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

Environmental Assessment for Rangeland Grasshopper & Mormon Cricket Suppression Program

OREGON

Baker, Crook, Deschutes, Gilliam, Grant, Harney, Jefferson, Klamath, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and Wheeler Counties

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Prepared by:
United States Department of Agriculture (USDA)
Animal and Plant Health Inspection Service (APHIS)
Plant Protection and Quarantine (PPQ)
6035 NE 78th Court
Portland, Oregon 97218

Available at Above Address or:
www.aphis.usda.gov/plant-health/grasshopper

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Table of Contents

Acronyms and Abbreviations

ac	acre
a.i.	active ingredient
AChE	acetylcholinesterase
APHIS	Animal and Plant Health Inspection Service
BCF	bioconcentration factor
BLM	Bureau of Land Management
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
EA	environmental assessment
e.g.	example given
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
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

I. Need for Proposed Action

A. Purpose and Need Statement

Infestations of grasshoppers or Mormon crickets may occur in the seventeen eastern Oregon counties listed above. The Animal and Plant Health Inspection Service (APHIS) may, upon request by land managers, conduct treatments to suppress grasshopper infestations as part of the APHIS 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.

The goal of proposed grasshopper suppression actions as analyzed in this EA is to safely reduce harmful grasshopper populations to acceptable levels when feasible, given the manifold challenges of such an endeavor. Populations of grasshoppers that may justify suppression work by APHIS in Oregon are considered on a case-by-case basis and require written land-manager request and active participation to actuate. This work is also subject to the availability of funding and the short window of effective timing wherein the limited application resources available are likely to achieve an ecologically effective result in reducing grasshopper populations and their potential damage.

Benefits of control may include protection of rangeland ecosystem resources and adjacent cropland against impacts for the current year, as well as reducing the potential for continued elevated damage in subsequent years. When grasshopper population become extreme due to outbreak conditions, their feeding on available vegetation can lead to denuded areas, elimination of seed production, increased soil erosion, reduced forage and habitat for other herbivores including wildlife and livestock, and impacts to rare plants (plus obligate species communities such as rare native pollinators). Further they have the potential to continue for several years without diminishment from natural causes, such as unfavorable climatic conditions or sufficiently scaled-up control from coevolved predators, parasites, or diseases. Additionally, suppressing grasshopper outbreaks on rangeland may prevent their subsequent migration and resulting potential impacts to high value crops or human safety in adjacent areas.

This EA analyzes potential effects of the preferred proposed action and its alternatives. This EA applies to a proposed suppression program that would take place from May through August, in 2022 and 2023, in the seventeen eastern Oregon counties listed above.

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 each of the given years, within this stated geographical range.

B. Background Discussion

Rangelands provide goods and services, including food, fiber, recreational opportunities, and grazing land for cattle (Havstad et al., 2007; Follett and Reed, 2010). Grasshoppers are part of rangeland ecosystems, serving as food for wildlife and playing an important role in nutrient cycling. However, grasshoppers and Mormon crickets have the potential to occur at high population levels (Belovsky et al., 1996) that result in competition with other herbivores for rangeland forage and can result in depletion of other rangeland species. In rangeland ecosystem areas of the United States, grasshopper populations can build up to economic infestation levels despite even the best land management practices and individual land-manager suppression efforts, justifying a treatment program as described in this assessment.

'Economic infestation level' refers to both a measurement of the damage that is caused by a population of pest species unto a natural resource in quantitative terms and as a qualitative descriptor of any population that has reached an economically significant and threatening level. For rangeland grasshoppers, an economic infestation level can be measured quantitatively on a case-by-case basis with knowledge of factors including: the economic value of available forage (as measured by productivity and composition), crops or other imperiled resources; the damage potential of the grasshoppers present (as determined by species complex, age, and density); and accessibility and cost of alternatives to the damaged resources. Short-term economic benefits accrue during the year of treatment, but additional multi-year benefits may also be likely to accrue and can be considered as part of the total value gained by treatment (i.e., further loss prevented). In decision making, these factors are combined to estimate if an overall 'economic threshold' has been reached that can begin to justify treatment. (That is, if the cost of treatment is estimated to be *equal to or less than* the predicted cost of taking no action.) Finally, though less common than the above considerations, potential losses that are more challenging to quantify in economic terms may also be considered as part of the decision-making processes. Examples of this may include perceived or physical damage to recreational opportunities and cultural resources, or the creation of significant nuisances or hazards to public safety.

When economic infestation levels occur, a rapid and effective response may be requested to reduce the destruction of rangeland vegetation; and in some cases, a response may be requested to prevent migratory grasshopper populations from invading adjacent areas. In most circumstances, APHIS is not able to accurately predict 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.

Over the past half-century of grasshopper survey in Oregon, patterns of reoccurring economic infestation levels have been mapped to show where future outbreaks are likely to re-occur (see figure 1 below), though outbreaks in a given year are not necessarily limited to the areas with the most frequent historical outbreaks, and in fact shifts potentially related to climate change are beginning to being noted, although this will be a long-term area of study with significant of uncertainty. Recent trends however, represent a potentially significant change for APHIS treatments in Oregon, since larger than historically expected outbreaks (roughly linked with extreme drought) are occurring more in counties with the largest amounts of federally managed public land (e.g., Harney, Lake, and Malheur counties) from which most of treatment request to APHIS originate. Program treatments by APHIS are far more limited than indicated by these historic outbreak areas, being almost always focused to limited areas where public concern is high and the available decision making factors (see 'site-specific data' in next paragraph) show a clear need for action that will justify the public expense and comport with all legal environmental requirement. Finally, the expense for privately managed land to request an APHIS program in Oregon are significant (there being no state sponsored cost share in Oregon), leading the program having been activated exclusively on federally managed lands in the last two decades or more.

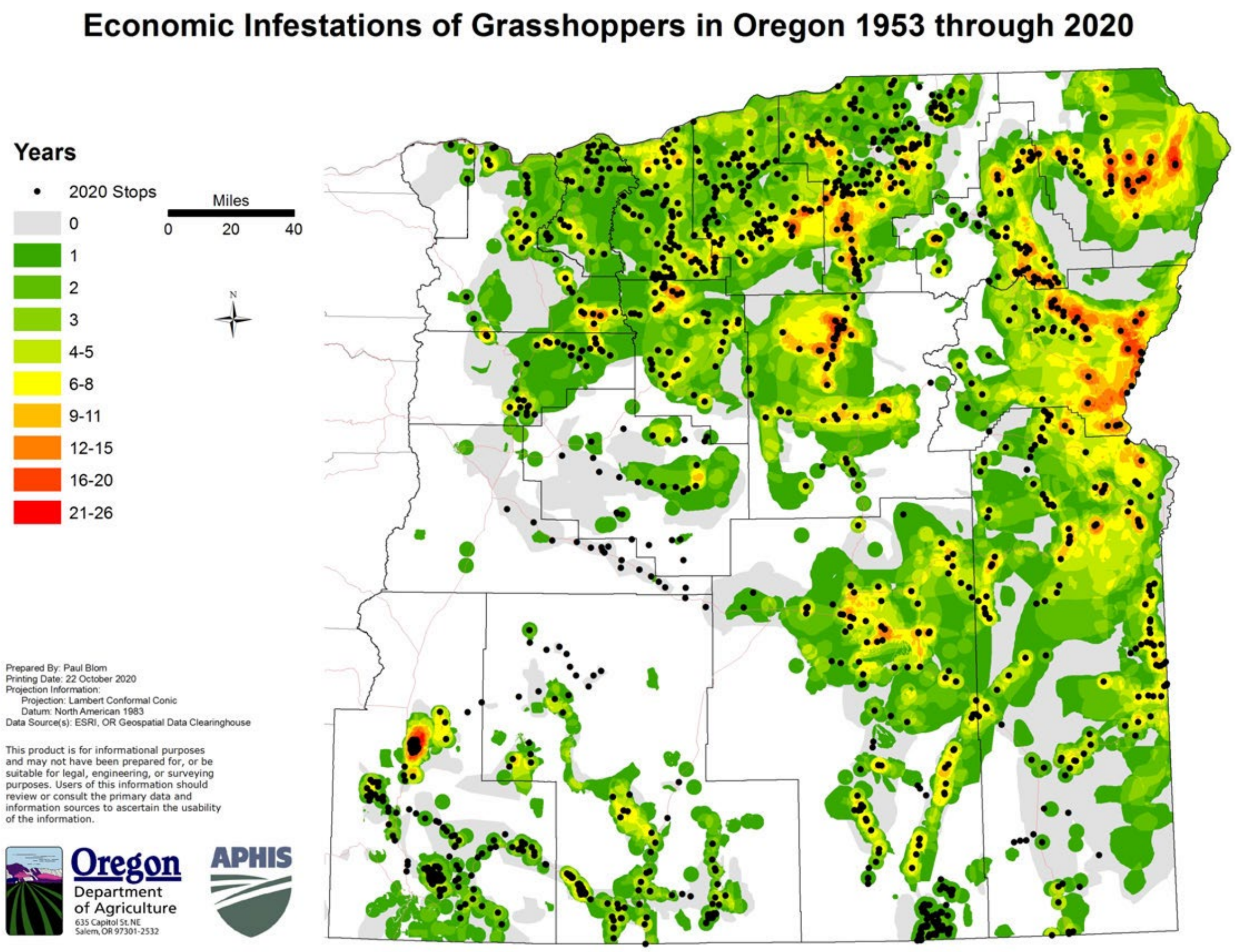

Figure 1: Number of Economically Infested Years for Grasshoppers in Oregon 1953 – 2020 Overlaid with 2020 survey locations indicated by black dots (1:2300k)

Historically, for the purposes of monitoring grasshopper populations across the Western US, a threshold of 8 grasshoppers per square yard or greater is considered an acceptable, if not fully definitive, economic infestation level. For the purposes of determining if a treatment is justified (that is, an economic threshold is reached), many other factors must be considered, as well as a consensus by the parties involved in requesting and actuating the work. Much higher density levels are frequently encountered in high-risk areas, and this density specific data is mapped and provided to the public in both weekly and annual reports in Oregon as part of a cooperative program with the Oregon Department of Agriculture (ODA). These reports can more precisely indicate where treatment activity may be warranted, including program treatments. But density alone, no matter how high, in addition to fluctuating from year to year due to many difficult to forecast factors, is only one of the considerations assessed in determining if a particular infestation has reached a level that justifies treatment, as summarized in the USDA Agricultural Research Service (ARS) publication, Grasshopper Integrated Pest Management (IPM) User Handbook, "Recognizing and Managing Potential Outbreak Conditions" (Section IV.8, page 2):

Broader Ecological and Economic Considerations

In developing control strategies for grasshoppers, managers must base their decisions on more than the density of grasshoppers. The observed grasshopper density must be considered in a broader ecological and economic context:

•the available forage base provided by plants and the potential reduction of this base by current and future grasshopper densities;

• the economic value of the forage base lost to grasshoppers;

• the economic cost of controlling grasshoppers; and

• the ecological mechanisms that may be controlling grasshopper numbers, and how control efforts might change these mechanisms and future grasshopper densities.

The Grasshopper Integrated Pest Management (GHIPM) Project has demonstrated that reference to a single grasshopper density… as constituting outbreak conditions is no longer adequate: density must be assessed in its ecological and economic context.

(The full IPM handbook is at: www.ars.usda.gov/pa/nparl/pmru/IPMHandbook*.)*

Final site-specific data used to make treatment decisions are gathered during spring nymph surveys. Emergent trends may also be supported by the observation history know to the land manager(s) as well as trends documented in previous years of survey and various environmental data. Site-specific data include: grasshopper densities, species complexes, dominant species status, developmental phenology, terrain, soil types, general range conditions, local weather patterns (wind, temp., precipitation), slope and aspect of hatching beds, animal unit months (AUM's) present in grazing allotments, forage damage estimates, number of potential AUM's consumed by grasshopper populations, 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, and recent history of site enrichment projects that may be imperiled (e.g. re-seeding, post-fire rehabilitation, or other land-manager enhancement work). These are all factors that may be considered when determining if an economic threshold has been reached for proposed program sites.

APHIS surveys grasshopper populations on rangeland in the Western United States, provides technical assistance on grasshopper biology to land managers, and may cooperatively suppress grasshoppers when direct intervention is requested by a Federal land management agency or a State agriculture department (on behalf of a State or local government, or a private group or individual). APHIS' enabling legislation provides, in relevant part, that "on request of the administering agency or the agriculture department of an affected State, the Secretary, to protect rangeland, shall immediately treat Federal, State, or private lands that are infested with grasshoppers or Mormon crickets…" (7 U.S.C. § 7717(c)(1)). The need for rapid and effective response when an outbreak occurs limits the options available to APHIS. The application of an insecticide within all or part of the outbreak area is the response available to APHIS to rapidly suppress or reduce grasshopper populations and effectively protect rangeland.

In June 2002, APHIS completed an environmental impact statement (EIS) document concerning suppression of grasshopper populations in 17 Western States (Rangeland Grasshopper and Mormon Cricket Suppression Program, Environmental Impact Statement, June 21, 2002). The EIS described the actions available to APHIS to reduce the damage caused by grasshopper populations in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. During November 2019, APHIS published an updated EIS to incorporate the available data and analyze the environmental risk of new program tools. The risk analysis in the 2019 EIS is incorporated by reference.

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

The MOU further states that the responsible BLM official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on BLM land is necessary.

The BLM must also 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.

APHIS supports the use of IPM principles in the management of grasshoppers. APHIS provides technical assistance to 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, themselves. In addition, APHIS' authority under the Plant Protection Act is to treat Federal, State and private lands for grasshopper 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 populations that will reduce non-target effects. One of the methods that has been developed to reduce the amount of pesticide used in suppression activities and is a component of IPM is Reduced Agent Area Treatments (RAATs), which is the preferred proposed action described in this EA. APHIS continues to evaluate new suppression tools and methods for grasshopper 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.

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 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 Oregon, 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 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. 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 the USDA APHIS PPQ office, 6035 NE 78th Court Portland, Oregon 97218. These documents are also available at the Rangeland Grasshopper and Mormon Cricket Program website www.aphis.usda.gov/plant-health/grasshopper.

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

This Draft EA analyzes the significance of environmental effects that could result from the alternatives described below. These alternatives differ from those described in the 2019 EIS because grasshopper treatments are not likely to occur (in most of the listed geographical area covered in the NEPA documents for this program) 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 Oregon. Under this alternative, APHIS may opt to provide limited technical assistance, but any suppression program would be implemented without direct assistance or oversight by APHIS.

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. In Oregon at this time, APHIS is only considering the use of liquid formulations of diflubenzuron or solid bait formulations of carbaryl for grasshopper programs conducted by APHIS. Malathion and liquid formulations of carbaryl are not currently being considered for use in Oregon for the Program and will therefore not be discussed further in this document.

APHIS would make a single application per year to a treatment area and could apply insecticide at an APHIS rate conventionally used for grasshopper suppression treatments, or more typically as reduced agent area treatments (RAATs). APHIS selects which insecticides and rates are appropriate for suppression of a grasshopper outbreak based on several biological, logistical, environmental, and economical criteria. The identification of grasshopper species and their life stage largely determines the choice of insecticides used among those available to the program. RAATs are the most common application method for all program insecticides, and only rarely do rangeland pest conditions warrant full coverage and higher rates.

Typically, the decision to use diflubenzuron, the pesticide most used by the program, is determined by the life stage of the dominant species within the outbreak population, since diflubenzuron can produce 90 to 97% grasshopper mortality in immature populations, but is not considered effective for mitigating mature grasshoppers. If the window for the use of diflubenzuron closes, as may occur due to treatment delays, then carbaryl bait is the only remaining control option being considered for use in Oregon by APHIS at this time. Certain species are more susceptible to carbaryl bait, but other species have been found not to be attracted to carbaryl bait, which can limit the effectiveness of this option.

The RAATs strategy is effective for grasshopper suppression because the insecticide controls grasshoppers within treated swaths while conserving grasshopper predators, parasites, and other potentially susceptible non-target biota in the swaths not directly treated. RAATs can substantially 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 bait or diflubenzuron would be considered under this alternative, typically at the following application rates:

- 10.0 pounds (0.20 lbs. active ingredients (a.i.)) of 2 percent carbaryl bait per acre
- 0.75 or 1.0 fluid ounce (0.012-0.016 lbs. a.i.) of diflubenzuron per acre (sub-label rates)

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 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.

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, pesticide would cover all treatable sites within the designated treatment block per label directions. The application rates under this alternative are typically at the following application rates:

- 10.0 pounds (0.50 lb a.i.) of 5 percent carbaryl bait per acre
- 1.0 – 2.0 fluid ounce (0.016 – 0.032 lb a.i.) of diflubenzuron per acre

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

C. Experimental Treatments

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

To achieve this mission, experimental plots ranging in area from less than one foot to 640 acres are used and often replicated. The primary purpose of these experiments is to test and develop improved methods of management for grasshoppers. This often includes testing and refining pesticide and biopesticide formulations that may be incorporated into the Program. These investigations often occur in the summer (May-August) and the locations typically vary annually.

The plots often include “no treatment” (or control) areas that are monitored to compare with treated areas. Some of these plots may be monitored for additional years to gather information on the effects of utilized pesticides on non-target arthropods. Note that an Experimental Use Permit is not needed when testing non-labeled experimental pesticides if the use is limited to laboratory or greenhouse tests ,or limited replicated field Trials involving 10 acres or less per pest for terrestrial tests.

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

1. Methods Development Studies

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

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

Rangeland Unit is also investigating the potential use of Unmanned Aircraft Systems (UAS) for a number of purposes related to grasshopper detection and treatment. UAS will be operated by FAA-licensed pilots with an aerial pesticide applicator’s permit.

2. Pesticides and Biopesticides Used in Studies

Pesticides likely to be involved in studies currently include those approved for Program use:

<u>Liquids</u>: Diflubenzuron (e.g., Dimilin 2L and generics: currently Unforgiven and Cavalier 2L). Program standard application rates are: diflubenzuron - 1.0 fl. oz./acre in a total volume of 31 fl.

oz./acre. Experimental rates often vary, but the doses are lower than standard Program rates unless otherwise noted.

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

LinOilEx: (Formulation 103), a proprietary combination of easily available natural oils and some commonly encountered household products, created by Manfred Hartbauer, University of Graz, Austria. Note that LinOilEx (Formulation 103) is experimental; for more information, see "Potential Impacts of LinOilEx Applications" in the section "Information on Experimental Treatments."

Biopesticides likely to be involved in studies currently include:

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

Beauveria bassiana GHA: a native fungal pathogen sold commercially and registered for use across the U.S.

3. Description of Possible Studies

At this time, it is not decided where in the 17 states most of the following proposed experimental field studies will occur. The final location decision is dependent upon grasshopper and/or Mormon cricket population densities, and availability of suitable sites.

Possible Study 1: Building on experimental field season research undertaken in 2020, we plan to further evaluate the efficacy of aerial treatments of Program insecticides using UAS. This study plans to use replicated 10 acre plots. Mortality will be then be observed for a duration of time to determine efficacy. Possible variants of this study (all of which will adhere to FAA regulations) may include night flights and treating with multiple UAS simultaneously (swarming).

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

Possible Study 3: Evaluate efficacy of the experimental biopesticide DWR2009 in bait form by coating wheat bran with the pathogen. A species of local abundance will be placed into replicated microplot cages and fed the baits by hand. Mortality and sporulation will be then be observed for a duration of time to determine efficacy in both the field and lab.

Possible Study 4: A stressor study to evaluate efficacy of the experimental biopesticide DWR2009 in liquid form when combined with Dimilin 2L. The FAASSTT will be utilized to apply varying dose levels of Dimilin 2L (below label rates) in order to compare efficacy, starting at the rate of 1.0 fl. oz./acre. Replicated microplots will be treated and then a species of local abundance will be placed into each cage. Mortality will be then be observed for a duration of time to determine efficacy.

Possible Study 5: Evaluate efficacy of the experimental biopesticide DWR2009 in liquid and bait form (by coating wheat bran with the pathogen) using ultra-ultra low volume RAATs (involves a timing device and ULV nozzles) and a 10 acre plot. ATV-mounted liquid and bait spreaders will be utilized to apply DWR2009. Specimens will be periodically collected to observe mortality and sporulation for a duration of time to determine efficacy.

Possible Study 6: Evaluate efficacy of the experimental, non-traditional pesticide LinOilEx (Formulation 103). A micro-FAASSTT (airbrush system mounted on a 5 gal bucket) will be utilized to apply varying dose levels in order to compare efficacy, starting at the base rate of 6.64 ml/cage. A species of local abundance will be placed into replicated microplot cages and sprayed directly. Mortality will be then be observed for a duration of time to determine efficacy.

