel species are federally listed as endangered and threatened, and more than 70% are thought to be in decline. About 32 species are thought to have already gone extinct. In the western U.S., populations of western pearlshell, California floater, and western ridged mussel are all in decline, especially in Arizona, California, Montana, and Utah.

The 2019 EIS includes an aquatic residue analysis but does not take the next risk assessment step of comparing its residue analysis to known toxicity endpoints for freshwater mussels or other aquatic invertebrates.

**Recommendation:** The diflubenzuron label indicates that the chemical is subject to runoff for months after application. APHIS must disclose impacts to at-risk mussels where they are present. In addition, APHIS should use larger buffers to protect freshwater mussels, such as those designated for listed salmonids in other states. In addition, APHIS should include monitoring for the presence and health of mussels in streams that traverse or are adjacent to treatment areas as part of its monitoring strategy.

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*All bodies of water are buffered according to APHIS Treatment guidelines and the protective measures agreed upon during the consultation process. If the land manager requests a greater buffer distance around water or other sensitive sites APHIS follows that request.*

*APHIS believes the buffers for aquatic habitats are protective of the freshwater mussels the commenter has identified. Implementation of the proposed buffers along with the other mitigation measures will provide protection of mussel food items as well as any freshwater fish hosts that are required for transformation of glochidia to juvenile mussels.*

*Strict environmental monitoring protocols during treatments have revealed no evidence of drift into any waterways in Utah or in the program generally.*

*The commenter gave the same comment in the 2020 EAs. Please see APHIS response to comment 41 in the 2020 EAs.*

**Comment 20**
USDA-APHIS received 1 comment concerning:

**The EAs are silent on buffers around stock tanks. These can be important reservoirs of biodiversity, even as they may be better known for being home to many non-native species.**

The EAs do not identify any buffers that will be observed to prevent pesticide overspray or drift into these habitats. Studies of these habitats (Hale et al. 2014; Hasse and Best 2020) have shown that stock ponds/tanks are important surrogate habitats for native species, and can be equivalent to natural habitats in terms of total abundance and richness of aquatic invertebrates.

**Recommendation:** APHIS should recognize the potential for stock pond/tanks to contribute significantly to the diversity of aquatic invertebrates in rangelands. APHIS should identify and map all stock tanks/ponds and specify a buffer around stock ponds/tanks from chemical treatment at least equivalent to that specified for wetlands, in order to protect aquatic diversity.

*The commenter provided similar comments for the 2021 and 2020 EAs. See response to comment #15 of the 2021 EAs and #42 in the 2020 EAs.*

*The Operational Guidelines do not take precedence over the protective measures for stock tanks covered by the Utah Biological Assessments, especially if T&E species in certain areas are associated with stock tanks. Buffers for stock tanks would not require the same buffers which have been consulted on, as compared to stock tanks which have no T&E species associated with them. Also, the same buffers required for aerial treatments vs ground treatments would be different especially if T&E species are associated with stock tanks.*

**Comment 21**
USDA-APHIS received 1 comment concerning:

**APHIS includes no information about whether an NPDES permit has been obtained, and what provisions it includes.**

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APHIS includes no information about whether an NPDES permit has been obtained, and what provisions it includes. As described on the Dimilin 2L label, diflubenzuron is susceptible to runoff, and could result in discharges to surface water. Under the Clean Water Act, discharges require permit coverage under the National Pollutant Discharge Elimination System. An NPDES permit may be required. Even if an NPDES isn't required for certain activities, APHIS still has a duty to comply with state water quality standards under the Clean Water Act. Further, an NPDES permit does not absolve the agency of its duty to disclose impacts to water quality under NEPA.

Aquatic impacts could occur weeks or months beyond the treatment period, given difluenzuron's persistence. It is not clear if environmental monitoring is conducted in such a way as to pick up delayed transfer of diflubenzuron to nearby waterways.