III. Affected Environment

A. Description of Affected Environment

The proposed suppression program area included in this EA encompasses rangeland in the Oregon counties of Baker, Crook, Deschutes, Gilliam, Grant, Harney, Jefferson, Klamath, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and, Wheeler (see Appendix 1, Map 1). These 17 counties comprise most of the eastern two thirds of Oregon. The total area is approximately 67,000 square miles (42,880,000 acres).

Generally, it is not possible to predict the precise locations where grasshopper outbreaks will occur in any given year (see further information in section I. Need for Proposed Action, part B. Background Discussion). Although this assessment covers all the rangeland in the 17 counties, APHIS's attention to the affected environment will concentrate on the areas of historical grasshopper outbreaks, as delineated by trends indicated in previous years of survey work, as well as land-manager requests for mitigating support.

This area can be divided into six 'level three' ecoregions based on similarities in geography, climate, and plant and animal communities (Meacham et. al. 2001). The main feature that these ecoregions share is the dry climate created by rain shadow effect of the Cascade Range.

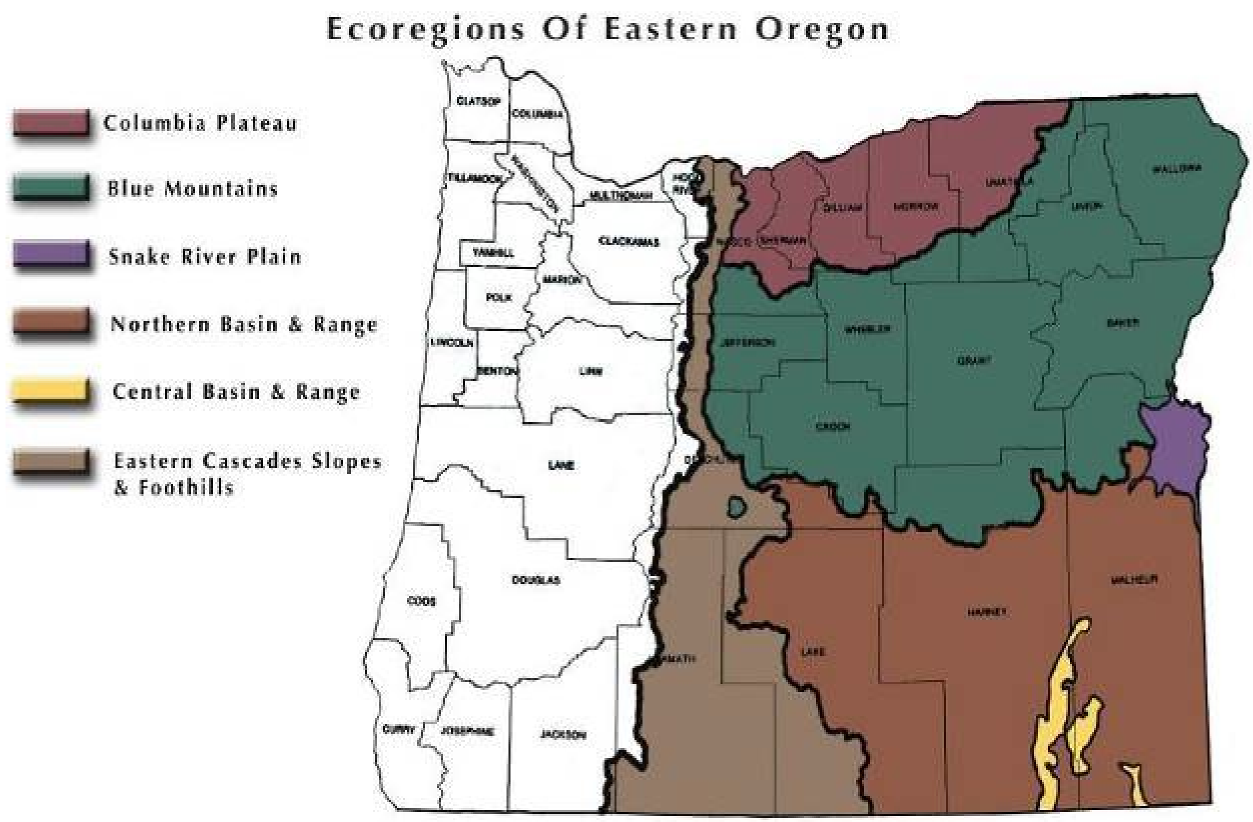

Figure 2 - Ecoregions of Eastern Oregon

Eastern Cascades Slopes and Foothills: This zone is characterized by vegetation that creates a transition from the higher elevation, moister forests of the Cascades on the West to the lower elevation, drier areas dominated by shrubs and grassland on the east. Open forests of ponderosa and lodgepole pine predominate in this ecoregion. The vegetation is drought adapted and susceptible to wildfire. Volcanic cones and buttes are common in much of the region.

Columbia Plateau: This is an arid sagebrush steppe and grassland, surrounded by wetter, mostly forested, mountainous ecoregions. This region is underlain by a thick layer of lava rock. Particularly in the region's eastern portion, where precipitation is greater, deep wind-deposited loess soils have been extensively cultivated for wheat.

Blue Mountains: This ecoregion is a complex of mountain ranges that are lower and more open than the neighboring Cascades and northern Rocky Mountains. Like the Cascades but unlike the Rockies, the Blue Mountains region is mostly volcanic in origin. Only its highest ranges, particularly the Wallowa and Elkhorn mountains, consist of intrusive rocks that rise above the dissected lava surface of the region. Much of this ecoregion is grazed by cattle, unlike the Cascades and northern Rockies.

Snake River Plain: This area is lower and less rugged than the surrounding basin and range ecoregions. A large percentage of the alluvial valleys bordering the Snake River are used for irrigated agriculture. Cattle feedlots and dairies are also common here. Except for the scattered barren lava fields, the remainder of the plains and low hills has natural sagebrush steppe vegetation which is used for cattle grazing.

Central Basin and Range: This ecoregion is composed of north-south trending fault block ranges and intervening drier basins. In the higher mountains, woodland, mountain brush and scattered open forest are found. Lower elevation basins, slopes and alluvial fans are shrub and grass covered, shrub-covered, or barren. The potential natural vegetation is, in order of decreasing elevation and ruggedness: scattered western spruce-fir forest, juniper woodland, sagebrush and salt brush-greasewood. The region is internally drained by ephemeral streams. In general, this region is warmer and drier than the Northern Basin and Range and has more shrub land and less grassland than the Snake River Plain. The land is primarily used for cattle grazing.

Northern Basin and Range: This ecoregion consists of dissected lava plains, rolling hills, alluvial fans, valleys, and scattered mountains. Mountains are more common in the eastern part. Overall, it is higher and cooler than the Snake River Plain, drier and more suited to agriculture than the Columbia Plateau and has fewer ranges than the Central Basin and Range. Sagebrush steppe is extensive here. Juniper dominated woodland occurs on the rugged stony uplands. Much of the region is used for rangeland. Generally, all but the eastern third of the Oregon part of this ecoregion is internally drained.

Within the potential treatment area, average January temperatures range from 24.2° F in Wallowa County to 37.4° F in Jefferson County, with 30.9° F the average for the region. Average July temperatures range from 63° F in Wallowa County to 75.6° F in Malheur County, with 69.0° F the average for the region. Annual precipitation ranges from 18.79" in Union County to a low of 9.15” in Sherman. The average annual precipitation for the entire region is 11.54” (Bradbury 2001).

The region contains several watersheds or drainages, most flow into the Columbia River or its major tributary the Snake River. Major drainages are the Deschutes, John Day, and Umatilla which flow north into the Columbia. Along the eastern edge of Oregon the Grande Ronde, Imnaha, Powder, Malheur, and Owyhee River systems flow into the Snake. Major lakes in these drainages include Wallowa Lake, Paulina Lake, East Lake, and Ladd Marsh. Many manmade reservoirs have been constructed for irrigation, flood control, and power generation. Major reservoirs in the area include Lakes Bonneville, Celilo, Umatilla, and Wallula on the Columbia, Brownlee, Oxbow, and Hells Canyon on the Snake. Smaller reservoirs include Owyhee, Warm Springs, Prineville, Wickiup, and Billy Chinook.

Most of the southeastern part of the region lies within the Great Basin hydrologic region. In this arid area, large through-flowing rivers have not developed, and each watershed drains to its lowest point, where water is lost to evaporation and groundwater recharge. Here small rivers feed closed basins and marshes including Malheur Lake, Harney Lake, the Warner lakes, Summer Lake, Silver Lake, Lake Abert, Alvord Lake, Paulina Marsh and Sycan Marsh. Goose Lake in Lake County drains into the Sacramento River drainage, and to the Pacific, only in very wet years (Meacham et. al. 2001).

The Klamath River Basin watershed or drainage covers most of Klamath County. It drains directly into the Pacific Ocean. Major sub-drainages in this system are the Lost River, Williamson River, Sprague River, Upper Klamath Lake, and Upper Klamath River. Many manmade reservoirs have been constructed for irrigation, flood control, and power generation. Gerber is a large reservoir in Klamath County. Smaller reservoirs include J.C. Boyle, Willow Valley, and Whiteline. Crater Lake occupies the caldera of Mount Mazama and is the deepest Lake in North America. It contains the largest volume of water of any lake in Oregon. Several other high mountain lakes occur in Klamath County such as Odell, Crescent, Davis, and Lake of the Woods. Klamath Lake has the largest surface area of any lake in Oregon. Other lower elevation bodies of water in the county include Agency Lake, Swan Lake, Aspen Lake, and the Klamath Marsh.

The area contains many smaller bodies of water, including springs. Springs are often unconnected to stream systems or other water bodies. Due to lack of connectivity, biota found at spring can be endemic.

Grassland, shrub land, and woodlands are present across the general area. Grasshopper treatments would occur only in rangelands (grass and shrub lands, not in forests). Some of the rangelands are utilized for livestock grazing, but rangelands also provide habitat for native and introduced game and non-game animal species.

Elevation and topography within the overall area vary considerably, from below 500 feet along the Columbia River to mountains over 9000 feet. Treatments would occur primarily on flatlands, foothills, and areas adjacent to cropland. Some treatments may occur on areas of rangeland where critical forage or revegetation projects are threatened. The rangeland of the Columbia

Plateau is mostly between 1000-2000 feet elevation, while the rangeland of the Northern Basin and Range averages 3500-4500 feet. Most suppression treatments would occur at elevations below 6000 feet.

B. Summary of Target Grasshopper Species

More than 100 species of Acridid grasshoppers have been recorded from localities in Oregon. Of these, no more than ten species in Oregon during the past five decades have been known to reach outbreak status and threaten crops and/or valuable range resources. The widespread grasshopper outbreaks of the mid-1980s were comprised primarily of "spur-throated" grasshoppers in the subfamily Melanoplinae: migratory grasshopper (*Melanoplus sanguinipes*), red-legged grasshopper (*M. femurrubrum*), two-striped grasshopper (*M. bivittatus*), Packard's grasshopper (*M. packardii*), and striped sand grasshopper (*M. foedus*). Localized outbreaks in the 1990s and early 2000s were mainly clear-winged grasshopper (*Camnula pellucida*). Outbreaks in 2019-2021 have included the economically damaging species big-headed grasshopper (*Aulocara elliotti*) and valley grasshopper (*Oedaleonotus enigma*) in addition to species of *Melanoplus* and *Camnula pellucida*.

The most widespread and commonly encountered pest species in Oregon is without a doubt Migratory grasshopper (*Melanoplus sanguinipes*), however, Clear-winged grasshopper and Big-headed grasshopper are often in very dense populations and may be more economically damaging during outbreaks.

The most frequent economic pest grasshopper species in Oregon rough order of concern are:

Melanoplus sanguinipes	migratory grasshopper
Camnula pellucida	clear-winged grasshopper
Aulocara elliotti	big-headed grasshopper
Oedaleonotus enigma	valley grasshopper
Melanoplus bivittatus	two-striped grasshopper
Melanoplus femurrubrum	red-legged grasshopper
Ageneotettix deorum	white-whiskered grasshopper
Melanoplus packardii	Packard’s grasshopper
Melanoplus foedus	striped sand grasshopper (outbreak levels in 1970s)

Other grasshopper species considered potential pests in the Western US that are present in Oregon but not usually reaching economic levels are:

Trachyrachys kiowa	Kiowa grasshopper
Amphitornus coloradus	striped grasshopper
Cordillacris occipitalis	spotted-wing grasshopper
Melanoplus infantilis	small spur-throat grasshopper

C. Site-Specific Considerations

1. Human Health

In 2016, the estimated population of the 17 counties within the potential treatment area was over 510,000 (www.census.gov). The suppression program would be conducted on rangelands that are not normally inhabited by humans. Agriculture is a primary economic factor for the area and human habitation is widely scattered throughout the region, mainly on the edges of the rangeland. Most habitation is comprised of single-family farm or ranch houses, but some rangeland areas may have suburban developments or “ranchettes” nearby. Average population density in rural areas of eastern Oregon is about 4.2 persons per square mile. Schools are located in most of the cities and towns, and no impact to these facilities is expected since treatments are conducted in rural rangelands.

Human health may be affected by the proposed actions. However, potential exposures to the general public from traditional application rates are infrequent and of low magnitude. These low exposures to the public pose essentially no risk of direct toxicity, carcinogenicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Program use of carbaryl and diflubenzuron has occurred in many past programs, and no adverse health effects have been reported.

Children and persons with sensitivity to chemicals are those most likely to experience any negative effects. These individuals will be advised to avoid treatment areas at the time of application until the insecticide has time to dry on the treated vegetation.

Recreationists may use the rangelands for hiking, biking, camping, bird watching, hunting, falconry or other uses. In the event a rural school house, inhabited dwelling, or recreational facility is encountered, mitigation measures in the Treatment Guidelines will be implemented, and no adverse impacts are expected.

Those most at risk during operations would be persons actually mixing or applying chemicals. These individuals will be advised to avoid treatment areas at the time of application until the insecticide has time to dry on the treated vegetation.

2. Nontarget Species

Grasslands, open forest, shrub/brush lands, and their associated wetlands are the most likely to be involved in a grasshopper control program. These lands host a variety of wildlife species including terrestrial vertebrate and invertebrate animals (including grasshopper species which are not threatening valuable resources), aquatic organisms, and terrestrial plants (both native and introduced).

The potential suppression area contains a vast variety of terrestrial invertebrates, primarily insects and other arthropods. They include species which compete with grasshoppers and some which prey on grasshoppers. In turn, some species of grasshoppers may prey opportunistically on other invertebrates.

Invertebrate organisms of special interest include biocontrol insects and pollinators. Land managers and others have released and managed biocontrol agents including insects and pathogens on many species of invasive plants within and near the suppression program area. These biocontrol agents are important in decreasing the overall population or the rate of reproduction of some species of undesirable rangeland plants, especially exotic invasive weeds.

Pollinators occur within and near the suppression program area. Pollinators include managed exotic and native insect species such as honeybees, leafcutter bees, and alkali bees which are commercially valuable for agriculture. Other species of insects and animals pollinate native and exotic plants and are necessary for the survival of some species. Two species that the Grasshopper Suppression Program has received comments on in the past are the Leona's little blue butterfly (*Philotiella leona*) and the monarch butterfly (*Danaus plexippus*). The Leona's little blue butterfly is only found in Klamath County near the Klamath Marsh, but the monarch butterfly is found throughout North and Central America. The suppression area covers an area considered to by spring and summer breeding areas for the monarch butterfly (xerces.org).

Vertebrates occurring in the area include highly visible introduced and native mammalian species such as cattle, sheep, horses, mule deer, elk, pronghorn, and coyotes as well as smaller animals like rabbits, mice, gophers, and bats. Birds comprise a large portion of the vertebrate species complex, and they also include exotic and native species. Some exotic game birds, like pheasant and partridge, have been deliberately introduced into the area, and other species such as starlings and pigeons have spread from other loci of introduction. Sage-obligate bird species, typified by sage grouse, are present in much of the Southern part of this area. Various reptiles and amphibians are also present. Many of the herbivorous vertebrate species compete with some species of grasshoppers for forage, while other species utilize grasshoppers and other insects as a food source. There is special concern about the role of grasshoppers as a food source for sage grouse, sharp-tail grouse, and other bird species.

A diverse complement of terrestrial plants occurs within the proposed suppression area. Many are considered as non-native, invasive weeds including annual grasses (e.g. cheat grass, venenata), annual forbs (e.g. diffuse knapweed, Scotch thistle, yellow starthistle), perennial forbs (e.g. Canada thistle, Russian thistle, leafy spurge, white top), and woody plants (e.g. Russian olive, tamarisk). A full complement of native plants (e.g. sagebrush, bitterbrush, numerous grasses and forbs) have coevolved with and provide habitat for native and domesticated animal species, while providing broad ecological services, such as stabilizing soil against erosion.

Biological soil crusts, also known as cryptogamic, microbiotic, cryptobiotic, and microphytic crusts, occur within the proposed suppression area. Biological soil crusts are formed by living organisms and their by-products, creating a crust of soil particles bound together by organic materials. Crusts are predominantly composed of cyanobacteria (formerly blue-green algae), green and brown algae, mosses, and lichens. Liverworts, fungi, and bacteria can also be important components. Crusts contribute to various functions in the environment. Because they are concentrated in the top 1 to 4 mm of soil, they primarily affect processes that occur at the land surface or soil-air interface. These include soil stability and erosion, atmospheric N-fixation, nutrient contributions to plants, soil-plant-water relations, infiltration, seedling germination, and plant growth.

3. Socioeconomic Issues

Agriculture is an important part of the area's economy and landscape. More than half the area is used for cropland or rangeland (Meacham et. al. 2001). Croplands are concentrated on the Columbia Plateau with other small, scattered pockets of mainly irrigated cropland in arable valleys. Crop growers in areas adjacent to possible suppression areas grow feed for dairies and feedlots as well as high value crop such as potatoes, sugar beets, wheat, barley, oats, hay, grass seed, and a variety of other crops. Grain production is concentrated on the Columbia Plateau. Morrow and Umatilla counties especially produce alfalfa, corn, and potatoes. Central Oregon counties produce a variety of vegetable seeds, mint, grain, and hay. Malheur County is a major producer of seed crops, potatoes, onions and sugar beets. Tree fruit production is important in Wasco and Umatilla Counties (Bradbury 2001). Processing plants add value in several of the rural communities.

Livestock grazing is one of the primary uses of rangeland in the covered area. It is the dominate agriculture in Harney and Lake Counties. Livestock enterprises include rangeland grazing by cattle, sheep, and horses; feedlots for beef; and concentrated dairy and hog farms. This rangeland may be utilized during the summer or reserved for fall and winter grazing.

There is a significant amount of acreage in organic production in the area. In 2008, there were 116 farms with 83,333 acres certified organic in these 17 counties.

Beekeepers maintain hives to produce honey and other bee products on land which is included in the proposed treatment area as well as on land located near the proposed treatment area. Alfalfa, seed crops, and tree fruits rely on pollination from bees which may live or forage on or near proposed suppression areas.

Much of the land in the potential suppression area is publicly owned. The area contains parts of six National Forests; Deschutes, Malheur, Umatilla, Wallowa-Whitman, Fremont-Winema, Ochoco; Crooked River National Grasslands; and Hell's Canyon National Recreation Area administered by USDA Forest Service. USDI Fish and Wildlife Service administers the Hart Mountain National Antelope Refuge, Klamath Marsh, Bear Valley, Lower and Upper Klamath National Wildlife Refuges, Malheur NWR, McKay Creek NWR, Cold Springs NWR, Umatilla NWR, and Deer Flats NWR. The USDI Bureau of Land Management administers much of the public rangeland and is the major landowner in the southeast and south-central part of Oregon. More than half the public forest and rangeland is leased for grazing (Meacham et. al. 2001). The remainder is either not farmable or set aside as protected areas.

This area also contains many parks, wilderness areas, public forests, and wilderness studies area administered by state or local governments. The Department of Interior, National Park Service administers John Day Fossil Beds National Monument. There may also be areas of rangeland habitat considered as “sensitive areas” for the survival of non-listed species of concern.

The general public uses rangelands in the proposed suppression area for a variety of recreational purposes including hiking; camping; wildlife, bird, and insect collecting and watching; hunting; falconry; shooting; plant collecting; rock and fossil collecting; artifact collecting; sightseeing; and dumping. Members of the general public traverse rangelands in or near the proposed suppression area by various means including on foot, horseback, all-terrain vehicles, bicycles, motorcycles, four-wheel drive vehicles, snowmobiles, and aircraft.

4. Cultural Resources and Events

Cultural and historical sites include locations and artifacts associated with Native Americans, explorers, pioneers, religious groups and developers. Native American petroglyphs have been discovered in several areas within the proposed suppression area. Artifacts from knapping (stone tool making) occur within the proposed suppression area. Elements of the Oregon Trail transect portions of the proposed suppression area, and monuments have been erected in several places. Museums, displays and structures associated with mining, logging, Japanese internment camps, and irrigation development exist in areas near the proposed suppression area.

There are five federally recognized Indian tribes in this area. According to the 2016 Oregon Blue Book (http://bluebook.state.or.us), the Confederated Tribes of Warm Springs had a Tribal Member population of 4,800 and a 644,000 acre reservation near Madras, OR. The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have 2893 enrolled members and a 172,000 acre reservation near Pendleton, OR. The Burns Paiute Tribe has 349 members, a 13,736 acre reservation near Burns, OR. The Fort McDermitt Paiute-Shoshone Tribe’s reservation straddles the Oregon-Nevada border, 18,829 acres are in Oregon.

The Klamath Tribes exercise court affirmed treaty rights within the 1954 former Klamath Reservation Boundary, approximately 1.8 million acres in the northern half of the county. This area includes the Klamath Marsh National Wildlife Refuge and large portions of the Freemont-Winema Forests. In addition to treaty resources in this area, cultural resources and tribal traditional use areas extend beyond the 1954 Reservation Boundary to the aboriginal homelands of the Klamath Tribes.

The 1855 Treaty that created the Warm Springs and Umatilla Reservations reserved specific rights in the Treaty, which include the right to hunt and gather traditional foods and medicines on open and unclaimed lands. These rights are generally referred to as "Treaty reserved rights” and extend to approximately 16.4 million acres of ceded land in Washington and Oregon. Other Native Americans may practice traditional food and medicine gathering in the proposed suppression area.

D. Special Considerations for Certain Populations

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

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

According to U.S. Census Bureau 2016 estimates (www.census.gov), the population makeup of Oregon is 87.4% White. Hispanic or Latino of any race is the next most numerous group comprising 12.8 %. Other identifiable groups include Black or African American 2.1%, American Indian and Alaska Native 1.8 %, Asian 4.5%, and Native Hawaiian and Other Pacific Islander 0.4%. Hispanic workers are often engaged in production and processing of crops.

The number of persons in the area below the poverty level in 2016 ranged from 22.9% in Malheur County to 10.6% in Deschutes County. Median household income ranged from $54,441 in Morrow County to $33,400 in Wheeler County. Comparing the potential suppression area to Oregon, the average percentage of persons below poverty in the 17 eastern Oregon counties is 15.8% versus 13.3% for the State of Oregon. The median household income for the State of Oregon is $53,270, but the average median household income in the 17 eastern Oregon counties is $42,655. The higher percentage of persons below poverty and the lower average median household income in the 17 eastern Oregon counties indicate that those areas may have a significantly higher proportion of low-income populations compared to the state as a whole.

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

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

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.

A. Environmental Consequences of the Alternatives

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

1. No Suppression Program Alternative

Under this alternative, APHIS would not conduct a program to suppress grasshoppers. If APHIS does not participate in any grasshopper suppression program, Federal land management agencies, State agriculture departments, local governments, private groups or individuals, may not effectively combat outbreaks in a coordinated effort. Without the technical assistance and coordination that APHIS provides during grasshopper outbreaks, the uncoordinated programs could use insecticides that APHIS considers too environmentally harsh. Multiple treatments and excessive amount of insecticide could be applied in efforts to suppress or even locally eradicate grasshopper populations. There are approximately 100 pesticide products registered by USEPA for use on rangelands and against grasshoppers (Purdue University, 2018). It is not possible to accurately predict the environmental consequences of the No Action alternative because the type and amount of insecticides that could be used in this scenario are unknown. However, the environmental impacts could be much greater than under the APHIS led suppression program alternative due to lack of treatment knowledge or coordination among the groups.

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

32-63% 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 following insecticides 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.

3. 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 HHERAs assessed available laboratory studies regarding the toxicity of carbaryl on fish and wildlife. In summary, the document indicates the chemical is highly toxic to insects, including native bees, honeybees, and aquatic insects; slightly to highly toxic to fish; highly to very highly toxic to most aquatic crustaceans, moderately toxic to mammals, minimally toxic to birds; moderately to highly toxic to several terrestrial arthropod predators; and slightly to highly toxic to larval amphibians (USDA APHIS, 2018a). However, adherence to label requirements and additional program measures designed to prevent carbaryl from reaching sensitive habitats or mitigate exposure of non-target organisms will reduce environmental effects of treatments.

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

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

Numerous 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.

Most 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 of 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 proposed use of carbaryl in a bait formulation, 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, finding no concerns for adverse health risk for program workers, are available at: 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.

4. 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 populations and making pesticide applications in a manner that reduces the risk to this group of nontarget invertebrates. Monitoring grasshopper 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.

5. 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 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.

6. Experimental *Metarhizium robertsii* Applications

Metarhizium is a common entomopathogenic fungus genus containing several species, all of which are host-restricted to the Arthropoda, with some having greater host specificity to an insect family, or even a group of related genera. Once considered a single species based on morphology but split into a number of species based on DNA sequence data, the genus is found worldwide and is commonly used as a management alternative to chemicals (USDA, 2000; Lomer et al., 2001; Zimmerman, 2007; Roberts, 2018; Zhang et al. 2019). Two *Metarhizium*, *M. brunneum* strain F52 and *M. anisopliae* ESF1, are registered with the USEPA as insecticides and are commercially used against a range of pest insects.

No harm is expected to humans from exposure to *Metarhizium* by ingesting, inhaling, or touching products containing this active ingredient. No toxicity or adverse effects were seen when the active ingredient was tested in laboratory animals. *M. anisopliae* has undergone extensive toxicology testing for its registration in Africa and the registration of Green Guard in Australia. There has been no demonstrated adverse effect on humans from these products. There is a potential for an allergic reaction to dry conidia if a person is extensively exposed to the product and has a preexisting allergy to fungal spores. *Metarhizium* use in this program is not expected to cause adverse impacts to soil, water, or air. No adverse impacts from the use of *Metarhizium* biopesticides have been observed in almost 20 years of field trials in other countries.

From 2005 to 2017, a massive project (led by Donald W. Roberts, Utah State University, in collaboration with USDA and others, and funded by APHIS-PPQ-S&T) was undertaken to collect 38,052 soil samples from across the 17 western states, from areas that were historically known to have large populations of grasshoppers and/or Mormon crickets. The purpose of these collections was to locate a domestic alternative to the nonindigenous *M. acridum*, used around the world for management of grasshopper (usually locust) populations, particularly in Australia and sub-Sahelian Africa, but also in Mexico and Brazil. The use of such a pathogen would be highly useful to the Program as a biopesticide. Approximately 2,400 new isolates of *Metarhizium* spp., *Beauveria* spp. and other entomopathogenic fungi were found. Many of these fungi isolates were selected for lab and field trials with grasshoppers and Mormon crickets, the most promising being strain DWR2009 belonging to the species *M. robertsii* (Bischoff et al., 2009). The DWR2009 isolate is still undergoing lab and field testing for efficacy against orthopterans. This species is closely related to *M. anisopliae*, which is commonly found worldwide and discernible only on the basis of diagnostic DNA sequences (Roberts, 2018).

There is the potential for prolonged persistence in the environment of a domestic isolate from one area brought to another. Despite this possibility, potential environmental impact is minimal given the widespread and common nature of *Metarhizium* in the western United States and because the DWR2009 isolate have been chosen for their optimized effects on orthopterans (Roberts, 2018). Although entomopathogenic fungi can reduce grasshopper populations, a substantial portion of the treated population are able to resist the infection through thermoregulation. Molecular systematics analyses (by the Roberts Lab; Bischoff et al., 2009; Kepler et al., 2014; Mayerhofer et al., 2019) revealed DWR2009 is very closely related to many other strains within *M. robertsii*, all of which are basically biologically equivalent to each other. In fact, *Metarhizium robertsii* can only be really differentiated from other species by a multiplexed PCR assay based on two gene sequences. Furthermore, it is likely that persistence effects would mirror those found to be the case for *M. anisopliae* and *M. acridum*. Both of these species need optimal temperature ranges to thrive, as well as relatively humid conditions (Zimmerman, 2007; EA, 2010). In particular, *M. acridum* does not persist in semi-arid and arid environments, which is what rangeland habitats are, where U.S. grasshopper outbreaks occur (EA, 2010). If the DWR2009 strain derived biopesticide is spread outside of the experimental plots exceptional rates of fungal infection are not anticipated. Since *M. anisopliae* is a generalist entomopathogen, lethal effects on non-target arthropods have been reported, but are more commonly observed in laboratory experiments than in the field. Plus, such effects are dependent on how the pathogen is applied; i.e., its intended target and application method play roles in non-target effects (Zimmerman, 2007). During experiments, the Rangeland Unit will spray ultra-low volumes (on 10 acres or less) of DWR2009 on grasshopper and Mormon cricket species from aircraft, or through the FAASSTT system. The Rangeland Unit may also coat small amounts of grasshopper bait with the DWR2009.

For the following four reasons, overall environmental impact by experimental studies utilizing *Metarhizium robertsii* applications should not be significant: 1) various strains of the pathogen are already common in rangeland habitats; 2) "behavioral fever" enables species to often "burn out" the infection by basking, allowing infected grasshoppers and Mormon crickets to escape death by mycosis; 3) fungal pathogens are fairly susceptible to heat and ultraviolet light, greatly reducing the environmental persistence of spores to a few days on treated foliage or ground; and 4) at least three days of 98-100% relative humidity is required for fungal outgrowth and sporulation (reproduction) from infected cadavers (Lomer et al., 2001; Zimmerman, 2007; EA, 2010; Roberts, 2018).

7. Experimental LinOilEx Applications

LinOilEx (Formulation 103) is a non-traditional pesticide alternative still in the early stages of development. Its mode of action appears to be topical, often inducing a 'freezing' effect in treated specimens whereby they appear to have been mid-movement when they die. Previous studies by its creator using locusts and katydids showed promise in its efficacy (Abdelatti and Hartbauer, 2019), so the Rangeland Unit decided to test it. Initial Mormon cricket microplot field studies and grasshopper lab studies are intriguing and warrant further field investigations via microplot cage experiments. The formulation is proprietary, but includes linseed oil, lecithin, wintergreen oil, and caraway oil mixed into a bicarbonate emulsion.

Target effects on locust and katydids in initial studies were high while non-target results were mixed, with one tested beetle species, as well as wheat seedlings, experiencing almost no impact. Another tested beetle species did experience relatively high mortality, but well-below target levels (Abdelatti and Hartbauer, 2019). The mode of action appears to be topical, meaning that direct contact with the formulation is needed to induce mortality. The Rangeland Unit's initial studies demonstrated that indirect contact, by spraying vegetation, did not induce mortality. Together, these data suggest that overall environmental impact by experimental studies utilizing LinOilEx applications is expected to be relatively minimal.

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.

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.

The proposed experimental treatments are short-term and would take place in a very limited area. The purpose of the field tests conducted by the Rangeland Unit will help determine whether APHIS would eventually include the following as options for the Program: 1) the use of UAS to aerially apply Program insecticides, 2) the use of the biopesticide *Metarhizium robertsii* (isolate DWR2009), and 3) the use of the non-traditional insecticide LinOilEx. The data generated by these studies would likely be used as part of the EPA registration process for this biopesticide. Inclusion of effective and environmentally friendly insecticides would provide the Program additional control options for grasshoppers and Mormon crickets in sensitive habitats. If successful, the use of *M. robertsii* could decrease the amount of chemical insecticides used in rangeland against grasshoppers and Mormon crickets.

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

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

APHIS 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 specific program areas. APHIS has evaluated the proposed grasshopper program at the general level of the 17 listed Oregon counties, and has determined that there is no disproportionately high and adverse human health or environmental effects on minority populations or low-income populations evident at this broad geographic level of general planning.

1. 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.

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

Aerial Broadcast Applications (Liquid Chemical Methods):

1) Notify all residents within treatment areas, or their designated representatives, prior to proposed operations. Advise them of the control method to be used, the proposed method of application, and precautions to be taken (e.g., advise parents to keep children and pets indoors during ULV treatment). Refer to label recommendations related to restricted entry period.
2) No treatments will occur over congested urban areas. For all flights over congested areas, the contractor must submit a plan to the appropriate Federal Aviation Administration District

Office and this office must approve of the plan; a letter of authorization signed by city or town authorities must accompany each plan. Whenever possible, the program plans aerial ferrying and turnaround routes to avoid flights over congested areas, bodies of water, and other sensitive areas that are not to be treated.

Aerial Application of Baits (Dry Chemical Methods):

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

2. 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 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.

3. 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.

4. 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) 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, and diflubenzuron (and other pesticides not considered for use in this EA) 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 (relevant to this EA):

- RAATs are used in all areas adjacent to salmonid habitat
- Insecticides are not aerially applied in 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 USFWS 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.

5. 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. FWS 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.

6. 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. 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.

a) Protection of Greater Sage-Grouse

After evaluating the best available scientific and commercial information regarding the greater sage-grouse (*Centrocercus urophasianus*), USFWS has determined that protection for the greater sage-grouse under the ESA is no longer warranted and has withdrawn the species from the candidate species list. For pesticide application in Oregon, APHIS will implement conservation objectives and measures recommended by USFWS and BLM for protection of greater sage-grouse.

Grasshoppers and Mormon crickets periodically have infestations which cause significant long-term damage to sagebrush. The use of insecticides is not known to pose range-wide threats to sage-grouse. Additionally, generous treatment buffers make significant contact unlikely.

Conservation Objective:
Maintain important sage-grouse forage base and avoid or minimize direct mortality to them.

Conservation Measures:

1. If possible, contract with Animal and Plant Health Inspection Service (APHIS) and/or Oregon Department of Agriculture (ODA) for all insecticide treatments.

2. Consult with SWCD, ODA, and APHIS. Avoid carbaryl and use diflubenzuron (Dimilin) if at all possible.

3. Work with agency specialists to plan and design control efforts to avoid harming sage-grouse and non-target species.

4. Work with USFWS to plan around areas occupied by sage-grouse during periods of nesting and sage-grouse chick foraging and development in May through July (or as appropriate to local circumstances) to prevent harm to nests during ground application and provide insect availability for early development of sage-grouse chicks.

5. Use approved chemicals with the lowest toxicity to sage-grouse that still provide effective control.

6. When feasible and as outlined by APHIS or ODA, use Reduced Area/Agent Treatments (RAAT) to control grasshoppers, which focuses control efforts along strips to avoid spraying entire fields.

APHIS will abide by the protective measures in the December 22, 2011 BLM Instruction Memorandum No. 2012-043. In addition to the protective measures for greater sage-grouse in the December 22, 2013 BLM instructional memorandum, USFWS and BLM also recommends including:

MD VEG 7: Do not use non-specific insecticides in brood-rearing habitat during the brood-rearing period (July 1 to October 31). Use instar-specific insecticides to limit impacts on greater sage-grouse chick food sources (September 2015 Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment (GRSG ARMPA);

Required Design Features Common to All 19: There will be no disruptive activities two hours before sunset to two hours after sunset from March 1 to June 30 within 1.0 mile of the perimeter of occupied leks. Disruptive activities are those that are likely to alter greater sage-grouse behavior or displace birds such that reproductive success is negatively affected (GRSG ARMPA);

In general habitat management areas: Treat the minimum amount of area needed to ensure grasshopper or Mormon cricket control objectives, as agreed to by BLM and APHIS locally, while avoiding occupied or likely occupied nesting or late brood-rearing habitat to the extent possible;

In all habitat areas: The 2002 Rangeland Grasshopper and Mormon Cricket Suppression Program Final Environmental Impact Statement identifies the aerial application of diflubenzuron (Dimilin), applied in a Reduced Agent and Area Treatment (RAAT) method, or ground applications of carbaryl bait as the preferred treatment for grasshopper and Mormon cricket control.

b) Protection of Columbia Spotted Frog

The Columbia spotted frog (*Rana luteiventris*) Great Basin Distinct Population Segment (DPS) is known to occur in Lake, Harney, Malheur, and Grant counties, Oregon. USFWS has determined that protection under the Endangered Species Act is no longer warranted and has withdrawn the species from the candidate species list. However, USFWS is recommending protection measures of this species, similar to Oregon spotted frog. During pesticide application in Oregon APHIS will work with USFWS to avoid areas occupied by Columbia spotted frog and to implement conservation objectives and protection measures recommended by USFWS and BLM prior to commencing with spray projects.

APHIS grasshopper and Mormon cricket program activities may affect spotted frogs. Direct toxic effects could occur to Spotted frogs should they be exposed to program insecticides. Indirect effects through loss of prey items could also occur if program chemicals were to reach occupied habitat. The APHIS Grasshopper and Mormon Cricket Suppression Program maintains a standard, programmatic 500 foot buffer from water for all aerial ULV treatments, a 200 foot buffer from water for all aerial bait treatments, a 200 foot buffer from water for all liquid ground treatments, and a 50 foot buffer from water for all ground bait treatments. These standard buffers are in place to reduce the chance that a pesticide used for grasshopper suppression will enter water. Monitoring of APHIS grasshopper treatments by Beyers and McEwen (1996) concluded that the standard buffer resulted in trace amounts of pesticide in aquatic habitats, and that grasshopper control operations had no biologically significant effect on aquatic resources.

To protect spotted frogs, APHIS will observe no treatment buffers of 500’ for liquid insecticide and 200’ for bait when applied by air, 200’ for liquid applied by ground, and 50’ for bait when applied by ground around areas of known habitat. APHIS will confer with FWS to determine locations of spotted frog habitat prior to treatment. Implementation of these protective measures will assure that the APHIS Grasshopper Suppression Program will not likely adversely affect spotted frog.

c) Protection of Borax Lake Chubb

The Borax Lake chub (*Gila boraxobius*) was emergency-listed as endangered in 1980, and a final listing rule with critical habitat was published in 1982. A recovery plan was published in 1987. On February 26, 2019, USFWS published a proposal to remove the Borax Lake chub, and its critical habitat, from the list of Endangered and Threatened Species in the federal register. In 2020, USFWS removed the Borax Lake chub from the Federal List of Endangered and Threatened Wildlife on the basis of recovery

Borax Lake chubs are opportunistic omnivores whose feeding habits vary a great deal with maturity level and seasonal occurrence of prey. Diatoms, chironomid larvae, microcrustaceans, and adult dipterans are primary food during the spring. In the summer, terrestrial insects play a more important role in the diet. Chironomid larvae are important in the winter when terrestrial insects are not abundant. Adults tend to consume more gastropods and diatoms than juveniles which tend to consume more copepods and terrestrial insects. Fish feed by picking food from soft bottom sediments or from rocks. Feeding takes place throughout the water column generally all day with a peak just after sunset. Relatively little is known about the biology of this species, including how it manages to survive in waters with such a high borate concentration.

Borax Lake chubs spawn through the year, but most spawning takes place in early spring. The species mature at a small size, standard length of little more than an inch and seldom lives more than 1 year.

This species is found in Borax Lake, a shallow 10-acre, thermal spring fed lake in Harney County, Oregon. The lake is named for its concentration of borax, and its ecosystem is considered highly susceptible to modification due to irrigation and geothermal projects. The Borax Lake chub, resides on private land owned by The Nature Conservancy, within an Area of Critical Environmental Concern designated by the BLM. The Nature Conservancy is not likely to make a request to APHIS to apply pesticides on their lands. Therefore, this area could be eliminated from the proposed action. Implementation of APHIS’ protective measures will assure that the APHIS Grasshopper Suppression Program will not likely adversely affect Borax lake chub.

7. Protection of Foskett speckled dace

The Foskett speckled dace (*Rhinichthys osculus*) was listed as threatened in 1985. The listing rule found that the designation of critical habitat was not prudent, as identification of the habitat may have led to vandalism of the small, isolated springs that support the species. A recovery plan was published in 1998. Due to the successful implementation of the recovery plan, the species' status improved, and on October 15, 2019, USFWS announced the removal of the Foskett speckled dace from the list of Endangered and Threatened Species.