**Recommendation:** APHIS must disclose whether its program has obtained an NPDES permit, or whether this requirement has been waived (and if so, why). APHIS must comply with state water quality standards and disclose impacts to water quality in the EA. APHIS should also disclose its environmental monitoring reports at its website and conduct environmental monitoring in such a way as to test for runoff effects weeks or months after treatment, in addition to drift at the time of treatment.

*The commenter provided a similar comment for the 2021 EAs. See response to comment #16 of the 2021 EA.*

## Comment 22

USDA-APHIS received 1 response concerning:

**Special status lands**

Utah contains numerous areas of special status lands. However, the EAs contain no analysis of impacts to or any specific protections to be accorded to special status lands such as Wilderness areas, Wilderness study areas, National Monuments, National Parks, Research Natural Areas, National Wildlife Refuges, Important Bird Areas and/or designated or proposed Areas of Critical Environmental Concern within or near potential treatment areas. This is especially disheartening, since these areas are so associated with some of the last refugia for declining species.

**Recommendation:** These special status areas have been designated for specific purposes and generally discourage human intervention with the natural ecosystem. Grasshopper suppression should not be undertaken in such areas. APHIS must review its procedures and ensure that it is not in danger of violating any federal laws or policies pertaining to such special designations. Buffers should also be considered to prevent drift into specially designated areas.

*APHIS does not make treatments on lands of special status without a request from the land managing agency and an evaluation of whether treatments are necessary. Additional protection measures for these types of lands are established by the agency requesting treatment and are followed by APHIS. If the analyses within the EA are not sufficient for the area under special status lands, a supplemental EA would be drafted for the treatment's uniqueness.*

## Comment 23

USDA-APHIS received 1 response concerning:

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**Avoidance of Lands Where Organic or Transitioning Production Occurs**
The general treatment guidelines for 2022 state: *"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."*

We are concerned about the potential for drift and runoff to certified organic or transitioning lands. Certified organic farmers who receive drift, even if unintentional, would risk losing certification for three years. That would mean these producers would also lose any income from those acres, and they would then have to manage affected lands completely separately from other unaffected acres.

Organic producers place a large emphasis on improving biodiversity on their lands, per the National Organic Standard. Many organic farmers approach this by establishing or conserving permanent pollinator and native habitat – an effort that can take years.

The general guidelines, crafted for the program as a whole, and included in each state's EA, leave a number of questions about notification and avoidance of impacts to organic or transitioning producers, including:
• It is unclear if each state maintains a complete registry of organic and transitioning producers, and if that registry is spatially referenced. Many producers farm land in disparate locations. There are a number of certifying organizations across the west, not just the states. It is unclear if these different organizations share information, and if APHIS would be accessing a complete list in any locality.
• It is unclear what the notification process to organic and transitioning producers is. A public meeting is likely to not be sufficient. Given the short time frames between final treatment decisions and the fact that treatments usually occur in the early, critical part of the growing season, it also seems likely that some organic producers could completely miss a notification.
• APHIS appears to make the establishment of buffers optional. Given the issues we've outlined with notification, optional buffers are not a sufficient protection.

**Recommendation:** APHIS should explain its notification process in the EA. We are concerned that some organic, and especially transitioning, parcels could be missed if APHIS does not cast a wide net to identify all locations where organic or transitioning farms exist. The identification and notification process should include multiple sources beyond any state list, even if redundant, to ensure that any organic or transitioning producer is accounted for in the spatial footprint of the spray. APHIS should not just notify but also confirm notification for each organic and transitioning producer, to ensure that its communication has reached its recipient. Given the large drift potential and its previous protocol for native managed bees, APHIS should not leave buffers open-ended but should institute a minimum 4-mile buffer around each identified organic or transitioning parcel. Sites such as driftwatch.org and other spatial locators should be used to the full extent of their availability.