The Foskett speckled dace occurs naturally in Foskett Spring, a small spring system found in the Coleman Basin on the west side of the Warner Valley, Lake County, Oregon. Its main natural habitat is the small, shallow pool at the spring source. The outflow of the spring at one time apparently formed a small rivulet, which is now obliterated by cattle. The main population is in the spring hole, which is about 6 feet in diameter, and mostly 6 to 12 inches wide and deep. Individuals live in tiny outflow rivulets that are at times only a few inches wide and deep. Some are found in cattle tracks into which water seeps continuously. It requires clean and fresh water with a fairly constant temperature.

Little is known about the habits of the Foskett speckled dace. Extensive migration is not known, but larval and early juvenile dace have been observed only in the marsh at the edge of the lake bed, so there is either a migration of adults downstream to spawn or rivulets to the marsh. There has been no complete study of food habits for the Foskett speckled dace, but preliminary observations indicate the use of small insects and crustaceans and zooplankton by fry.

Trampling by cattle is perceived as the main reason for diminution of the habitat. Other threats would include encroachment of vegetation, such as cattails, pumping of ground water or channelization which would affect water level, flow and increased silt.

There are no anticipated treatments near Foskett Spring and it is unlikely that the BLM would make a request to APHIS to apply pesticides on their lands around Foskett Spring. Implementation of APHIS' protective measures will assure that the APHIS Grasshopper Suppression Program will not likely adversely affect Foskett speckled dace.

8. 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, available at: 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.

9. 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.

Cultural and historical sites include locations and artifacts associated with Native Americans, explorers, pioneers, religious groups and developers. Native American petroglyphs have been discovered in several areas within the proposed suppression area. Artifacts from knapping (stone tool making) occur within the proposed suppression area. Elements of the Oregon Trail transect portions of the proposed suppression area, and monuments have been erected in several places. Museums, displays and structures associated with mining, logging, Japanese internment camps, and irrigation development exist in areas near the proposed suppression area.

There are five federally recognized Indian tribes in this area. According to the 2016 Oregon Blue Book (http://bluebook.state.or.us), the Confederated Tribes of Warm Springs had a Tribal Member population of 4,800 and a 644,000 acre reservation near Madras, OR. The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have 2893 enrolled members and a 172,000 acre reservation near Pendleton, OR. The Burns Paiute Tribe has 349 members, a 13,736 acre reservation near Burns, OR. The Fort McDermitt Paiute-Shoshone Tribe's reservation straddles the Oregon-Nevada border, 18,829 acres are in Oregon.

The Klamath Tribes exercise court affirmed treaty rights within the 1954 former Klamath Reservation Boundary, approximately 1.8 million acres in the northern half of the county. This area includes the Klamath Marsh National Wildlife Refuge and large portions of the Freemont-Winema Forests. In addition to treaty resources in this area, cultural resources and tribal traditional use areas extend beyond the 1954 Reservation Boundary to the aboriginal homelands of the Klamath Tribes.

The 1855 Treaty that created the Warm Springs and Umatilla Reservations reserved specific rights in the Treaty, which include the right to hunt and gather traditional foods and medicines on open and unclaimed lands. These rights are generally referred to as "Treaty reserved rights" and extend to approximately 16.4 million acres of ceded land in Washington and Oregon. Other Native Americans may practice traditional food and medicine gathering in the proposed suppression area.

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VI. Listing of Agencies and Persons Consulted

National Oceanic and Atmospheric Administration - Fisheries
Eric Murray, Fisheries Biologist
LaGrande Field Office
3502 Highway 30
LaGrande, OR 97850

Mike Tehan, Branch Chief of Oregon Habitat
525 NE Oregon, Suite 500
Portland, OR 97323

Randy Tweten, Eastern Oregon Team Leader3502 Hwy 30
LaGrande, OR 97850

Walt Wilson, Biologist
Ellensburg Field Office
304 S. Water St., Ste. 201
Ellensburg, WA 98926

Oregon Department of Agriculture - Insect Pest Prevention and Management
Todd Adams, Field Operations and Survey Lead
30588 Feedville Rd.
Hermiston, OR 97838

Thomas Valente, Entomologist
635 Capitol St NE
Salem, OR 97301-2532

Paul Blom, Helmuth Rogg, Dick Jackson, Entomologists (Retired)

Bureau of Land Management
Lonnie Huter, Invasive Species Program Coordinator OR/WA
1220 S.W. 3rd Avenue
Portland, OR 97204

US Forest Service
Karen Ripley, Forest Health Monitoring Coordinator
1220 SW 3rd Avenue
Portland, OR 97204

US Fish and Wildlife Service
Dawn Davis, Sagebrush Ecosystem Coordinator - Certified Wildlife Biologist
Interior Region 9

Bridget Moran, Field Office Supervisor
63095 Deschutes Market Road
Bend, Oregon 97701

VII. Appendices

A. APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program Treatment Guidelines

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

General Guidelines for Grasshopper / Mormon Cricket Treatments

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

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

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

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

5. On APHIS run suppression programs and subject to funding availablity, the Federal government will bear the cost of treatment up to 100 percent on Federal and Tribal Trust land,

50 percent of the cost on State land, and 33 percent of cost on private land. There is an additional 16.15% charge, however, on any funds received by APHIS for federal involvement with suppression treatments.

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

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

NOTE: The insecticide being considered must be labeled for the included crop as well as rangeland and current Worker Protection Standards must be followed by the applicator and private landowner.

8. In some cases, rangeland treatments may be conducted by other federal agencies (e.g., Forest Service, Bureau of Land Management, or Bureau of Indian Affairs) or by non-federal entities (e.g., Grazing Association or County Pest District). APHIS may choose to assist these groups in a variety of ways, such as:

a. loaning equipment (an agreement may be required):
b. contributing in-kind services such as surveys to determine insect species, instars, and infestation levels;
c. monitoring for effectiveness of the treatment;
d. providing technical guidance.

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

Operational Procedures

General Procedures for All Aerial and Ground Applications:

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

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

3. One of the following insecticides that are labeled for rangeland use can be used for a suppression treatment of grasshoppers and Mormon crickets:

   A. Carbaryl solid bait
   B. Diflubenzuron ULV spray

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

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

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

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

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

NOTE: A Treatment Manager is an individual that the COR has delegated authority to oversee the actual suppression treatment; someone who is on the treatment site and overseeing / coordinating the treatment and communicating with the COR. No specific training is required, but knowledge of the Aerial Application Manual and treatment experience is critical; attendance to the Aerial Applicators Workshop is very beneficial.

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

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

9. APHIS reporting requirements associated with grasshopper / Mormon cricket suppression treatments include:

   A. Completion of a post-treatment report (Part C of the Project Planning and Reporting Worksheet (PPQ Form 62)

B. Providing an entry for each treatment in the PPQ Grasshopper/Mormon Cricket treatment database

C. For aerial treatments, providing copies of forms and treatment/plane data for input into the Federal Aviation Interactive Reporting System (FAIRS) by PPQ's designee

Specific Procedures for Aerial Applications:

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

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

a. Wind velocity exceeds 10 miles per hour (unless state law requires lower wind speed);

b. Rain is falling or is imminent;

c. Dew is present over large areas within the treatment block;

d. There is air turbulence that could affect the spray deposition;

e. Temperature inversions (ground temperature higher than air temperature) develop and deposition onto the ground is affected.

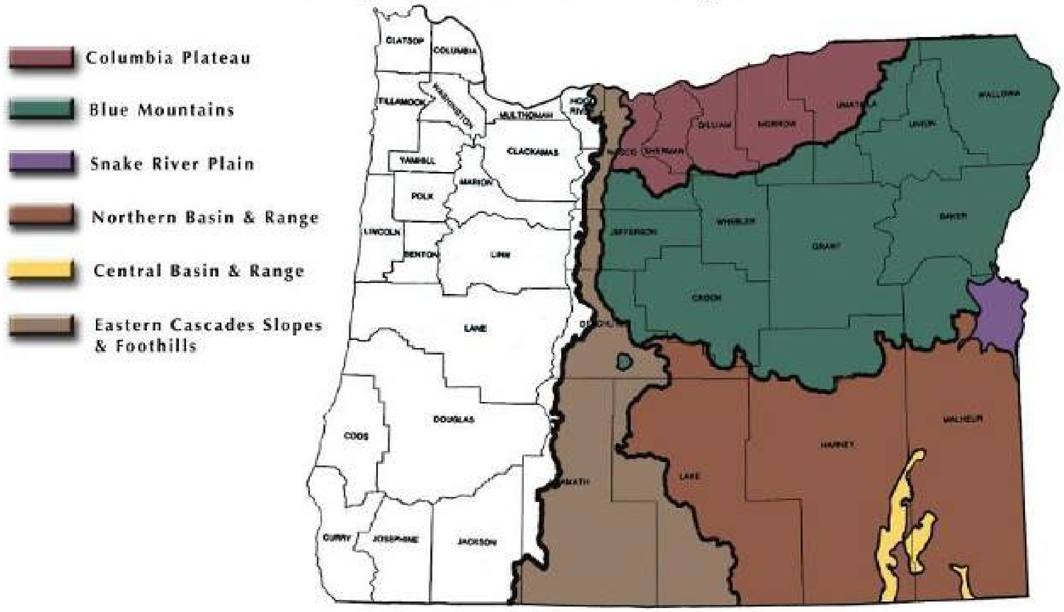
3. Weather conditions will be monitored and documented during application and treatment will be suspended when conditions could jeopardize the correct spray placement or pilot safety.

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

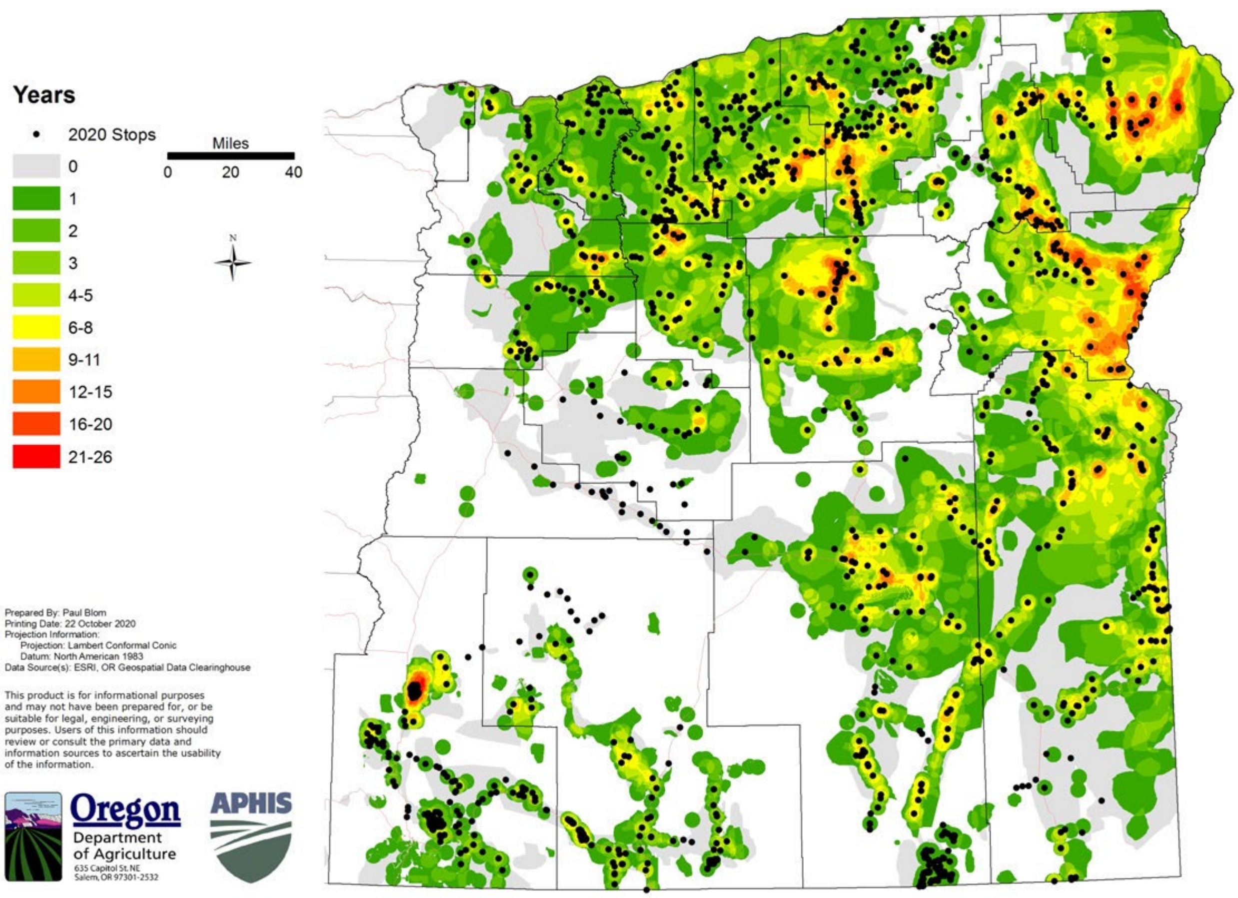
5. Whenever possible, plan aerial ferrying and turnaround routes to avoid flights over congested areas, water bodies, and other sensitive areas that are not to be treated.

B. Map of the Affected Environment

Ecoregions Of Eastern Oregon



Economic Infestations of Grasshoppers in Oregon 1953 through 2020



C. Endangered Species Act Correspondence

1. Cover Letter Stating Request for Informal Consultation with USFWS

Bridget Moran
Field Office Supervisor
US Fish & Wildlife Service
Bend Field Office
63095 Deschutes Market Road
Bend, Oregon 97701
Phone: 541-383-7146

March 4th, 2022

Dear Supervisor Moran:

The U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), in conjunction with Federal, State, and local cooperators, is preparing for possible grasshopper/ Mormon cricket mitigation programs on rangeland in eastern Oregon again this year. This letter is to request an informal exchange of Section 7 consultation information between the Service and APHIS to ensure that any grasshopper suppression programs conducted by APHIS in Oregon are in compliance with the Endangered Species Act (ESA).

As required by APHIS policy, until the programmatic Biological Assessment (BA) for the Grasshopper Program is completed it is necessary for State APHIS Offices to consult with their local FWS to assure compliance with the ESA. The local consultations must be completed prior to any treatments and completion is indicated by receipt of a letter of concurrence from the Service.

APHIS has prepared a 2022 BA for Oregon that arrives at affects determinations for each listed species and critical habitats which occur in the proposed action area. Where it is determined that the action may affect a listed species or its habitat, the BA specifies mitigation measures that are designed to reduce the potential effects to the point where they are not likely to adversely affect the listed species or its habitat. This BA also addresses the chemical diflubenzuron (Dimilin) and the RAATs (Reduced Agent-Area Treatment) strategy as treatment alternatives which were not considered in the last National Programmatic Biological Opinion, October 3, 1995.

The informal local consultation process has been used to obtain concurrence from your agency on the effects determinations made by APHIS. Please provide any coordination necessary with the Klamath Falls, La Grande, and Bend Field Offices. A written response from the Service is requested indicating whether you concur with the 'not likely to adversely affect' (NLAA) determinations in the Biological Assessment.

Specifically, a written response is requested regarding the continued concurrence that potential grasshopper program mitigation activities have a NLAA determination, for the following ESA-listed threatened or endangered species and their designated critical habitats (referenced by (CH)):

- Applegate's milk-vetch (*Astragalus applegatei*)
- Warner sucker (CH) (*Catostomus warnerensis*)
- Shortnose sucker (CH) (*Chasmistes brevirostris*)
- Yellow-billed cuckoo (*Coccyzus americanus*)
- Lost River sucker (CH) (*Deltistes luxatus*)
- Hutton tui chub (*Gila bicolor spp.*)
- Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*)
- Oregon spotted frog (CH) (*Rana pretiosa*)
- Bull trout (CH) (*Salvelinus confluentus*)
- Spalding's catchfly (*Silene spaldingii*)
- Howell's spectacular thelypody (*Thelypodium howellii spectabilis*)

For the species for which APHIS has arrived at 'no effect' determinations, please provide input if the Service has information to indicate otherwise. If there is no information to indicate that a determination other than "no effect" is warranted, then no further review of those species is necessary. APHIS has consulted separately with NOAA Fisheries for effects determinations for ESA-listed anadromous fishes.

Your cooperation and timely response in assisting APHIS to meet its ESA responsibilities are appreciated. If you have any questions regarding these requests, please contact me at 503-730-7622, colin.g.park@usda.gov.

Sincerely,

Colin Park /s/
Plant Health Safeguarding Specialist
USDA, APHIS, PPQ

Enclosed: 2022 APHIS Biological Assessment

2. US Fish & Wildlife Service 2022 Letter of Concurrence (LOC)

File Number: 2022-IC-0018

File Name: APHIS Grasshopper Suppression Program 2022
TS Number: TS22-281
Doc Type: Final

Colin Park, Plant Health Safeguarding Specialist
USDA, APHIS, PPQ
6035 NE 78th Court, Suite 100
Portland, Oregon 97218

Subject: Concurrence on the effects to listed species and critical habitat from Oregon Grasshopper Mitigation by USDA APHIS PPQ

Dear Mr. Park:

The U.S. Fish and Wildlife Service (Service) has reviewed the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service's (APHIS) Plant Protection and Quarantine (PPQ) program's request for concurrence that the Grasshopper Mitigation Program (Program) *may affect but is not likely to adversely affect* species or habitats listed under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.; Act). Your March 7, 2022 request for informal consultation and accompanying biological assessment (Assessment; APHIS 2022) was received by the Service on the same day. The species and their critical habitats subject to informal consultation pursuant to section 7 of the Act are presented in Table 1 below.

APHIS also determined that implementation of the Program will have no effect on the following species: Canada lynx (*Lynx canadensis*), Gray wolf (*Canis lupus*), Northern spotted owl (*Strix occidentalis caurin*), Gentner's fritillary (*Fritillaria gentneri*), MacFarlane's four-o'clock (*Mirabilis macfarlanii*), Malheur wire-lettuce (*Stephanomeria malheurensis*), Whitebark pine (*Pinus albicaulis*), Slender Orcutt grass (*Orcuttia tenuis*), and Green's Tuctoria (*Tuctoria greenei*). The regulations implementing section 7 of the Act do not require the Service to review or concur with no effect determinations. However, the Service acknowledges that the basis for these no effect determinations is clear and reasonable.

APHIS also included protective measures for formerly designated candidate species (greater sage-grouse, *Centrocercus urophasianus* and the Columbia spotted frog, *Rana luteiventris*); and recently delisted species (Borax Lake chub, *Gila boraxobius* and Foskett speckled dace, *Rhinichthys osculus*). Legally, APHIS does not have to implement conservation recommendations for candidate and non-listed species; however, addressing these species at this stage of consultation may minimize or avoid adverse effects to the species and may avert potential future conflicts.

Table 1. This list includes federally-listed species and their proposed or designated critical habitat, where applicable, for which APHIS has determined that implementation the Program may affect, but is not likely to adversely affect.

Species	Status	Critical Habitat
Western DPS of Yellow-billed cuckoo (*Coccyzus americanus*)	Threatened	No Critical Habitat Designated in Oregon
Oregon spotted frog (*Rana pretiosa*)	Threatened	Final Designated
Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*)	Threatened	No Critical Habitat Designated
Hutton tui chub (*Gila bicolor* spp.)	Threatened	No Critical Habitat Designated
Warner sucker (*Catostomus warnerensis*)	Threatened	Final Designated
Lost River sucker (*Deltistes luxatus*)	Endangered	Final Designated
Shortnose sucker (*Chasmistes brevirostris*)	Endangered	Final Designated
Bull trout (*Salvelinus confluentus*)	Threatened	Final Designated
Applegate's milk-vetch (*Astragalus applegatei*)	Endangered	No Critical Habitat Designated
Howell's spectacular thelypody (*Thelypodium howellii* ssp. *spectabilis*)	Threatened	No Critical Habitat Designated
Spalding's campion (*Silene spaldingii*)	Threatened	No Critical Habitat Designated

In November 2019, APHIS published an updated Environmental Impact Statement (EIS) document, from the original 2002 EIS, concerning suppression of grasshopper (*Camnula pellucida*) and Mormon cricket (*Anabrus simplex*) populations in 17 western states, and incorporated the available data and analysis of the environmental risk of new program tools. 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. APHIS includes discussion of information cited in the 2019 EIS and refers to it as "incorporated by reference" in the Assessment. The Service would like to clarify that the Service is not concurring on the 2019 EIS proposed action. The reference to the 2019 EIS is for informational purposes only and not as a request for consultation on that proposed action.