*Certified organic producers are registered with the state of Utah through the Utah Department of Agriculture and Food (UDAF). APHIS consults with UDAF on a regular basis, and prior to any treatment project, all nearby organic or transitioning installations are identified and avoided by a 500-foot buffer zone. A 4-mile buffer, as suggested by the commenter, is totally unnecessary to avoid unwanted drift.*

## Comment 24
USDA-APHIS received 1 comment concerning:

**Extent of treatment to private lands**

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We have concerns about grasshopper treatments on public lands, which have resource values above and beyond cattle forage that must be taken into account. The EA notes that APHIS will also take requests for treatment from private landowners. We are also concerned about impacts to resources and species that overlap with private lands and the scope of APHIS's program, which is not supposed to be geared toward private lands. For example, determining occupied habitat occupied by listed or candidate species on private land may be difficult or tricky.

**Recommendation**: APHIS should clarify whether and how it decides to treat private lands and what the likely impacts of that would be. APHIS should ensure that it is not overlooking the potential conservation issues that may exist on private lands, for example the presence of habitats for listed species or species of conservation interest should be specifically asked about on the treatment request form.

*Private landowners may request APHIS grasshopper/Mormon cricket treatments. In any case, regardless of land ownership, APHIS must fully comply with NEPA requirements for sensitive site protection. Providing full disclosure of known sensitive sites and allowing for access and survey for accurate identification and buffering of such sites is one of many requirements for requesting an APHIS treatment.*

**Comment 25**
USDA-APHIS received 1 comment concerning:

**Cumulative effects analysis**

There is insufficient analysis of cumulative impacts in the EAs. For example, the EAs do not adequately disclose the locations where spraying has occurred in the past, nor did the APHIS 2019 EIS.

In the EA, APHIS states that cumulative effects "are not expected to be significant" basing its reasoning on the assertion that the probability of an outbreak occurring in the same area as a previous outbreak is unlikely. But without information provided about the location and scale of treatments in any previous years, and with the EA's lack of attention to important studies that show impacts from grasshopper suppression chemicals to a wide variety of invertebrates (as we have already detailed), we are very concerned about cumulative effects stemming from these treatments.

Based on our independent review, statements that the probability of an outbreak occurring in the same area as a previous outbreak is slim. For example, Shell and Lockwood (1997) examined decades-long patterns of outbreaks in Wyoming and were also able to map higher-probability outbreak areas. APHIS also places emphasis on the fact that its policy dictates that only one treatment a year is conducted, but does not address nearby impacts on private or state lands where more than one treatment may be conducted, which could contribute to cumulative impacts. In addition, ecological impacts can be severe even if a repeat treatment is unlikely if treatment results in adverse effects to a species confined to a small range, already in decline, or both.

APHIS mentions the many products that may be used on private lands and states that the impact of these private lands uses could be worse if the APHIS program did not exist. This self-justification of the program is based on speculation, and does not consider another alternative – what the impacts might be if chemical control were not the primary solution considered by APHIS.

In addition, some states have grasshopper programs that also operate at the state and local level. There is no mention of this or of their scale, if these in fact exist in Utah.

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In addition, impacts to migratory species from cumulative exposures (such as honey bees whichare in large part transported to California during the almond bloom) are not addressed.

Finally, the EAs do not discuss in any meaningful way the cumulative effects flowing from APHIS's treatments and other pesticide treatments conducted by private, state, tribal, and federal actors. APHIS does not exist in a vacuum; pesticide use is widespread. Yet the EAs sweep potential cumulative effects under the rug by focusing only on treatments conducted in the precise same areas as APHIS's treatments. There is no discussion of how treatments conducted *nearby*—pesticides applied to crops by farmers, for instance—might interact with APHIS's treatments.

***Recommendation:*** To have an adequate understanding of cumulative impacts, APHIS must disclose where spraying has occurred in the past, and what impacts have resulted, as part of the current condition assessment. APHIS must also analyze cumulative impacts considering declining species, as these species will be more vulnerable to negative effects resulting from the treatments. APHIS must consider cumulative exposure to any migratory species, especially those that merit more intensive consideration due to their legal protections, ecological importance or economic importance. APHIS must also take into account grasshopper management that is led by other agencies or private partners, and the combined effects of these on resources of concern.