The proposed action which is being consulted on, is the "Site-Specific Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program - Oregon" (OR-22-01) prepared by APHIS (EA) which describes site specific issues related to potential grasshopper suppression programs. The described action is located in Baker, Crook, Deschutes, Gilliam, Grant, Harney, Jefferson, Klamath, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and Wheeler counties of Oregon. Cropland of any kind (including lands enrolled in the Conservation Reserve Program) is not eligible for treatment under this Assessment. Implementation of the Program will only be conducted when potential economically damaging populations of grasshoppers occur, funding exists, there is a written request from the land manager(s), and APHIS determines that treatment is necessary.

After several coordination meetings between APHIS and the Service prior to the informal consultation conducted in 2003, APHIS developed a proposed action with protective buffers designed to prevent application of pesticides within a prescribed distance of federally-listed species to prevent effects from spray application. In order to implement the avoidance buffers, APHIS will need to survey for certain species whose distributions are unknown or poorly understood. Such surveys are not likely needed for fish species or frogs for whose distributions are limited to specific habitats such as waterways, or plants that are sessile and whose distributions are well known. Since yellow-billed cuckoo distribution is not well understood or unknown in the project area, APHIS will confer with the Service to consult recent survey records or conduct surveys of high potential for nesting and foraging habitat prior to implementing the suppression program.

1) PROPOSED ACTION

The proposed action is a statewide program for grasshopper and Mormon cricket suppression activities described in the site-specific EA (OR-22-01) tiered to the 2002 EIS. APHIS treatment programs also follow the Treatment Guidelines (included in the EA) and the Grasshopper Program Statement of Work (or Prospectus) developed by APHIS. Suppression treatments are typically implemented from May through early June. Treatments later in the growing season are strongly discouraged due to lack of effect for the available pesticides in the Program, as well as a greatly reduced likelihood of preventing damage in the current year. However, treatments may still be advisable with sites or grasshopper populations exhibiting unusual phenology and will be considered on a case-by-case basis through July and into August.

The chemical control methods used by APHIS include the use of liquid sprays of diflubenzuron and a bait formulation of carbaryl, applied at conventional rates and as reduced agent area treatments (RAATs). The preferred chemical control methods for treatment of grasshoppers in Oregon by APHIS PPQ include the use of liquid spray diflubenzuron and carbaryl in a bait formulation applied as RAATs.

Under this Program, APHIS would make a single application per year to a treatment area and could apply insecticide at rate conventionally used for grasshopper suppression treatments, or more typically as RAATs. APHIS will select which insecticides and rates are most 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. Under this Program, carbaryl or diflubenzuron would cover all treatable sites within the designated treatment block per label directions, typically at the following application rates:

- 10.0 pounds (0.20 lb a.i.) of 2 percent carbaryl bait per acre;
- 0.75 or 1.0 fluid ounce (0.012 lb a.i.) of diflubenzuron per acre.

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 Program, carbaryl bait or diflubenzuron would cover all treatable sites within the designated treatment block per label directions. The application rates under this Program are typically at the following application rates:

- 10.0 pounds (0.50 lbs. a.i.) of 5 percent carbaryl bait per acre;
- 2.0 fluid ounce (0.032 lbs. a.i.) of diflubenzuron per acre.

Starting in 2017, APHIS removed the use of malathion from the proposed action based on review of recent information and the Environmental Protection Agency's (EPA) January 2016 Assessment regarding the environmental effects of malathion (Lentz 2017, *in litt)*. Additionally, APHIS is suspending their investigation of the use of chlorantraniliprole, which was included on a provisional basis in the 2020 Assessment (Park 2021, *in litt*). Thus, chlorantraniliprole will not be considered for use in the program in 2022 and is not included in this consultation. Service concurrence is limited to the use of liquid diflubenzuron and carbaryl bait as described in the proposed action in APHIS' 2022 Assessment.

The proposed action maintains a standard, programmatic 500 foot buffer from water for all aerial ultra low volume (ULV) treatments, a 200 foot buffer from water for all aerial bait treatments, a 200 foot buffer from water for all liquid ground treatments, and a 50 foot buffer from water for all ground bait treatments. These standard buffers are in place to reduce the chance that a pesticide used for grasshopper suppression will enter water. In order to protect listed plant species, APHIS will implement the following measures from the edge of known listed plant species locations: a 3 mile buffer for aerial applications will be used for from known locations of listed plant species. Carbaryl bait ground application may be used up to 50 feet from the edge of known locations of listed plant species.

2) EFFECTS TO FEDERALLY LISTED WILDLIFE AND THEIR CRITICAL HABITAT

The buffers are mandatory as part of the proposed action and are designed to avoid contamination of federally-listed species habitats. APHIS's assessment concludes the buffers reduce or eliminate the potential for direct exposure to the federally-listed species and reduces the chance of indirect effects being substantial enough to adversely affect the federally-listed species. The buffers were not derived by specific impact and distance data, but are based on field tests demonstrating the absence of detectable levels of chemical. APHIS's determination is the Project's protective measures reduce the potential effects of the action to the point that the effects are insignificant or the probability of adverse effect is discountable and therefore the project may affect but is not likely to adversely affect the federally-listed species listed in Table 1.

3) CONCURRENCE

The Service reviewed the Project described in the Assessment in accordance with section 7(a)(2) of the Act. Based on the Service's review of the Assessment and other information, we concur with APHIS's determination that the Program actions proposed for 2022, in 17 counties of Oregon (described previously) may affect, but are not likely to adversely affect the 11 endangered and threatened species listed in Table 1, nor their designated critical habitats, where applicable.

Our concurrence with your "not likely to adversely affect" determination for threatened and endangered species is based on the conservation measures that will be incorporated into the action. Risk of adverse effects to the federally-listed species listed in Table 1 is minimal due the following factors as described in the proposed action:

1. All applicable Federal, State, Tribal, and local environmental laws and regulations will be followed in conducting suppression activities.

2. Information displayed in the Assessment on effects from application of diflubenzuron and carbaryl support the conclusion that adverse effects to federally-listed species are avoided under the proposed action. APHIS will restrict or avoid insecticide applications such that indirect effects to federally-listed species and their habitats will be insignificant and discountable.

3. APHIS will avoid applying pesticides in areas of known or potentially occupied threatened and endangered species habitat to reduce direct and indirect effects consistent with Table 2 of the Assessment. Potential indirect effects described in the Assessment include reductions in insect prey for local populations of birds, impacts to aquatic environments, and effects on plant productivity from reductions in non-target pollinator insect populations.

4. Pesticides will not be applied in areas known to have a high water table, or where sub surface leaching is likely. Carbaryl bait will not be applied within 500 feet of any water which contains threatened and endangered species at any time. Designated critical habitat that is currently unoccupied would be treated as occupied habitat unless otherwise directed by the Service prior to treatment.

5. Aerial spray applications of diflubenzuron or carbaryl will not be conducted within 0.5 mile of any flowing or standing water which contains threatened and endangered fish species at any time. Aerial spray applications will not occur within 500 feet of occupied Oregon spotted frog habitat at any time. Ground application of diflubenzuron or carbaryl, will not be conducted within 500 feet of any flowing or standing water which contains threatened and endangered fish species at any time. Ground application will not be conducted within 200 feet of occupied Oregon spotted frog habitat at any time. Designated critical habitat that is currently unoccupied would be treated as occupied

habitat unless otherwise directed by the Service prior to treatment. Aerial application of pesticides will not be conducted when winds exceed ten miles per hour. To avoid drift and volatilization, aerial application of pesticides will not be conducted when it is raining or rain is imminent, when foliage is wet, when it is foggy, when temperature exceeds 80 degrees Fahrenheit, when there is air turbulence, or when a temperature inversion exists in the project area. Boundaries and buffers will be clearly marked. Aircraft used in aerial application will be equipped with systems to prevent nozzle dribble when the spray mechanism is disabled and emergency shut off valves to minimize pesticide loss in the event of broken lines, or system malfunctions.

6. All mixing and loading will be done in approved areas where spills cannot enter any body of water. All pesticide tanks will be leak proof and constructed of corrosion resistant materials. Aircraft used in aerial application will be equipped with APHIS-approved differentially corrected global positioning systems that guide pilots along desired flight paths with an accuracy of plus or minus three feet. Free flying will not be allowed.

7. APHIS will monitor insecticide applications and will document compliance with the protective measures in the Assessment. Emphasis should be on determining the effectiveness of avoidance buffers for federally-listed species including indirect affects to prey animals and pollinators and indirect transportation of insecticide products to non-target areas, including all water bodies.

8. APHIS will notify the Service before any application of pesticide and determine the location of any federally-listed or proposed threatened or endangered listed species. APHIS will provide the Service with maps and GIS shape files of proposed treatment areas for the Service to use to determine accurate locations of the action in relation to known species locations.

This concurrence is based on APHIS's implementation of the avoidance and mitigation measures outlined above. To assist in future consultations we request APHIS provide the Service a summary of environmental monitoring activities conducted each year in which suppression activities are conducted. The report shall be submitted on or before January 1 (or an APHIS and Service mutually agreed upon date) every year prior to initiation of the next grasshopper and cricket suppression activity.

This concludes informal consultation on the subject action. This informal consultation does not exempt APHIS from prohibition of take under section 7(a)(2) of the ESA for any of the 11 species listed above. This informal consultation may be superseded by a future programmatic consultation and covers only those activities carried out in 2021 as described in the Assessment. As provided in 50 CFR § 402.16, reinitiation of consultation may be necessary if: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered herein; (2) the action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered herein; or (3) a new species is listed or critical habitat designated that may be affected by the action.

4) ADDITIONAL (CANDIDATE AND NON-LISTED) SPECIES PROTECTION

In addition to the above species listed under the Act, the Service maintains a list of species that are candidates for listing. Candidate species are plants and animals for which the Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species are separate from species that are listed as threatened or endangered, in that they do not receive the regulatory protections of the Act. In previous consultations, APHIS considered protective measures for the greater sage-grouse and Columbia spotted frog; however, these species have subsequently been removed (USFWS 2015, 2016) from the candidate list. In addition, APHIS will continue to provide protective measures and consult the Service annually on Borax Lake chub and Foskett speckled dace which were delisted on July 13, 2020 and October 15, 2019, respectively, due to recovery. The Service is also recommending protection of the monarch butterfly (*Danaus plexippus*), a candidate under the Act. The Service values ongoing conservation and protection of these species to prevent the need to list in the future, thus we are including the following conservation recommendations.

Greater Sage-Grouse

In March 2010, the Service determined that protection of the greater sage-grouse (hereafter, sage-grouse) under the Act was warranted. However, listing sage-grouse was precluded by the need to address other species' listings facing greater risk of extinction (USFWS 2010). On October 2, 2015, the Service announced a 12-month finding on petitions to list sage-grouse both rangewide and the Columbia Basin population, as an endangered or threatened species under the Act (USFWS 2016). After review of the best available scientific and commercial information, the Service found that the Columbia Basin population does not qualify as a distinct population segment (DPS). In addition, the Service found listing sage-grouse was not warranted for protection under the Act at the time.

Sage-grouse in Oregon are found in Union, Baker, Deschutes, Crook, Lake, Harney and Malheur counties. Sage-grouse have not been observed in Klamath County since 1993 (USFWS 2010). In 2015, the Oregon Department of Fish and Wildlife (ODFW) finalized the "The Oregon Sage-Grouse Action Plan" to help manage sage-grouse populations in Oregon. This plan was an update to previous versions from 2005 and 2011 (Hagen 2005, ODFW 2011, Sage-Grouse Conservation Partnership 2015). The strategy relies upon Core Areas of habitat that are essential to sage-grouse conservation. The maps and data provide a tool for planning and identifying appropriate avoidance areas and mitigation in the event of human development in sage-grouse habitats. The Core Area maps, available on ODFW's website, define areas that should be targeted for conservation actions or avoided when large scale disturbances are proposed. Core Area maps also provide a broad-scale filter to assist planners, County, State and Federal agencies in identifying areas of likely high and low resource conflicts associated with development proposals. APHIS should ensure that all suppression activities conducted in Oregon are consistent with the measures identified within the 2015 plan, specifically those found in Section IV and Appendix 4 (Sage-Grouse Conservation Partnership 2015).

The Bureau of Land Management (BLM) developed protective measures for sage-grouse to be implemented on BLM-administered lands. The Service recommends APHIS follow recommendations in the "Oregon Greater Sage-Grouse Approved Resource Management Plan

Amendment” (BLM 2015), such as, Required Design Features, including seasonal restrictions. The Service also recommends following information found in the BLM Instructional Memorandum (IM) Number 2016-115, dated June 24, 2016, for all spray activity on BLM-administered lands (BLM 2016), which the APHIS references in the proposed action. Within, Priority Habitat Management Areas (PHMA) and occupied habitat the IM requires that sage-grouse nesting/early brood-rearing habitat or summer/late brood-rearing habitat areas are not treated (spray or bait) during the respective seasonal use periods, unless:

5) An emergency case exists as determined locally by both BLM and APHIS, or

6) Habitat conditions are unsuitable for sage-grouse and the area is not likely to be occupied by sage-grouse at the time of treatments.

3) If treatments in PHMAs and occupied habitat cannot be avoided, treat the minimum amount of area needed to ensure grasshopper and Mormon cricket control objectives.

Within General Habitat Management Areas (GHMA), the IM requires treatment of the minimum amount of area needed to ensure grasshopper or Mormon cricket control objectives, as agreed to by BLM and APHIS locally, while avoiding occupied or likely occupied nesting or late brood-rearing habitat to the extent possible.

Insect reduction as a result of rangeland grasshopper control has been found to reduce brood sizes in a wild sage-grouse population (Johnson 1987). The Service recommends APHIS works with the BLM to plan around areas occupied by sage-grouse during periods of sage-grouse chick foraging and development in May and June (or as appropriate to local circumstances) to provide insect availability for early development of sage-grouse chicks. In addition, sage-grouse brood areas should be located if not already known, and protected from insecticide spraying (Johnson 1987). Grasshopper control should also be delayed in brood-rearing areas to allow for maximal chick development before spraying reduces their insect forage (Johnson 1987). Treatment areas near active or pending leks will be evaluated by wildlife specialists prior to being considered for treatment. In general, a 4-mile buffer around active and pending leks will be avoided to protect nesting and early brood-rearing of sage-grouse chicks and food sources unless close to heavily infested private lands or areas within the buffer are determined by a wildlife biologist to not be suitable habitat for nesting or early brood-rearing. The Service recommends APHIS use these guidelines to avoid pesticide spraying of nesting and brood-rearing areas for sage-grouse in order to prevent further declines from current sage-grouse population levels. Exceptions to buffer restrictions for aerial spray and ground application of diflubenzuron or carbaryl should be made in consultation with the Service, appropriate ODFW area biologists, and BLM District resource specialists, on a case-by-case basis.

The Service recommends APHIS study the potential effect of the rangeland grasshopper and Mormon cricket control program on sage-grouse, particularly related to reduction in insects as forage, within nesting and brood-rearing habitat. We request that APHIS provide us with information regarding how they will avoid areas occupied by sage-grouse during time periods of sage-grouse chick foraging and development. The Service is available to assist APHIS to minimize and avoid impacts to sage-grouse.

Columbia spotted frog Great Basin DPS

The Columbia spotted frog Great Basin DPS (Great Basin DPS) is known to occur in Lake, Harney, Malheur, and Grant counties, Oregon. In addition to the counties in Oregon, the Great Basin DPS is also known to occur in portions of Idaho and Nevada. The Great Basin DPS is widely distributed throughout southeastern Oregon, and local populations are isolated from each other by natural or human-induced habitat barriers. Threats to the Great Basin DPS include poor management of habitat including water development, improper grazing, mining activities, and nonnative species.

The Service recommends APHIS avoid pesticide spraying of habitat for the Great Basin DPS and buffer the area surrounding Columbia spotted frog habitat similar to measures taken for Oregon spotted frog covered under this consultation in order to reduce risk of exposure of the Great Basin DPS to pesticide chemicals. We recommend that APHIS provide information to the

Service regarding how they will avoid areas occupied by the Great Basin DPS prior to commencing with spray projects. The Service is available to assist APHIS to minimize and avoid impacts to the Great Basin DPS.

Borax Lake Chub

Borax Lake chub was delisted from the Act on July 13, 2020, due to recovery. This species is found in Borax Lake, a shallow 10-acre, thermal spring fed lake in Harney County, Oregon. The lake is named for its concentration of borax, and its ecosystem is considered highly susceptible to modification due to irrigation and geothermal projects.

The Service recommends APHIS avoid pesticide spraying of habitat for Borax Lake chub and buffer the area surrounding Borax Lake chub habitat similar to measures taken for other federally-listed fish species covered under this consultation in order to reduce the risk of exposure of Borax Lake chub to pesticide chemicals. We recommend that APHIS provide information to the Service regarding how they will avoid areas occupied by Borax Lake chub prior to commencing with spray projects. The Service is available to assist APHIS to minimize and avoid impacts to Borax Lake chub.

Foskett Speckled Dace

The Foskett speckled dace was delisted from the Act on October 15, 2019, due to recovery. This species occurs naturally in Foskett Spring, a small spring system found in the Coleman Basin on the west side of the Warner Valley, Lake County, and an introduced subpopulation at nearby Dace Springs. Trampling by cattle is perceived as the main reason for diminution of the habitat. Other threats include encroachment of vegetation, such as cattails, pumping of ground water or channelization which would affect water level, flow and increased silt.

The Service recommends APHIS avoid pesticide spraying of habitat for Foskett speckled dace and buffer the area surrounding Foskett speckled dace habitat similar to measures taken for other federally-listed fish species covered under this consultation in order to reduce the risk of exposure of Foskett speckled dace to pesticide chemicals. We recommend that APHIS provide information to the Service regarding how they will avoid areas occupied by Foskett speckled dace prior to commencing with spray projects. The Service is available to assist APHIS to minimize and avoid impacts to Foskett speckled dace.

We appreciate the opportunity to work with you on this action. Please note that the proposed action requires further coordination to inform the Service of pesticide application activities in areas of any listed threatened or endangered species. If we can be of further assistance, please contact me at (541) 383-7146 or Dawn Davis at (503-319-0594).

Sincerely,

Bridget Moran Field Supervisor /s/

cc: Marisa Meyer, FWS, La Grande, Oregon Adam Johnson, FWS, Klamath Falls, Oregon Jenny Marek, FWS, Klamath Falls, Oregon

7) References

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Appendix D: *Draft EA Comments and Responses*

APHIS response to public comments on EA-OR-2022-01

APHIS received the following three sets of comments for the draft version of this EA (listed alphabetically, with letter printed in whole, with responses included or provided after, as listed in the Table of Contents).

Table of Contents

1. Center for Biological Diversity et al. 2022 Comments

Letter Received on 4/1/2022: **"RE: Draft Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program, Oregon EA Number: OR-22-1":**

(Text in full, followed by comment summaries and responses; as well as applicable Appendices provided, followed by comment summaries and responses.)

3/31/22

To Whom it May Concern:

Please accept the following comments on behalf of the Center for Biological Diversity ("Center") in response to the Animal and Plant Health Inspection Service's ("APHIS") environmental assessments ("EAs") evaluating the impacts of the agency's proposed grasshopper and Mormon cricket suppression programs in Oregon.

The Center is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has 1.7 million members and online activists dedicated to the protection and restoration of endangered species and wild places, including thousands of members and supporters in Oregon, where one of our largest offices is located. The Center has *worked for over thirty years to protect imperiled plants and wildlife, open space, air and water quality, and overall quality of life.*

All comments from last year and the year before are equally applicable this year as the 2022 draft EA 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.

In addition to the matters raised in those comments, we wanted to raise a few additional concerns. The first is 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. APHIS has sprayed in the area east of the popular Steens Mountain Wilderness, where people flock from all over to visit. Spraying also has occurred in or near Pueblo Mountain, including the Wilderness Study Area, an area visited by hikers and hunters. Spraying has occurred around Trout Creek, another area of interest for recreation. The Alvord Desert and Mann Lake are other areas that recreationists are very interested in. Malheur Lake is a major destination for birders from all around the nation, and APHIS did not properly consider the impacts of treatments on these birders or the birds they travel from all over to see migrating through the area. And these are just a few of the areas of well known interest where APHIS has failed to consider impacts to

recreationists. In general, Americans have been flocking to the outdoors in record numbers in recent years, and recreational uses of rangelands has dramatically increased, including in areas where recreation was not previously a significant use. APHIS has failed to take a hard look at the recreational uses of these 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.