*Please refer to Comment #19 in the 2021 EAs.*

**Comment 26**
USDA-APHIS received 1 comment concerning:

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

APHIS does not identify how it coordinates with land management agencies, such as the BLM, to address site-specific sensitive issues such as sage-grouse, Resource Management Plan requirements, limitations on special status lands, etc. Due to the spatial specificity of such issues, the national MOUs simply cannot adequately address such concerns.
Unfortunately APHIS also makes no mention in the EAs of what is most sorely needed: cooperation and planning with land managers to take appropriate steps to prevent the types of grasshopper and cricket outbreaks that are now dealt with by chemical controls. We believe that APHIS and its land management partners need to invest in longer-term strategic thinking regarding grasshopper management on Western rangelands. Building resilience into the system should be the key goal.

According to the Rangeland Management section of the Grasshopper IPM handbook, high diversity in canopy structure and plant species composition tends to support high diversity in grasshopper species and this diversity and composition tend to provide stability and to suppress pest species that exploit disturbance.

Emphasizing cultural techniques through appropriate grazing management could help to reduce reliance on pesticide applications and allow abiotic and biotic factors to regulate grasshopper and Mormon cricket populations to the greatest extent possible. For example Onsager (2000) found that (compared to season-long grazing) rotational grazing resulted in significantly less adult *Melanoplus sanguinipe*s grasshoppers and significantly less damage to forage. Under rotational grazing, the nymphs developed significantly slower and their stage-specific survival rates were significantly lower and less variable. Consequently, significantly fewer adults were produced significantly later in the season under rotational grazing.

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Seasonal presence of all grasshopper species combined averaged 3.3X higher under season-long grazing than under rotational grazing. Local outbreaks that generated 18 and 27 adult grasshoppers per square meter under season-long grazing in 1997 and 1998, respectively, did not occur under rotational grazing. The outbreaks consumed 91% and 168%, respectively, as much forage as had been allocated for livestock, as opposed to 10% and 23%, respectively, under rotational grazing.

In addition, some research suggests that grasshoppers could be managed without insecticides by carefully timing fire and grazing to manage vegetation and reduce habitat suitability for target species (Capinera and Sechrist 1982; Welch et al. 1991; Fielding and Brusven 1995; O'Neill et al. 2003; Branson et al. 2006). While more research is needed to develop species- and region-specific management treatments that use alternatives to pesticides (Vermeire et al. 2004), there is likely enough data to employ cultural techniques now.
As described above birds may consume 50% of grasshoppers on site. Ensuring healthy bird populations is critical for long-term grasshopper management.

Another argument for re-thinking the chemical-centric suppression program is that the costs of the program constrain APHIS' ability to respond to treatment requests. In addition, climate change poses a threat that may alter the frequency and locations of outbreaks.

***Recommendation:*** The operating guidelines state "*landowners requesting treatment are encouraged to have implemented IPM prior to undergoing treatment.*" This does not go far enough. APHIS must elevate the expectation of preventative approaches in its cooperative agreements with other land management agencies. APHIS can collaborate with agencies (such as the Natural Resource Conservation Service (NRCS), the Farm Service Agency (FSA), and State Extension program) to facilitate discussion and disseminate information to ranchers about preventative measures that can be taken and alternatives to pesticide use. APHIS and/or collaborating agencies should investigate and implement opportunities to incentivize healthy range management practices.

APHIS and its partners should be approaching the problem by keeping a focus on the potential to reduce grasshopper carrying capacity by making the rangeland environment less hospitable for the pests.

APHIS must not take a limited view of its role and responsibilities, and should utilize any available mechanism to require land management agencies to diminish the severity, frequency and duration of grasshopper outbreaks by utilizing cultural management actions. For example, Memoranda of Understanding (MOUs) should be examined and updated to ensure that land management agencies are accountable in utilizing cultural techniques to diminish the carrying capacity of pest species.