In addition, 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. Eastern Oregon is home to many native bees species. APHIS fails to take a hard look at the impacts of this program on native bees. In particular, treatment sites just north of Denio and east of the Pueblo Mountains literally surround a site where Bombus nevadensis has been reported. There are additional sites of Bombus nevadensis adjacent to treatment areas just north of this site, around Wildhorse Valley. Bombus fervidus, a vulnerable species, has been sighted just north of there, east of Frenchglen by Sheepshead Mountains, right in a treatment area, and just adjacent to the treatment areas around Malheur Lake. Bombus huntii has been sighted just north of there, by Lambing Canyon. APHIS failed to consider how treatments such as the aerial spraying of diflubensuron all around these bumblebee sites could affect these increasingly rare species.

These species likely persist in these areas because there is so much protected land around them. This includes multiple National Wildlife Refuges and wilderness areas, 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 these increasingly rare bumblebee species. In addition, we are concerned that the American bumble bee could be present in the area. This species was petitioned for under the Endangered Species Act in 2021, has received a positive 90 day finding, and is currently being considered for listing. In addition to bumble bees, the many species of solitary bees that exist in Oregon 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, including Western Whites, Checkered Whites, Small Wood-Nymphs, Queen

Alexandra's Sulphurs, Orange Sulphurs, Sullivan's Sulphurs and Coronis Fritillaries and other butterfly species have been similarly neglected in the EAs. Pacific Spiketail dragonflies are also present in the areas sprayed. People travel from all around to see the butterflies and other insects in this area. However, APHIS has failed to adequately consider impacts to listed and non-listed insect species.

Further, we are deeply concerned about impacts to sage grouse, and dismayed that many treatments have occurred in, adjacent to and around sage grouse habitat throughout the southeastern portion of the state. This includes, but is not limited to, the treatment areas around

Frenchglen, Denio and in the Malheur National Wildlife Refuge. APHIS has failed to adequately consider these impacts to this highly imperiled bird, particularly the impact of having essential food sources eliminated, but also other impacts such as disturbance from treatment activities on these notoriously skittish birds. With sage grouse in steep decline, we are deeply concerned about APHIS engaging in any treatment activity in their habitat.

We also note that 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 for various reasons each year, including national wildlife refuges. 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 also does not note the five million dollars the state of Oregon just allocated to grasshopper eradication efforts, efforts that will likely exacerbate the environmental impacts of APHIS's treatment.1 With over four million dollars going to suppression efforts funded by the state, focusing on use of dimilin, APHIS clearly needs to take a hard look at how the impacts of its treatments could cause cumulative effects when combined with the Oregon state efforts. The failure to include such a significant development in the EA is a significant flaw and must be remedied through further analysis. Likely all these treatments combined exacerbate impacts to non-target species.

In addition, APHIS has failed to incorporate new knowledge about these pesticides in tits EAs. In particular, In March 2021, EPA release a final biological evaluation assessing the risks to listed species from uses of carbaryl.2 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.3 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.

In addition, EPA and FWS's partial reliance on actual use data 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 in the EA remains deeply concerning.

For the many reasons described therein, the draft EA fail to comply with NEPA, the ESA, and other applicable laws. Thank you for considering and incorporating the contents of these comments. Please do not hesitate to contact me if you would like to discuss these matters.

1https://www.oregon.gov/oda/shared/Documents/Publications/Administration/AgQuarterlySpring.pdf?utm_medium=email&utm_source=govdelivery

2 https://www.epa.gov/endangered-species/final-national-level-listed-species-biological-evaluation-carbaryl#executive-summary
3 https://www.epa.gov/endangered-species/biological-opinions-available-public-comment-and-links-final-opinions

Sincerely,

Lori Ann Burd

Environmental Health Director and Senior Attorney
Center for Biological Diversity
P.O. Box 11374 Portland, OR 97211-0374
971-717-6405 urd@biologicaldiversity.org

Comment Summaries and Responses

Comment 1: "All comments from last year and the year before are equally applicable this year as the 2022 draft EA suffers from the same or similar deficiencies as the 2021 and 2020 ones…."

APHIS disagrees with this assessment and extensive reliance on responses to other EAs as approximate stand-ins for review of this draft EA, once again. The Center for Biological Diversity (CBD) employed the same method last year (see Appendix A). At a minimum, the appendixes provided are extremely redundant, and rarely add anything of substance to the review process overall. CBD is in effect providing the same basic criticisms several times, perhaps in an effort to either simply delay the actual work that APHIS proposes in the EA, or to give the false impression that it has many times more comments to make.

Worse however, many of the comments provided never applied to an Oregon program EA at all, including its several previous iterations. As stated in the response to CBD comments in 2021, EAs for this program are neither the same from year to year nor the same from state to state. But CBD continues to decline to make basic edits as required to be specific to our Oregon EA, year after year. For example, the current, *most specific* letter from CBD (above) again refers to Malathion as having some baring on OR-22-01. This is simply not accurate, even in this most specific letter. The many responses provided by CBD as appendixes are therefore perhaps 'equally applicable', but the question of what EA any of them are referencing is frequently unclear.

While APHIS values feedback from subject matter experts and diverse interest groups, this process relies on consideration of the actual EA in question. For the sake of completeness, APHIS is responding to all comments relevant to OR-22-01 included in the various appendixes, though this is unlikely to be how future 'appended comments' are responded to for the program in Oregon.

Comment 2: "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. …APHIS has failed to take a hard look at the recreational uses of these 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."

Recreation, and the potential loss of value from this land use, especially as it relates to grasshopper outbreaks, is in fact included in the model describing economic impacts and reason for potentially supporting treatments in the EA. Further, since the EA does cover potential impacts on humans, vertebrate species generally, and wildlife including invertebrates, and finds no significant impact, it is not clear in the comment how treatments might possibly impact recreationists (as defined by the comment) negatively in any way, or how this is not considered in the EA precisely. Constructive criticism is an important part of this process, but without some clarity, it is difficult to know what the commentor is concerned about specifically. The closest the comment comes to indicating a concern that's actually related to the EA in question is a presumption that there will somehow be a significant negative impact on birds, butterflies and bees that recreationists 'are travelling to see'. It could equally be argued however that it does not appear that CBD thinks that anyone travels to see grasshoppers in particular, which is the only species targeted for reduction. This is quite unfortunate, considering how abundant they are on average, let alone during outbreaks. Furthermore, grasshopper species, especially during outbreak, are in fact competing and limiting many other species, with benefits for direct feeders such as birds being limited by saturation, while the APHIS program is seeking to only to reduce populations to normal levels in limited areas where populations are found to be economically damaging. Indeed, a targeted reduction in grasshoppers may lead to a flourishing of other wild species, by simple reasoning of primary ecological trophic principals, since grasshoppers are generally competitive to these species overall, not beneficial or mutual, especially at outbreak levels.

Comment 3: "APHIS failed to consider how treatments such as the aerial spraying of diflubenzuron all around these bumblebee sites could affect these increasingly rare species."

It is not clear if this comment is a continuation of the recreation concern, but if so APHIS does not consider this to be clearly connected, since the locations of these rare bees is apparently not very clear, and they require specialize skills to find and identify.

Contrary to the comment, known *Bombus nevadensis* sites as described in the comment were not in treatment areas in 2021. This is factually incorrect.

These species do not currently have ESA protection status, such as covered in the ESA consultation process as described in the Letter of Concurrence section of the appendix. It may be seen there that species of concern that do not currently have any official ESA protection status are also considered and provided protection measures for, primarily at the recommendation of FWS, and that extended status was also not recommended by these experts that APHIS consulted for this process.

In any case however, risk to all non-target species is mitigated by all of the following: Selective treatments (that is, treating limited areas with high grasshopper populations); use of 'softer' chemicals (that do not kill on contact but require ingestion, and/or have no lethal dose with vertebrates); and finally, by untreated swaths within the treatment block(s) by utilizing RAATs whenever feasible (and/or as specifically required/limited to by the treatment requestor).

It is worth reiterating once more, that in extreme grasshopper outbreaks there are clearly harmful impacts to rare plants and pollinators, so that treated areas may in fact provide a boost to these same species that are of concern. This is a possibility that the commentor apparently discounts entirely for unknown reasons..

Comment 4: "We also note that 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."

Also factually incorrect, this is considered in: IV. Environmental Consequences, B. Other Environmental Considerations, 1. Cumulative Impacts.

The link provided described an emergency program provided by the state of Oregon (AgQuarterlySpring.pdf (oregon.gov)). There will be no planned overlap in grasshopper treatments with this program, since APHIS primarily handles federal land in Oregon, and federal land is not eligible for this single year, emergency state program.

Comment 5: "In addition, APHIS has failed to incorporate new knowledge about these pesticides in tits [sic] EAs. In particular, In March 2021, EPA release a final biological evaluation assessing the risks to listed species from uses of carbaryl.[2] 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.[3] 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."

The carbaryl study does not clearly relate to a 2% bait formulation at the rates and with the mitigations specified in this EA. Since pesticides do nothing without some clear mode of uptake, comparing bait to broadcast sprays as functionally similar is simply inaccurate.

As cited in previous comment-responses that dealt with the pesticide programmatic consultations between EPA and FWS:

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.

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 6: "Overall, we reiterate that the lack of specific information in the EA remains deeply concerning."

The proposed Grasshopper treatment program described in the EA could occur only within a specific area, using a limited number of insecticides and application methods. The environmental consequences of suppressing or not suppressing grasshopper infestations are analyzed in the EA and other programmatic risk analysis documents.

APHIS values the potential for *specific* criticism--that is specific to the text of the EA in question--and will continue to reach out for such as broadly as possible, and respond to all comments received, as well as updating the EA draft, repeatedly for each cycle that this method is utilized.

a. Center for Biological Diversity Appendix A, 2021 Comments

"RE: Draft Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program, Oregon EA Number: OR-21-1"

(Text in full, followed by comment summaries and responses.)

3/15/21

To Whom it May Concern:

Please accept the following comments on behalf of the Center for Biological Diversity ("Center") in response to the Animal and Plant Health Inspection Service's ("APHIS") environmental assessments ("EAs") evaluating the impacts of the agency's proposed grasshopper and Mormon cricket suppression programs in Oregon.

The Center is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has 1.7 million members and online activists dedicated to the protection and restoration of endangered species and wild places, including thousands of members and supporters in Oregon, where one of our largest offices is located. The Center has worked for over thirty years to protect imperiled plants and wildlife, open space, air and water quality, and overall quality of life.

All comments from last year are equally applicable this year as the 2021 draft EA suffers from the same or similar deficiencies as the 2020 one, and are hereby incorporated by reference and attached as Appendix A. Also, comments on this EA by the Xerces Society for Invertebrate Conservation from 2021 and the Xerces Society along with the Center for 2020 are equally applicable, and are hereby incorporated by reference and attached as Appendix B and C respectively.

For the many reasons described therein, the draft EAs fail to comply with NEPA, the ESA, and other applicable laws. Thank you for considering and incorporating the contents of these comments. Please do not hesitate to contact me if you would like to discuss these matters.

Sincerely,

Lori Ann Burd
Environmental Health Director and Senior Attorney
Center for Biological Diversity
P.O. Box 11374 Portland, OR 97211-0374
971-717-6405 urd@biologicaldiversity.org

Comment Summary and Response

As stated in this appendix, no actual comment was presented in this (2021) iteration of CBD's input on the program's draft EAs. It's inclusion as an appendix relating to OR-22-01 is therefore entirely unclear.

b. Center for Biological Diversity Appendix B, 2020 Comments

"RE: Draft Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program, Oregon, EA Number: OR-20-1":
(Text in full, followed by comment summaries and responses.)

6/1/20

To Whom it May Concern:

Please accept the following comments on behalf of the Center for Biological Diversity ("Center") in response to the Animal and Plant Health Inspection Service's ("APHIS") environmental assessment ("EA") evaluating the impacts of the agency's proposed grasshopper and Mormon cricket suppression programs in Oregon.

The Center is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has 1.7 million members and online activists dedicated to the protection and restoration of endangered species and wild places, including members and supporters in Oregon. The Center has worked for thirty years to protect imperiled plants and wildlife, habitat, air and water quality, and overall quality of life.

While normally we would craft even more detailed comments on the EA, we are unfortunately constrained by time because we were never informed by APHIS of the availability of this EA, despite the fact that we had commented on both the Notice of Intent to Prepare and EIS and the Draft Programmatic Environmental Impact Statement for the Grasshopper and Mormon Cricket Suppression Program, and by the sheer volume of EAs for this program throughout the west. Going forward, we request that you add us to your list of interested parties so that timely notice of opportunities to comment are provided. **[Note: CBD in Oregon was specifically notified in 2020, as well as every subsequent year, as to the publication of the *Oregon* EA; perhaps this is a comment drafted in response to another state's EA at that time? Regardless, there is no relevance at all to recent Oregon EAs, let alone the only one in question at this time, OR-22-1. This comment is the first example of a type of comment that is considered not relevant to the current EA, because of a gross lack of specificity. Since CBD did not edit their appendices to be relevant by their own determination, such comments will not be responded to in this EA at APHIS' determination. Further examples of such comments primarily focus on chemicals or formulations not included in this EA for consideration at all, such as Malathion, Chlorantraniliprole or liquid formulation of Carbaryl.]**

We are deeply concerned about the actions contemplated in this EA. We are dismayed by APHIS's plan to, if asked, spray toxic pesticides across swaths of land that provide much needed habitat for a diverse array of species, including native bee species that are barely known, while we are in the midst of the sixth great extinction, to protect a few private interests. For narrow endemic species already on the brink, a single spraying incident could bring extinction. For agency staff, recreationists, growers and farmworkers, ranchers and ranch hands, exposure to these pesticides brings unnecessary health risks. While we recognize that grasshoppers and Mormon crickets are viewed as pests by some, they are a natural part of ecosystems adapted to disturbance. We urge APHIS reconsider its tactics, which includes accepting the role of grasshoppers and Mormon crickets, and if it has no choice but to act, to act in accordance with the precautionary principle and integrated pest management, rather than immediately turning to the use of dangerous poisons.

I. The Draft Environmental Assessments Frustrate Public Participation

The National Environmental Policy Act ("NEPA") "is a procedural statute intended to ensure environmentally informed decision-making by federal agencies."1 In taking a "hard look" at the consequences of major decisions, agencies are required to "involve the public in preparing and implementing their NEPA procedures."2 Further, agencies have an obligation to afford "interested persons an opportunity to participate in the rule making."3

The very purpose of NEPA is to "ensure that federal agencies are informed of environmental consequences before making decisions and that the information is available to the public."4 Indeed, meaningful and effective public participation is one of the cornerstones of NEPA. The regulations require that agencies shall "make diligent efforts to involve the public in preparing and implementing their NEPA procedures."5 The agency must "provide public notice of NEPA-related hearings, public meetings, and the availability of environmental documents" so that interested persons and agencies can be informed.6 Also, federal agencies shall to the fullest extent possible "encourage and facilitate public involvement in decisions which affect the quality of the human environment."7

Here, APHIS has failed to meet NEPA's public involvement requirements.

APHIS frustrated public participation by failing to inform interested parties of the existence of this EA, by not providing information for the submission of public comments including where and when to submit comments by, limiting public notice to local papers, and providing a short public comment period during this COVID-19 pandemic. When the public is "not being allowed to participate . . . or [has to] hurriedly clamber to do so because of . . . the limited time frame and other constraints upon public participation" decisions are made "without the full benefit of public input."8

Indeed, the need for consistent and meaningful public engagement is especially vital where, as here, the proposal in question is controversial and deals with issues of significant public interest.9

The Draft EA also limit public participation by failing to provide contact information for the submission of electronic comments. Nowhere on the webpage for the Draft Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program or the EA is there an email address for comment submission, nor is there contact information for any staff member that questions or comments could be addressed to.10 In 2020, when most people are trying to stay at home to stay safe during a pandemic, there is no excuse for not providing an email address for comment submission to spare commentators a trip to the printer and post office.

In addition to there being no contact information for submission of comments, there is no information on when the comment period opened, or will close, on the EA provided on the webpage. With the EA dated March 20, 2020, a reasonable person could have easily concluded that a 30 day comment period would have ended at the end of April 20, and had no idea that the actual deadline was June 1, 2020. Had we not been persistent in following up to ascertain the actual posting date and comment period closing date, we could have easily missed the opportunity to comment. APHIS's failure to provide the most basic information to interested parties, i.e. the availability of EA for public comment, where to send comments to, and when comments are due, fails to comport with NEPA's threshold requirements.

Furthermore, the 30 day comment deadline for the Draft EA is wholly inadequate during the current COVID-19 pandemic, where both staff and members of the concerned public have limited capacity for commenting, given the challenges associated with a global pandemic including but not limited to increased childcare demands, illness, etc.

The Draft EA further limits public participation by failing to post notices in the Federal Register or on regulations.gov, unlike earlier versions of the environmental review.11 It is unclear what method of notice was provided to the public beyond publishing the EA online during the COVID-19 pandemic, although we have been informed for some of these grasshopper EAs that there was notice in local newspapers. Relying solely on local notice is insufficient as it excludes countless other interested parties for a project with potentially widespread impacts, including impacts to areas and species of national concern. In sum, APHIS has failed to meet NEPAs requirements for public involvement in this EA.

NEPA is our “basic national charter for the protection of the environment.”12 Congress enacted NEPA “[t]o declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; [and] to enrich the understanding of the ecological systems and natural resources important to the Nation.”13 NEPA demands, “to the fullest extent possible . . . the policies, regulations, and public laws of the United States . . . be interpreted and administered in accordance with” its principles.14

NEPA requires agencies to take a hard look at the environmental impacts of proposed actions and fully disclose these impacts to the public before proceeding. “NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken.”15 This process “is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.”16 Agencies must “integrate the NEPA process . . . at the earliest possible time to insure that planning and decisions reflect environmental values.”17 “Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA.”18

A. APHIS Has Failed to Articulate or Analyze a Reasonable Range of Alternatives

The range of alternatives offered by APHIS is inadequate. They are outlined as “No Action,” “Insecticide Applications at Conventional Rates or Reduced Agent Area Treatments with Adaptive Management Strategy (Preferred Alternative), and “Experimental Treatments.”19 While the RAATs are an improvement over conventional approval rates, this alternative should actually be two, one, Insecticide Applications at Conventional Rates and two, Reduced Agent Area Treatments with Adaptive Management Strategy. Lumping the two together means that supporting this alternative could mean pesticide application at conventional rates without RAATs. APHIS must break these into different alternatives.

Further, it is perplexing as to why APHIS does not include an alternative that explicitly adopts and utilizes Integrated Pest Management (“IPM”). While the two latter alternatives appear to attempt to incorporate some aspects of IPM, it’s not clear why IPM is not just one of the alternatives. We urge APHIS to adopt a new alternative that combines IPM with the best of RAATs and Experimental Treatments to cause the least harm possible while carrying out its statutory mandates under the Plant Protect Act.

The Natural Resources Conservation Service (NRCS) defines IPM as “a site-specific combination of pest prevention, pest avoidance, pest monitoring, and pest suppression strategies.”20 IPM was developed as a process for addressing pests of all kinds as a response to the overuse of chemical pesticides and their associated environmental harms. IPM recognizes that pesticide overuse threatens environmental health, disrupts food webs, contaminates drinking water and undermines pesticide effectiveness.

IPM has become the standard framework for using pesticide by many agencies and land managers and the Federal, Insecticide, Fungicide, and Rodenticide Act (FIFRA) states that "…the [Environmental Protection Agency] Administrator in cooperation with the Secretary of Agriculture shall develop approaches to the control of pests based on integrated pest management…".21 IPM practice is codified into the laws and regulations of agencies that manage public lands including: the Department of Interior (DOI)22, and its Bureau of Land Management (BLM)23 as well as the United States Department of Agriculture's (USDA) United States Forest Service (USFS)24 and the National Parks Service (NPS).25 Given that much of APHIS's work on grasshopper and Mormon cricket suppression is on lands that span a range of ownership types including significant portions of federal public lands, it would only make sense that APHIS would employ a method that is well known by these land managers.

Unfortunately, there are countless examples of entities claiming to adhere to the tenants of IPM but in reality deploying dangerous pesticides as a first line of attack. In adopting an IPM alternative, we urge APHIS to not make this mistake in Oregon.

IPM is a process that requires planning that is land-use and pest-specific that uses the minimum level of pest suppression necessary. IPM relies on prevention, avoidance, monitoring, and suppression ("PAMS") techniques in order to decrease pest pressure from a combination of biological, cultural, and chemical controls.26 Early Detection and Rapid Response ("EDRR") is essential to identifying, monitoring, and removing undesirable species from an environment.27 Successful management requires the preparation and implementation of strategic, long-term plans with defined threshold values that rely on prevention, education, and restoration that enhance the overall health of an ecosystem.28 In IPM, chemical control may only be the last line of defense after preventative and avoidance practices have been implemented, and in IPM, even when pesticides are used, the least toxic options are deployed. Unfortunately, many agencies claiming to use IPM don't even bother to use less toxic pesticides before resorting to chemicals known to cause significant harm to human health and the environment. Sometimes they even resort to prophylactic pesticide use. This is an inappropriate approach for many reasons, including because these prophylactic pesticide uses are likely to undermine natural control mechanisms.29

APHIS must adopt an alternative that harmonizes its mandates in regard to grasshoppers and Mormon crickets with the IPM mandates and goals of the lands that it operates on. APHIS must enlist IPM experts to craft an alternative that is land-use and pest-specific, using the minimum level of pest suppression necessary, relying on prevention, avoidance, monitoring, and suppression techniques in order to decrease pest pressure with the least harmful controls possible. Some of the methods APHIS describes in other alternatives could be incorporated in to the new IPM alternative.

B. APHIS Has Not Adequately Analyzed the Impacts to Human Health

The EA states that the "suppression program would be conducted on rangelands that are not normally inhabited by humans."30 It goes on to say "[h]uman health may be affected by the proposed actions. However, potential exposures to the general public from traditional application rates are infrequent and of low magnitude. These low exposures to the public pose essentially no risk of direct toxicity, carcinogenicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity."31

These statements do not provide any site specific analysis of the impacts to human health, and ultimately raise more questions than they answer. For one, APHIS does not actually analyze the potential impacts of the proposed actions to any humans in any of the potential spray zones, regardless of how sparse the population is.

APHIS also states that “Children and persons with sensitivity to chemicals are those most likely to experience any negative effects. These individuals will be advised to avoid treatment areas at the time of application until the insecticide has time to dry on the treated vegetation.”32 Does APHIS mean to say it has information on and a means to contact all people who may pass through these areas who have allergic or hypersensitive reactions to these insecticides? Where did it get this data? Who else has access to it? How can it be sure it is not missing anyone? Simply put, this assertion seems highly suspect.

Further, APHIS does not account for tribal use areas in the human health effects analysis, ignoring major issues such as sacred sites, traditional collection sites, hunting grounds, etc. How will APHIS ensure that it is avoiding culturally sensitive sites? While it says it will consult with tribes prior to treatment season,33 this statement presumes that APHIS staff know all the sites that are of consequence to tribes, which seems like a dubious claim.

As described in great detail in the pesticides section, APHIS is proposing to use very dangerous chemicals that can cause a variety of significant impacts to human health. APHIS must conduct an adequate analysis of human health effects as NEPA requires. APHIS does not even attempt to consider whether groundwater or surface water used by humans may be impacted, another major failing of this EA. The low relative density of human population does not absolve APHIS of its mandate to take a hard look at human health effects.

Further, in addition to the people who reside in these areas, APHIS must consider the impacts to the humans to who pass through treated areas, whether they be ranchers or ranch hands, OHV riders, local residents or people who for whatever reason decided to take a walk or otherwise spend some time in the natural beauty of Oregon’s open spaces. Especially during this COVID-19 crisis, people may well seek to spend time outdoors in Oregon’s rangelands, and APHIS must consider the impacts of the proposed action on these individuals. APHIS recognizes that recreationists use these range lands, but it only says that if a recreational facility is encountered, it will deploy mitigation measures.34 However, even APHIS recognizes that the recreational uses of Eastern Oregon’s rangelands are primarily dispersed uses,35 like bird watching and hunting, and thus the statement that it will look out for recreational facilities does nothing to assess the impacts to the tens of thousands of people who participate in dispersed recreation in Eastern Oregon every summer.

APHIS acknowledges that “[t]hose most at risk during operations would be persons actually mixing or applying chemicals. These individuals will be advised to avoid treatment areas at the time of application until the insecticide has time to dry on the treated vegetation.”36 This does not constitute a hard look at the impacts, it is simply an acknowledgement that there is an issue that requires a hard look.

These are dangerous chemicals, and APHIS’s failure conduct a proper analysis of their impacts to human health is a far cry from the level of analysis demanded by NEPA and due care for public health.

C. APHIS Has Not Adequately Analyzed the Impacts to Biological Resources

1. APHIS Fails to Adequately Analyze Impacts to Endangered Species Act Listed Species

For the reasons described in detail below, APHIS has failed to comply with the requirements of the Endangered Species Act (ESA) for this proposed action, and has also failed to take the hard look NEPA requires at the impacts of the proposed action to imperiled species including federally listed endangered species.

2. APHIS Fails to Adequately Analyze Impacts to Migratory Birds

APHIS fails to look at the effects of the proposed action on migratory birds. Eastern Oregon's rangelands provide important habitat for a massive array of migratory birds, yet there is zero analysis of how they would be affected in the EA.37 APHIS needs to take a hard look at the impacts of the proposed action, including direct and indirect effects. A direct effect of not spraying insecticides is abundant food in the form of grasshoppers and crickets for migratory birds. Conversely, a direct effect of spraying is reduced abundance of food for insectivorous migratory birds. Another potential direct effect of insecticide spraying is poisoning. An example of an indirect effect is the cumulative effect of continuous low level pesticide exposure from numerous sites over many years.

Rather than provide any analysis, or even name a single migratory bird species and discuss how the proposed action in Oregon may affect this species, APHIS just states that it 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 minimizing, 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.38 If this is in fact the case, then APHIS needs to explain how it will actually support the conservation intent, what it plans in terms of buffers, etc. The EA goes on to say, "[f]or any given treatment, only a portion of the environment will be treated, therefore minimizing potential impacts to migratory bird populations"39 The MBTA's prohibitions against harm to migratory birds do not apply just to population level impacts, but to individuals. APHIS misses the point by pointing to the likely lack of population level effects in this EA.

APHIS fails to comply with the Migratory Bird Treaty Act and NEPA. APHIS must take a hard look at potential impacts to migratory birds.

3. APHIS Fails to Adequately Analyze Impacts to Wildlife, Non-target Species, Species of Concern and Additional Species of Concern

APHIS's handling of impacts to non-target species and species of concern fails to fails to meet NEPA's requirement that the agency take a hard look at the impacts of its proposed action. The EA can not be finalized until APHIS actually takes a hard look at the impacts on the huge swath of non-target and species of concern. While this section of this EA is an improvement over what other states have done, in that it actually names vertebrates and invertebrate animals, aquatic organisms, terrestrial plants, and discusses the sage grouse and Columbia spotted frog and how they will be protected, it presents an overly optimistic perspective on spraying, minimizes or ignores the impacts many species, including most of the species that it names.40

The affected environment includes tremendous biodiversity, including rare rare habitats. There are species that may live no where else except these tiny remnant habitats. However, APHIS fails to take a hard look at the effects on these species. For example, APHIS fails to properly consider impacts to native bees. Bees are flying at the same time as grasshopper treatments could occur. Insecticide spraying done in the wrong place at the wrong time could have the tragic and unintended consequence of wiping out an entire population of a species, or even driving extinct a rare species, perhaps even one that has never been named and is a narrow endemic. Native bees, especially solitary bees, remain understudied and underappreciated, despite the hugely important impacts they have on ecosystem function. Oregon is also home to many species of native bumble bees, and many of these bumble bee species are in decline. Native bees are imperiled by numerous factors including habitat loss, pesticide (especially insecticide) use, and disease. APHIS can not simply propose to use four different insecticides in core native bee habitat in Oregon without considering how this could affect native bee species.

There are numerous other sensitive or culturally important species in Oregon. For example, Oregon is a migratory corridor for monarch butterflies. They are a species in steep decline currently being considered for ESA listing by the U.S. Fish and Wildlife Service.41 They are also hugely culturally significant. APHIS mentions but does not consider impacts to their existence. Indeed, monarch butterflies may well migrate through Oregon during a time when grasshopper spraying could occur. Yet APHIS doesn't consider what the proposed action might mean for them or how this could affect the massive efforts currently underway to save monarch butterflies from extinction.

APHIS must take a hard look at the impacts of the proposed action on pollinators and other sensitive and culturally important species.

D. The EA Has Not Adequately Analyzed the Cumulative or Synergistic Impacts of the Proposed Action

The EA has not adequately analyzed the cumulative impacts of the program with other governmental or private entity actions. NEPA requires an EA to adequately disclose and analyze cumulative effects.42 Cumulative impacts are defined by the NEPA regulations as environmental impacts resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."43

APHIS relies heavily on its presumption that if it does not manage grasshoppers with insecticides, then other land managers will and this will lead to an overall increase in insecticide use.44

The EA does not take into account the background level of exposure to humans and animals from pesticides and other pollutant sources that exist in the environment from other actions or the synergistic effects of the enhanced toxicity that many mixtures exhibit. APHIS does state that it will query local entities for other pesticide treatment plans, but it does not say what it will do with the results of these queries,45 nor how these treatments may cumulatively or synergistically impact the human environment.

There is no mention of widespread mosquito spraying that takes place in many areas.46 Furthermore, cattle and other livestock that graze on these lands are often treated prophylactically with insecticides to prevent lice, mites, ticks, or parasites. These treatments can be in the form of a whole body wash/dip or oral treatment. As cattle are grazing these pesticides will be washed off their bodies or excreted through waste and contaminate surrounding land and water bodies. Cattle ear tags are also common, which release a small amount of insecticide over a long period of time to control flies.

This is all in addition to pesticides used on agricultural crops. A substantial acreage of rangeland is adjacent to lands used for plant agriculture, acres that may well be growing pesticide intensive commodity crops. These areas generally have a high potential for crossover contamination through drift or runoff of pesticides. Large quantities of pesticides, including insecticides and fungicides that may be synergistic with the insecticides included in the EA, may be used on these lands. In addition, herbicide use on crops already significantly impacts insects by destroying habitat and food sources in agricultural lands. Many popular crops seeds are pre-treated with neonicotinoids, which are deadly toxic to bees, freshwater invertebrates, and more, making the areas adjacent to these fields even more important for wildlife.

None of these issues were disclosed or analyzed in the Draft EA and add to the already large cumulative exposures from pesticides used in 1) the boll weevil eradication program, 2) fruit fly cooperative eradication program, 3) the gypsy moth cooperative eradication program, and 4) invasive plant control.47

These cumulative exposures can not only adversely affect human and environmental health but can also negatively impact biological control programs that try to manage insect and weed pests with natural predators.

How these pesticides act in conjunction with one another to additively or synergistically increase toxicity is not discussed and no mitigation measures were proposed. Therefore, APHIS must fully analyze the impacts from cumulative exposures and identify ways in which risk can be mitigated or prohibited. Without this analysis, APHIS fails to meet its threshold disclosure requirements under NEPA.

The project is vague and ill-defined, it improperly precludes the disclosure of environmental effects because the information on the project and its impacts is incomplete. In the purpose and need APHIS just makes vague assertions about how determinations are made on a case by case basis and participation is based on potential damage to various resources.48 This appears to be a request for a blank check any time any assertion of damage is made if the deciding officer is so inclined. There are no limits to the scope of the action, triggers to action, or any of the other necessary aspects of a purpose and need statement.

While the description of Oregon's many ecosystems and natural features is interesting, it was not a NEPA relevant description of the project as it relates to the affected area.49 The description is vague and fails to describe the conditions on the targeted rangelands, but rather just the regions.

This does not give the public sufficient information to be able to gauge the risks involved in this type of spray operation. The agency must give the public a more precise definition of when the threshold for spraying has been met (i.e. number of grasshoppers or crickets/acre and a full description of the economic interests at stake). The agency must also more precisely define RAAT and give an explanation of why full label rates would ever have to be used. APHIS must also convey what metrics will be used to determine the area that will be sprayed in any given outbreak.

The agency must accurately and comprehensively disclose and analyze the range of rare, sensitive, threatened, and endangered species, ecological areas, communities, Native American gathering grounds and sensitive receptors that could potentially be significantly affected by the proposed project. Without this baseline data the EA cannot disclose the environmental effects of the project.

F. APHIS Has Failed to Adequately Describe the Environmental Effects of the Pesticides

APHIS's description of the environmental effects of the pesticides at issue failed to properly capture many of their environmental effects. Below is a far more complete picture of pesticides and their effects, which APHIS is obligated to analyze in terms of the proposed action in Oregon. The 2019 Programmatic EIS does not adequately analyze these impacts as they relate to Oregon.

Carbaryl

Carbaryl can be harmful to many different taxa. Long-term exposure to carbaryl is associated with decreased egg production and fertility in birds.50 Carbaryl is considered moderately toxic to mammals with decreased pup survival being the most sensitive effect.51 EPA has designated carbaryl as "highly toxic" to bees on a short-term exposure basis and ranged from moderately to highly toxic to other insects, motes and spiders. Carbaryl is considered "highly toxic" to certain species of fish when exposed to short-term bursts and can reduce the number of eggs spawned when fish are exposed to lower levels over a longer period of time.52 Carbaryl has been designated “very highly toxic” to aquatic invertebrates on an acute exposure basis by the EPA and mesocosm studies that analyze how the pesticide affects aquatic community structure have found significant negative effects at low levels.53 The EPA identified potential interactions between carbaryl and the androgen pathway in fish, indicating that carbaryl is an endocrine disruptor in male aquatic vertebrates.54

Numerous ESA analyses have found that carbaryl has significant harmful impacts for endangered species. On March 12, 2020, the EPA released a draft biological opinion finding that carbaryl is likely to adversely affect 1542 out of 1745, or 86% percent of all listed species in the U.S. and 713 out of 776 designated critical species’ habitats across the U.S.55 EPA found many Oregon species were likely to be adversely affected, as discussed below. This is a chemical far too toxic for APHIS to consider using across wide swaths of land in Oregon.

The European Union banned carbaryl in 2007 due to, among other things, “…a high long-term risk for insectivorous birds and a high acute risk to herbivorous mammals, a high acute and long-term risk to aquatic organisms and a high risk for beneficial arthropods.”56

Carbaryl is classified as “likely to be carcinogenic to humans” based on treatment-related hemangiosarcoma development in mice.57 EPA has determined that humans can be exposed to more than 4 times the amount of carbaryl known to cause neurotoxicity from some legal uses of the pesticide.58 EPA also found that the current labelled uses of carbaryl may result in neurotoxic harms to mixers, loaders and applicators.59 This indicates a neurotoxic risk to humans and other mammals from the EPA-approved uses of carbaryl.

In sum, use of this dangerous old pesticide must be discontinued and should not be considered for use in grasshopper and Mormon cricket eradication in Oregon.

Chlorantraniliprole

EPA has found that all use scenarios of chlorantraniliprole can result in direct or indirect effects to all listed species.60 Chlorantraniliprole is considered “very highly toxic” to freshwater invertebrates61 and EPA found that many uses of it can result in acute and chronic harms to aquatic invertebrates.62 This was the case for both aerial and ground spray applications. Sublethal doses can impair locomotion in bees more than seven days post exposure.63 A 2013 European Food Safety Authority analysis of chlorantraniliprople found that the use of the pesticide poses a high risk to soil macro-organisms, aquatic invertebrates and sediment dwelling organisms.64

APHIS presents chlorantraniliprole as: “a low use rate insecticide that has reduced human health and ecological risk when compared to other insecticides, including carbaryl and malathion.” While it is true that this relatively new pesticide is not known to have as significant effects as carbaryl or malathion, that does not make it safe, and APHIS must consider its substantial environmental impacts, including population level effects.

Diflubenzuron

Diflubenzuron is considered “highly” to “very highly toxic” to aquatic invertebrates.65 In a 2018 analysis, EPA found that the registered, labeled uses of diflubenzuron may result in freshwater invertebrate exposure at up to 550 times the level known to cause harm.66 Diflubenzuron exposure to honeybees and other pollinators at the larval stage was estimated to be more than 500 times the level known to cause harm.67 Although arthropods are not a part of EPA's ecological risk assessment, the European Food Safety Authority found that "Juvenile non-target arthropods were very sensitive to diflubenzuron. Very large in-field no-spray buffer zones would be needed to protect nontarget arthropods.68 There is no reason for APHIS to exclude consideration of impacts to arthropods in its analysis of this pesticide.

As APHIS acknowledges, this is a restricted use pesticide, meaning that it is so dangerous that it cannot be used by people who lack specific pesticide training. APHIS also acknowledges the pollinator impacts but attempts to diminish them without providing evidence on how or why they are not significant. It does not mention that Oregon is home to an amazing abundance of native bees and pollinators, and does not recognize that native pollinators are far more sensitive than the honeybees that are often used as a surrogate by both EPA and APHIS due to the lack of hive buffering effects. This is not a pesticide that should be applied to broad swaths of land. It is highly toxic to far too many species of importance in Oregon.

Diflubenzuron is commonly fed to ranging cattle as a way to control flies.69 This pesticide is present in the excreted manure and urine of cattle where they range.70 Therefore, any decision on whether to use diflubenzuron in these areas must consider that listed or non-listed species can be exposed to other sources of the pesticide. It is that cumulative exposure that must be considered in this decision – and is compelled by the ESA and NEPA's mandate that an action agency take into account the environmental baseline.

Malathion

While it appears that malathion is not being considered for use in Oregon, since the EA does not expressly state that malathion use is eliminated from consideration and it is included in the 2019

Programmatic EIS, this section is included, however, it is our sincere hope that Oregon has indeed excluded this dangerous old organophosphate from consideration.

Malathion is considered "very highly toxic" to all aquatic and terrestrial invertebrates, as well as aquatic vertebrates such as fish.71 The indirect affects to any plant or animal that rely on these taxa can also be substantial.72 When exposed to malathion for longer periods of time, female birds displayed regressed ovaries, reduced number of hatched eggs and enlarged gizzards.73 Malathion degrades into maloxon, which has been shown to be at least 22 times more toxic than the parent molecule.74

A 2017 EPA biological evaluation also found that the use of malathion is likely to adversely affect 1778 out of 1835 listed species in the U.S. and 784 out of 794 critical species' habitats across the U.S.75 These findings were based on methodology recommended by the National Academy of Sciences.76 EPA found many Oregon species were likely to be adversely affected.77 The U.S. Fish and Wildlife Service later drafted a biological opinion finding that malathion is likely to jeopardize the continued existence of 1284 threatened and endangered species.78 This is an astounding number of jeopardy calls for a single pesticide, and makes it even more astounding that APHIS would continue to consider using it for grasshopper and cricket control.

Malathion has been categorized as a probable human carcinogen by the World Health Organization's International Agency for Research on Cancer (IARC).79 It is listed on

California's Proposition 65 list of chemicals known to cause cancer80 and has been designated as having suggestive evidence of carcinogenicity by the EPA for instances of liver, oral palate mucosa and nasal respiratory epithelium tumor formation in mice.81

EPA has determined that humans can be exposed to more than 6 times the amount of malathion known to cause neurotoxicity from some legal uses of the pesticide.82 EPA also found that the current labelled uses of malathion may result in neurotoxic harms to those exposed to pesticide drift from aerial applications at labelled rates.83 In addition, occupational applicators, mixers and loaders were found to be exposed to malathion through inhalation and dermal absorption at levels above what the EPA considers safe – even when using required personal protective equipment.84 This indicates a neurotoxic risk to humans and other mammals from the EPA-approved uses of malathion.

For these reasons, malathion poses unacceptable risks to human health and the environment and should absolutely not be used by APHIS for grasshopper or Mormon cricket control.

Pesticide Impact on Soil Health

APHIS touts EPA-approval as an indication that the pesticides that the agency proposes to use are safe. However, under our nation’s pesticide laws, EPA-approval is an indication that use of the pesticide won the agency’s cost-benefit analysis, and should not be misconstrued as a finding of safety. In addition to the harms recognized above, EPA’s risk assessments do not analyze harms to soil organisms or overall soil health.85 APHIS does not discuss or account for how pesticides impact overall soil health or the health of any organisms that reside in soil in the action area. Impacts on soil health can impact listed and non-listed plants by impacting nutrient cycling, soil oxygenation and soil water retention, as well as listed and non-listed animals that rely on plants or soil organisms for their survival. Here we provide information on how widespread spraying of insecticides on vast areas of land can negatively affect soil health in those areas. APHIS must incorporate this information into its EA.