Longer-term strategic thinking should include:
● Prevent conditions that allow grasshopper and Mormon cricket populations to reach outbreak conditions by employing diverse management techniques (e.g., biological, physical, and cultural).
● Implement frequent and intense monitoring to identify populations that can be controlled with small ground-based pesticide application equipment.
● If pesticides are used, select active ingredients and application methods to minimize risks to nontarget organisms.

*See Response to Comment #19 in the 2021 EAs.*

**Comment 27**
USDA-APHIS received 1 comment concerning:

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

We appreciate that public notice of this site-specific EA and its comment period was posted at the APHIS website. Grasshopper suppression efforts, especially those on federal lands, are of more than local concern. The action being proposed is a federal action, proposing to use federal taxpayer funds. The species of the United States, our natural heritage, do not observe ownership, county, tribal, or state boundaries. As such, APHIS should not claim that grasshopper suppression actions are only of local interest. All proposed grasshopper suppression actions and environmental documents should be noticed properly to stakeholders across the United States. The proper and accepted way of doing this is to publish notices and decisions in the Federal Register.

We understand that this program may have attracted little public attention in the past. This is not a valid reason for not using broad methods to invite public participation, such as notices of availability in the Federal Register. It is past time for APHIS to be more transparent about its actions, particularly on public lands. To do so will build trust. As such, there is little to lose and much to gain.

***Recommendation:*** We recommend that, in the future, notice of open public comment periods for all site-specific EAs for grasshopper suppression be posted in the Federal Register, and documents made available for review at regulations.gov and at the APHIS grasshopper website. In addition, we make the following recommendations:
• Actual proposed treatment areas should be mapped and shared with the public when each state APHIS office submits its treatment budget request. Special status lands and sensitive designations should be disclosed on these maps.
• Later refinements to locations should be mapped and shared with the public prior to treatments.
• Nymphal survey results should be provided as soon as available and prior to treatments, in map and table form (counts by species at each survey point, not total counts by survey point).
• Economic threshold analysis needs to be conducted and disclosed especially for treatments on public lands.
• Consultation documents, including APHIS' transmittal to the Services describing the listed species, APHIS determinations, and APHIS rationale for those determinations, should be shared with the public in the draft EA, along with the concurrence letter if it has been transmitted to APHIS.
• Results of environmental monitoring associated with treatments (i.e. drift cards, water samples) should be disclosed.
● Monitor sites before and after application of any insecticide to determine the efficacy of the pest management technique as well as if there is an impact on water quality or non-target species.

*The commenter submitted similar comments for the 2021 EAs. See response to comment #20 of the 2021 EAs.*

*The commenter submitted similar comments for the 2020 EAs. Please refer to APHIS responses to comments 1, 2, 3, 4, 50, 53 and 54 of the 2020 EAs.*

## Responses to the Center for Biological Diversity 2022

**Comment 28**
USDA-APHIS received 1 comment concerning:

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All comments from last year and the year before are equally applicable this year as the 2022 draft EAs suffers from the same or similar deficiencies as the 2021 and 2020 ones, are incorporated by reference and are also attached as appendices. Also, comments on these EAs by the Xerces Society for Invertebrate Conservation from both 2021 and 2020 are equally applicable, incorporated by reference and attached as appendices.

*The commenter submitted similar comments for the 2021 EAs. See the response to comment #1 of the 2021 EAs. The responses for comments 1 through 161 are found in the 2020 EAs. These responses are equally applicable for the 2021 EAs.*

**Comment 29**
USDA-APHIS received 1 comment concerning:

**Impacts to recreation and recreationists**

The EAs presume that recreation is not a significant use of potentially treated areas, when in fact this is not shown to be the case. In general, Americans have been flocking to the outdoors in record numbers in recent years, especially to Utah, and recreational uses of rangelands has dramatically increased, including in areas where recreation was not previously a significant use in Utah. APHIS has failed to take a hard look at the recreational uses of treatment areas, and potential impacts of treatments on recreationists, including adults, children, horses, and dogs, as well as the species that the recreationists are traveling to see, including birds, butterflies and bees. There are a great many such areas in Utah.

The places that could sprayed are not only hugely important for hundreds of species of birds, invertebrates and rare plants, and they also include popular places for people enamored with these landscapes and the many species it supports to visit. These areas are destinations for road trippers, anglers, hunters, bird watchers, hikers, photographers, campers, and many others. These visitors do not want to be subjected to insecticide exposure, nor do they want their dogs, horses, or kids exposed. APHIS did not properly consider the impacts of treatments on birds or birders who are residents or who travel from all over to the area.

*The commenter wrongly assumes that APHIS does not consider recreation to be a significant use of rangelands in Utah. APHIS talks about recreational use of rangelands on pages 12-13 of the EAs under the "Socioeconomic Issues" section of the "Site-Specific Considerations." As described by the local populations and governments within the impacted areas, the presence of high densities of Orthopterans significantly deters from recreational activities on rangelands. Recreation takes place in established areas that already have had significant disturbance by recreational activities (i.e., ATVs, vehicles, mountain bikes, camping equipment). In the presence of high densities of Mormon crickets and grasshoppers, campers and recreationalists migrate into areas that were not previously used for recreation and cause increased impacts to areas with less historical disturbances.*

*APHIS does not treat directly onto campsites where recreationists are occupying. APHIS monitors the treatment areas and makes a concerted effort to notify potential recreationists directly and by posting notification of treatments at centralized points of entry. APHIS also consults with the land managing agency to identify areas of significant recreational use where individuals may be impacted and notify*

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*those individuals of treatment plans and work to restrict access into the treatment areas. APHIS would not conduct a treatment of rangeland if people were present.*

*APHIS would not conduct a treatment of rangeland if people or their pets were present. APHIS provides analysis of the potential effects of program applied insecticides on humans and animals in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. APHIS does not believe the program treatment will affect unseen bystanders or reduce recreational opportunities, nor will it have significant impacts on the rangeland populations of birds, bees or butterflies, or reduce recreational opportunities to see these animals. Lastly, if parties were intending to recreate or to observe wildlife on the vast landscape, they would be free to conduct those recreational activities anywhere else outside of the comparatively small grasshopper control areas. APHIS does not believe this minor inconvenience would cause significant impacts to the human environment.*

**Comment 30**
USDA-APHIS received 1 comment concerning:

News of the insect apocalypse has dramatically increased public interest in viewing insects in the wild, particularly bees and butterflies, giving rise to information about species in the area that APHIS has failed to consider, and driving people into many new places to search for increasingly rare bee species. Utah is home to many native bee species and is, in some places, a biodiversity hot spot for native bees. APHIS fails to take a hard look at the impacts of this program on native bees, despite the fact that spraying is occurring in and around areas where native bee species are reported. There are hundreds of reported sightings of native bees in Utah that are an important parts of the scientific understanding of how these species are faring.

For examply, Bombus huntii was sighted in an area to the east of Roosevelt that had been aerially sprayed with dimilin in 2009. APHIS fails to take a hard look at how spaying of dimilin in this area affected Bombus huntii populations. Bombus fervidus was also sighted just outside of the sprayed area. Imperiled Bombus occidentalis as been reported just outside the zone of the 2012 aerial dimilin sprays west of Ridgefield. Bombus morrisoni has also been reported in this area. And these are just a few examples where spraying has occurred near important native bee habitats.

These bee species and many other species exist in these areas likely because there is protected land around them, areas where wildlife should be able to thrive without exposure to insecticides. However, these treatments in and around the protected lands reduce the value of these lands to wildlife such as bumble bees. We are very concerned that treatment could impact increasingly rare bumble and solitary bee species. In addition to bumble bees, the many species of solitary bees that exist in Utah are hard for citizen scientists to identify so we have fewer records, but we are equally concerned about impacts to these species. Impacts to the many butterfly species in the area are also unexplored by APHIS.

In addition to impacts to the species that could be directly affected, APHIS fails to consider impacts to the species that depend on them for various parts of their life cycles, and the people who love to view them but might not be able to due to treatment activities.

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*APHIS provides analysis of the potential effects of program applied insecticides on pollinators including bumble bees in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. The commenter has expressed these concerns repeatedly, and APHIS has addressed them previously. See our responses to comments #3, 6, 8, 9, and 14 above; comments #5, 6, 9, 13 in the 2021 EAs and comments #10, 12, 14, 19, 20, 21, 23, 24, 25, 28, 37, 38, and 40 of the 2020 EAs.*

*APHIS does not believe grasshopper treatments will cause significant impacts to these pollinator populations or to those who attempt to observe them (see Comment 2 above).*

**Comment 31**
USDA-APHIS received 1 comment concerning:

We are also deeply concerned about APHIS's conclusions that treatments conducted under this program will not adversely affect listed species. The EAs states that "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." EA UT-22-1 at 31. However, in the email pasted below, explaining that USDA could not provide BA because "USDA is not using the document to make decisions," the agency appears to contradict the position it takes in the state EAs. We ask that APHIS clarify its position regarding the 2015 BA not just in regard to the Utah EAs but also every other EA that refers to the 2015 BA.

*As stated in the final EIS APHIS has completed programmatic consultation with the National Marine Fisheries Service (NMFS). APHIS has reinitiated programmatic consultation with NMFS to include chlorantraniliprole (however, Utah does NOT consider chlorantraniliprole for any of its treatment options). The NMFS consultation does not apply to species in Utah since there are no federally listed species under NMFS jurisdiction; however, the information was provided in response to comments regarding the final EIS. APHIS submitted a programmatic biological assessment to the FWS in 2015. APHIS is currently working with the FWS to update and complete the national biological assessment and receive concurrence. The intent of the programmatic biological assessment is to provide consistent mitigation measures for listed species that may co-occur with Program treatments. Consultation with the FWS is still being completed at the local level prior to any treatments. No APHIS treatments are made in states without prior concurrence from the FWS or NMFS regarding federally listed species. This information is also summarized in the final EIS.*

*APHIS in Utah has on-going consultation with the FWS on federally listed species that may occur within the counties or areas where grasshopper and Mormon cricket treatments may be required. APHIS has worked closely with the FWS to determine the application of protection measures and where those measures should be applied prior to any treatments. APHIS also evaluated the potential direct and indirect impacts to non-target species which is summarized in the final human health and ecological risk assessments for each insecticide.*

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*APHIS completed informal consultation with the FWS regarding the Program at the state level years ago after having developed agreed-upon mitigation measures for all T&E and Proposed T&E species relative to GH/MC suppression projects in Utah. The USFWS has concurred with APHIS's assessment that the Utah GH/MC suppression program is not likely to adversely affect species of concern. That consultation/concurrence has continued throughout the years as the T&E list has evolved. Formal consultation has not been required since the FWS has concurred with the APHIS determinations of not likely to adversely affect, including any associated critical habitat. Since APHIS has complied with Section 7 through informal consultation, APHIS has not violated Section 9 of the ESA, nor has formal consultation been required resulting in a biological opinion.*

**Comment 32**
USDA-APHIS received 1 comment concerning:

APHIS does not explain how its treatments impact the environment when combined with other pesticide treatment activities conducted by private, local, state and other federal programs. For example, millions of acres of federal public land are treated with pesticides, including insecticides, for various reasons each year, including national wildlife refuges, BLM and Forest Service lands in Utah. But APHIS's analysis does not consider how these other treatments conducted by the federal family interact with its own activities, much less other treatments such as those conducted by private entities. APHIS clearly needs to take a hard look at how the impacts of its treatments could cause cumulative effects when combined with state, regional and private treatments, including grasshopper and Mormon cricket treatments. The failure to include such a significant development in the EAs is a significant flaw and must be remedied through further analysis. Likely all these treatments combined greatly exacerbate impacts to non-target species.

*APHIS discussed the potential of overlapping chemical treatments in the areas where outbreaks of grasshoppers have occurred or could occur in the future in the cumulative impacts section of the final EIS, from page 79 to 84 and in the draft EA [approximately pages 28 – 29]. It is unlikely there would be significant overlap between other APHIS pest programs and the grasshopper program. Current label restrictions and operational mitigations minimize significant exposure of soil, water and air to Program insecticides. Grasshopper chemical treatments are not expected to persist or bioaccumulate in the environment and there is a lack of significant routes of exposure.*

*We are unaware of any retreatment that would occur in an area that we have treated. Generally, the land we treat is a hybrid of BLM rangeland and absentee landowners leasing land for grazing. Private landowners do not actively manage that land, and therefore, are not expected to be making any other types of chemical applications. Although APHIS is unaware of any, BLM could potentially do herbicide applications in areas we treat, but they would not treat for grasshoppers or Mormon crickets and informs us of any such projects.*

**Comment 33**
USDA-APHIS received 1 comment concerning:

APHIS has also failed to incorporate new information about these pesticides in its EAs. In March 2021, EPA release a final biological evaluation assessing the risks to listed species from uses of carbaryl.[1] The EPA found that carbaryl is likely to adversely affect 1640, or 91% of all listed species, and adversely modify 791 designated critical habitats, or 93% of all designated critical habitats. In addition, the FWS has released a final biological opinion on malathion.[2] This biological opinion explores the many types of harms malathion poses to listed species, including those in the project area. Its findings must be incorporated into APHIS's analysis.

Also, EPA and FWS's partial reliance on actual use data in their respective ESA consultation processes begs the question, is APHIS communicating with EPA and FWS about its use of pesticides in this program so that the agencies can incorporate this information into their endangered species analyses? And if it has not, how will it remedy this so that the agencies are working with correct data on rangeland use?

Overall, we reiterate that the lack of specific information on treatments and their impacts in the EAs remain deeply concerning.

*The chemicals used in Utah are detailed in the Biological Assessment submitted to FWS, and they receive concurrence with APHIS by FWS. The USFWS Field and State Offices are all clearly aware of the pesticides used in Utah. These USFWS offices all review the Biological Assessment and agree to the concurrence letter addressed to APHIS. The pesticides used in Utah are approved for use by US EPA and the state of Utah. The pesticide labels are strictly adhered to as are all other Program measures designed to reduce risk to non-target organisms, including listed species.*

*These concerns are similar to comments submitted by the Center for the 2021 EAs. See response to comment #12 of the 2021 EAs. Please see the APHIS responses to comments #17 in the 2020 EAs.*

**The comment responses you are looking for would include the following text:**

*The Endangered Species Act section 7 pesticide consultation process between the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services, collectively) and the EPA specifically concerns FIFRA pesticide registration and reregistration in the United States, including all registered uses of a pesticide. The state-level Biological Assessments for APHIS invasive species programs are separate from any consultations conducted in association with any pesticide registration and reregistration process.*

*The Agricultural Improvement Act of 2018 (Farm Bill) created a partnership between USDA, EPA, the Services, and the Council on Environmental Quality to improve the consultation process for pesticide registration and reregistration. USDA is committed to working to ensure consultations are conducted in a timely, transparent manner and based on the best available science. The Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides provides a directionally improved path to ensuring that pesticides can continue to be used safely for agricultural production with minimal impacts to threatened and endangered species.*

*APHIS provided information about use of carbaryl to EPA for the FIFRA consultation for carbaryl. The Grasshopper Program use of carbaryl has in the past comprised substantially less than 1% of the percent crop treated (PCT) for rangeland use of carbaryl. This is the case for the reasonably foreseeable future. For rangeland, in the EPA BE, the Grasshopper Program's very low usage was rounded up to <1% PCT, which gives an overestimate of rangeland acres treated and thus endangered species risk. APHIS use of carbaryl is even smaller compared to all uses of carbaryl nationwide. Further, the*

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*Grasshopper Program consults directly with the Services to ensure program activities do not adversely affect protected species or their critical habitat.*