Carbaryl:

Carbaryl was ranked as extremely toxic to earthworms in a lab test rating pesticide toxicity from relatively nontoxic, moderately toxic, very toxic, extremely toxic, and super toxic.86 Carbaryl significantly impacted the survival or population abundance of E. fetida,87 E. Andrei,88 Lumbricus terrestris,89 and Lumbricus rubellus, Aporrectodea caliginosa, and Allolobophora chlorotica.90 A single application of carbaryl in a field study caused a 38% reduction in survival of total Lumbricidae,91 and a 78% reduction in total earthworms for at least 5 weeks.92 In another study, carbaryl induced an avoidance response in E. fetida.93 Carbaryl negatively affected the biomass of E. andrei,94 Perionyx excavates,95 total earthworms,96,97 and Lumbricus terrestris at a tenth of the recommended dose.98 A 60-99% reduction in earthworm biomass and density due to carbaryl treatment lasted 20 weeks.99 Carbaryl negatively affected growth in E. fetida,100 and the feeding rate of Diplocardia spp.101 Reproduction of E. fetida,102 and Perionyx excavatus was negatively affected, with the hatching rate of P. excavatus reduced by 87% at sublethal concentrations lower than the recommended field rate.103

Morphological abnormalities and histological changes in E. andrei and M. posthuma were observed at very low, sublethal doses ranging from 0.24-1.20 mg/kg and 0.5-1.20 mg/kg, respectively.104 Carbaryl impacted multiple biochemical biomarkers in E. andrei, including Acetylcholinesterase (AChE), methoxyresorufin-O-deethylase (MROD), and NADH and NADPH red cytochrome reductase.105 AChE activity was inhibited in E. fetida in two studies,106,107 one of which resulted in muscular paralysis that directly impacted earthworm burrowing capabilities.108 A total loss of burrowing was observed at 4 and 8 mg/kg after 40 minutes and at 1 and 2 mg/kg after 80 minutes.109

Burial of organic matter was also negatively affected.110 Casting activity of earthworms was reduced by 90%,111 and 71% and 81% after 3 and 5 weeks, respectively.112 Total cast production of L. terrestris was significantly impacted at one-tenth of the recommended field rate.113 Soil structure changes were observed between the control and carbaryl treated sites, with higher treatments of carbaryl causing significantly more lumps in the soil due to earthworm inactivity.114

In addition to earthworms, carbaryl negatively affected collembola population abundance 115,116,117,118,119 and reproduction.120 Carbaryl also negatively impacted Prostigmata mites,121 and Tiphia vernalis, a wasp that feeds on scarab beetle larvae in the soil.122 Carbaryl can be particularly toxic to ground-nesting bees, like Andrena erythronii,123

Bombus terrestris,124 and Bombus terricola.125 Carbaryl caused 100% mortality in Nomia melanderi when exposed to field-rate pesticide residues 3 hours post-application, 97% mortality with 8 hours post-application, and 78% mortality 2 days post application.126 Carbaryl was more toxic than DDT, which was also tested.127 Bombus impatiens colony vitality (as measured by colony weight, worker weight) and the number of workers, honey pots, and brood chambers was reduced following carbaryl exposure.128

Chlorantraniliprole:

In a laboratory study, chlorantraniliprole negatively inhibited the enzymes acetylcholinesterase and glutathione-S-transferase in Eisenia fetida.129 Chlorantraniliprole negatively affected Folsomia candida (collembola) reproduction.130 Microscopic examination in an avoidance test revealed that the collembola were paralyzed from the chlorantraniliprole treatment and couldn't migrate, clarifying an observed avoidance at 1 mg/kg, but no avoidance at any higher concentrations.131 The authors note that chlorantraniliprole may be more toxic to non-target arthropods closely related to insects than to other soil invertebrates.132 In the field, ground-nesting bumble bees (Bombus impatiens) treated with chlorantraniliprole consumed less pollen than control bees,133 and Staphylinidae (Coleoptera) population abundance was slightly but significantly suppressed.134

Diflubenzuron:

After one application of diflubenzuron, myriapoda populations were nearly eradicated (73% reduction), gamasina mites were reduced by 40%, and uropodina mites were reduced by 57%.135 Diflubenzuron treatment reduced the populations of oribatid mites, prostigmata mites, and soil arthropod larvae, mostly comprised of coleoptera and diptera, by nearly 15%.136 In a field study, collembola populations were negatively affected by diflubenzuron and did not recover for one and a half years.137 The earthworms, Dendrobaena rubidus and Lumbricus rubellus were reduced in plots treated with concentrations of diflubenzuron at half the recommended field rate.138 Gamasid and oribatid mite populations were additionally reduced, and oribatida were observed migrating into deeper soil layers to avoid the pesticide.139 The half-life of diflubenzuron ranges from 1 to 27 days.13 Diflubenzuron treatment resulted in a total loss in brood production of male Bombus terrestris, and 100% inhibition of egg hatching success and larval growth.140 Transovarial transport and accumulation of the pesticide in deposited eggs explained the total loss of reproduction.141 Abnormal cuticle formation, which can lead to mechanical weakness and death, was observed in dead larvae that worker bees were observed removing from treated nests.142

Malathion:

Malathion’s primary acute toxic effect is the inhibition of the enzyme, acetylcholinesterase (AChE).143 Multiple studies have observed AChE inhibition in earthworms when malathion was applied. Malathion had a severe effect on AChE activity in Drawida willsi.144 In addition to AChE, the biochemical biomarkers glutathione-S-transferase, and catalase were also inhibited by malathion in studies with Eisenia

Andrei.145,146 Malathion has also been observed to negatively affect the reproduction of E. andrei147 as well as the sperm count and viability and testicular histology of male E. fetida at sublethal concentrations, potentially impairing population abundance.148 Growth, casting activity, and respiration of D. willsi was negatively affected by malathion treatment and did not recover for 75, 60, and 30 days, respectively.149 In a lab test rating the toxicity of 45 pesticides to E. fetida, malathion was ranked moderately toxic with an LC50 of 114.4 ug/cm.150 In addition to earthworms, malathion caused a 40% decrease in survival of the ground-nesting bee, Nomia melanderi.151

All of these impacts must be considered as part of the direct, indirect, and cumulative effects analysis required by NEPA.

III. APHIS Must Complete ESA Section 7 Consultation and Disclose the Results of that Consultation in the EA Prior to Approving Any Action

The ESA requires that each federal agency “insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species.”152 Compliance with this mandate requires that the agency, prior to any discretionary action, “consult with” and seek the assistance of U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) to assess impacts on endangered and threatened species and critical habitats.153 The EA is an agency action subject to this consultation requirement, must be prepared “concurrently with and integrated with environmental impact analyses . . . required by . . . the Endangered Species Act of 1973.”154 In addition, APHIS has a duty to avoid the take of these species pursuant to Section 9 of the ESA.155

Oregon is home to nearly five dozen federally protected threatened and endangered species and numerous designated critical habitats. APHIS has identified thirteen species under the jurisdiction of the US Fish and Wildlife Service in the area of the proposed action.156 We APHIS’s decision to revise the grasshopper and Mormon cricket suppression program is an agency action within its discretion and therefore subject to the ESA consultation requirement. The Plant Protection Act leaves to agency discretion the tools, methods, and implementation of that treatment.157

The purpose of the NEPA analysis is to analyze and disclose to the public the potential environmental effects of the proposed project to make an informed decision. The purpose of ESA consultation is to ensure that APHIS does not put protected species in jeopardy, adversely modify their critical habitat or unlawfully take protected species. In order to properly provide information to the public for commenting on the EIS and the EA, the section 7 process should be completed prior to the completion of NEPA.158 That information should be disclosed to the public through the NEPA process to allow for full public comment and input. APHIS cannot proceed with this EA without receiving concurrence from the U.S. Fish and Wildlife Service on decisions affecting ESA listed species and critical habitat.

APHIS touts the completion of a 2010 consultation with NMFS in this EA.159 However, it does not even mention salmon or steelhead in its analysis or discussion of non-target impacts, how it is complying with the 2010 Biological Opinion in this EA or its appendices, or whether any conditions have changed that trigger the threshold for the reinitiation of consultation on the local level. With climate change, fires, ocean acidification and many other threats affecting Oregon’s listed salmonids, APHIS can not simply rely on a decade old consultation and move on. At the very least, it must initiate informal consultation with NMFS on the impacts of this specific proposed action to species under its jurisdiction. There are far too many salmon and steelhead streams in the area of the proposed action for it a simple statement of reliance on a decade old BiOp to suffice to meet APHIS's legal obligations.

Further, APHIS provides no indication that it has completed even informal consultation with FWS to analyze direct and indirect effects of the 2020 proposed action on threatened, endangered and sensitive species and their habitats including. Consultation must include consideration of effects including but not limited to, runoff, drift, synergistic effects, inert pesticide ingredients, and degraded pesticide ingredients.160 APHIS must ensure that consultation addresses all species and critical habitat that could be directly and indirectly affected by the proposed project.

The list of species APHIS informally consulted on back in 2019 also appears to be incomplete. For example, the federally listed northern spotted owl does have a portion of its range in the eastern 2/3rds of the state, yet it is excluded from the list of species that received the benefit of informal consultation. a

To satisfy ESA's mandate, APHIS must rely on the best available scientific and commercial data regarding pesticide use, impacts, and ingredients, and distribution and range of listed species.161 The ESA has specific requirements for formal consultation, such as a description of the action, specific area affected by the action, listed species or critical habitat that may be affected, and an analysis of the cumulative impacts.162

APHIS has failed to comply with the basic mandates of the ESA in these EA and actions and if it moves forward with this project, it will be doing so in violation of the ESA.

The EA states that "APHIS submitted a programmatic biological assessment and requested consultation with USFWS on March 9, 2015 for use of carbaryl, malathion, diflubenzuron, and chlorantraniliprole for grasshopper suppression in the 17-state program area. 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."163

A half decade old request for concurrence has no legal relevance here, and does not indicate ESA compliance. Further, EPA is not empowered under the ESA to make the conclusion that the program is not likely to adversely affect listed species and just move on from there. APHIS's 2020 letter requesting concurrence on its determination is not provided, and thus can not be assessed by the public in commenting on this agency action.

The ESA demands more of both APHIS and the Services. If the agency is proposing an action, and requesting consultation on the action, it must properly engage in the ESA's well established processes, and there is no exemption for when the agency thinks that it is not likely to occur so thus FWS should just sign off. This approach is plainly unlawful. APHIS must actually consider whether the proposed action may affect listed species, and it must engage in a species specific analysis to do so.

APHIS has failed to meet its consultation requirements with the U.S. Fish and Wildlife Service. There is no programmatic consultation that covers the FWS species for the proposed action. The initiation of consultation in 2015 does not provide any take coverage or signify that APHIS has complied with its Section 7 duties, nor does the 2019 informal consultation with FWS.

Per the ESA, APHIS must avoid an irreversible or irretrievable commitment of resources related to this project prior to the completion of consultation.164 But APHIS is already deep in the NEPA process and only promises to disclose the results of its informal consultation with FWS but does not do so, precluding the public from having an opportunity to review the consultation and provide feedback. APHIS would unlawfully be making an irreversible or irretrievable commitment of resources if it allows insecticide application on rangeland grasshoppers and/or Mormon crickets to occur prior to fulfilling its Section 7 obligations. APHIS will run afoul of its Section 7 ESA requirements if it chooses to move forward, and it will also likely violate the ESA's prohibition against the take of endangered species as described by Section 9 of the statute if it moves forward with this project prior to properly completing its Section 7 duties. Even where there is a letter of concurrence, APHIS may still fail to comply with the ESA because informal consultation does not authorize the incidental take of federally-listed species nor does it authorize the adverse modification or destruction of critical habitat.

Endangered Species of Oregon

Below is a list of some Oregon species that APHIS needs to consult on under Section 7 of the ESA, lest the agency risk violations of Section 9's prohibition against unauthorized take of species.

Birds

Northern spotted owl (Strix occidentalis caurina)
Yellow-billed cuckoo (Coccyzus americanus)

The northern spotted owl ((Strix occidentalis caurina) could face threats from insecticide use both from direct effects and also because they consume small mammals in which insecticides could bioaccumulate. Bioaccumulation of insecticides and other toxins in raptors is in fact a serious problem, especially once cumulative effects such as exposure to lead from spent ammunition, and rodenticides, a leading cause of death to birds of prey, are factored in. Northern spotted owl range does include a portion of Oregon's east side and APHIS can not ignore this species.

The yellow-billed cuckoo (Coccyzus americanus) is a neotropical migrant that winters in South America and breeds in North America.165 The yellow-billed cuckoo also inhabits large riparian woodlands and primarily feeds on caterpillars found on cottonwood (Populus spp.) and willow (Salix spp.) species.166 Grasshopper spraying in or near riparian areas can decrease prey populations for these species as well as produce chronic sub-lethal effects as a result of drift or ingesting pesticide through the insects they consume.

Bioaccumulation of insecticides and other toxins in insectivorous birds is a very serious problem, especially once cumulative effects such as exposure to other environmental toxins including from agricultural pesticide run-off are factored in.

Grasshopper spraying can also decrease prey populations for these species as well as produce chronic sub-lethal effects as a result of drift or ingesting pesticide through the insects they consume. For all these species, insecticide spraying threatens their food supply and imperils them with acute and subacute poisoning impacts.

The EPA's recent draft biological assessment for carbaryl found that the pesticide is likely to adversely affect both of these species.167

There is much reason to be concerned about the potential impacts of the insecticides at issue for these avian species. APHIS can not[sic] simply hope that these species are not affected, it must actually analyze whether the proposed action may cause any effects.

Fish:

Warner sucker (Catostomus warnerensis)
Shortnose sucker (Chasmistes brevirostris)
Lost River sucker (Deltistes luxatus)
Hutton tui chub (Gila bicolor ssp.)
Borax Lake chub (Gila boraxobius)
Lahontan cutthroat trout (Oncorhynchus clarki henshawi)
Bull trout (Salvelinus confluentus)

ESA listed species under NMFS' jurisdiction including salmon and steelhead (many species)

All of these fish are highly sensitive to disturbances and vulnerable to extinction because of their limited distribution. Carbaryl is slightly to highly toxic to fish, including reductions to brain enzymes.168 It's reasonable to assume that, given the extant studies were performed on full-size fish, effects will be exacerbated in these small fish (most <5cm in length). For all of the insecticides, there is an indirect effect of their application causing a loss of invertebrates which these fish partially rely upon for sustenance. Even a slight decrease in invertebrate abundance and diversity could have significant effects on these fish, given their diminutive stature

The EPA's recent draft biological assessment for carbaryl found that the pesticide is likely to adversely effect all of this species. 169

Oregon's listed salmonids are already facing significant threats from climate change, dams, pesticide use more broadly, and habitat loss. Insecticide use threatens them with direct effects, and also imperils their food supply. NMFS has issued unprecedented jeopardy calls for West Coast salmonids from malathion.170 Bioaccumulation of toxins in their limited range, both from this project and other activities such as farming, mining, grazing, and OHV use, presents a substantial threat that must be considered for these precariously endangered fish. The population trends for these fish are discouraging to say the least, and APHIS must comply with its duties under the ESA to ensure they are not further harmed.

APHIS must ensure that insecticide spraying for grasshopper suppression does not result in any insecticide drift or runoff in to the habitats of any of these species, especially considering the many other pollutants they must contend with. From direct effects like acute poisoning to indirect effects such as reduced prey availability, APHIS can not[sic] simply hope that vague assurances will satisfy its obligation to these species.

Invertebrates

While there are not currently any listed invertebrate species in the project area, APHIS still should more carefully consider the impacts of the proposed action on invertebrate species, including the monarch butterfly, a candidate for listing, and also the Franklin's bumble bee.

Invertebrates are of course, highly susceptible to the impacts of insecticide spraying.

Plants

Applegate's milk vetch (Astragalus applegatei)

Howell's spectacular thelypody (Thelypodium howellii ssp. spectabilis)
Spalding's campion (Silene spaldingii)

There are only six known occupied sites of the Applegate's milk vetch, an extremely rare member of the pea family with whit[sic] flowers that have lilac tips. This species is greatly imperiled, and any spraying in its habitat could have catastrophic impacts on this plant vis a vis impacts to its insect pollinators.

The Howell's spectacular thelypody is a beautiful little plant with purple flowers that is imperiled by herbicide use as well as habitat degradation including from grazing. It is thought to exist on under twenty sites in just two eastern Oregon counties. Any errant spraying could have potentially catastrophic impacts to this plants[sic] and the insects it relies on.

Spalding's Catchfly or campion is a fascinating plant covered in dense sticky hair that exists in the very kinds of rangelands that the proposed action targets, and is imperiled both by grazing and herbicide use. Less rare than the other two plants, any insecticide spraying in the northeastern corner of the state may be a threat to this federally protected plant and the insects that are an inextricable part of its life cycle.

Use of insecticides can directly effect plants, can harm their soil and can also reduce available pollinators for these plants, threatening the viability of their life cycle. Any mitigation efforts to avoid adverse effects to this species will necessitate knowledge of all occupied habitat, which requires regular surveys, and also knowledge of groundwater, as well as knowledge of unoccupied but nonetheless essential habitat. This knowledge would also have to factor in current and anticipated threats, cumulative impacts, and likely climate change migration. APHIS also must consider the fact that EPA has concluded that all three species are likely to be adversely affected by carbaryl in its recent draft biological evaluation for this pesticide.171 The proposed action must undergo proper ESA consultation so that effects to these plants[sic] species can be examined in light of the best available scientific information, as required by the ESA. Conclusory statements and rubber stamps do not satisfy the ESA's mandates.

IV. CONCLUSION

For the many reasons described above, the draft EA fails to comply with NEPA and the ESA. Thank you for considering and incorporating the contents of these comments. Please do not hesitate to contact me if you would like to discuss these matters.

Sincerely,

Lori Ann Burd

Environmental Health Director and Senior Attorney
Center for Biological Diversity
P.O. Box 11374 Portland, OR 97211-0374
971-717-6405 laburd@biologicaldiversity.org

[Comment Citations]

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Comment summaries and responses

NOTE: As stated above in response to comments above such as: "While normally we would craft even more detailed comments on the EA, we are unfortunately constrained by time because we were never informed by APHIS of the availability of this EA…", CBD in Oregon was specifically notified in 2020, as well as every subsequent year, as to the publication of the Oregon EA, so perhaps this is a comment drafted in response to another state's EA at that time? Regardless, there is no relevance at all to recent Oregon EAs, let alone the only one in question at *this* time: OR-22-1. This comment is the first example of a type of comment that is considered not relevant to the current EA, because of a lack of specificity. Since CBD did not edit their appendices to be relevant by their own determination, such comments will not be responded to in this EA at APHIS' determination. Further examples of such comments primarily focus on chemicals or formulations not included in this EA for consideration at all, such as Malathion, Chlorantraniliprole or liquid formulation of Carbaryl.

Comment 1: "…The proposal in question is controversial and deals with issues of significant public interest."

APHIS is not aware of any controversy in the program. Every year APHIS works with local stakeholders to gather information and discuss the grasshopper program. The grasshopper program requires a written request to treat on any land and discussions with the land owner or manager determine the course of the final action. APHIS acts in partnership with stakeholders through agreements and Memoranda of Understanding on all activities in the program.

Comment 2: "The range of alternatives offered by APHIS is woefully inadequate."
APHIS structured and analyzed the risk of the substantial program alternatives available to the agency. Alternatives, including those excluded from further analysis, were discussed in the final EIS.

Comment 3: "While the RAATs are an improvement over conventional approval rates, this alternative should actually be two, one, Insecticide Applications at Conventional Rates and two, Reduced Agent Area Treatments with Adaptive Management Strategy. Lumping the two together means that supporting this alternative could mean pesticide application at conventional rates without RAATs. APHIS must break these into different alternatives."

The EA states “Under Alternative A, the No Action alternative, APHIS would not conduct a program to suppress grasshopper infestations. Under this alternative, APHIS may opt to provide limited technical assistance, but any suppression program would be implemented by a Federal land management agency, a State agriculture department, a local government, or a private group or individual.”

Under Alternative B, the Preferred Alternative, APHIS would manage a grasshopper treatment program using potentially any of pesticides and application methods described in the EA Alternative B to suppress outbreaks. The grouping of conventional methods and pesticide rates with the more commonly used RAATs procedures reflects the variety of approaches that the agency may need depending on treatment specific circumstances.

Comment 4: “APHIS does not include an alternative that utilizes Integrated Pest Management.” “…APHIS must enlist IPM experts to craft an alternative that is land-use and pest-specific, using the minimum level of pest suppression necessary, relying on prevention, avoidance, monitoring, and suppression techniques in order to decrease pest pressure with the least harmful controls possible.”

APHIS technical guidance is part of each alternative proposed, and is not unique to any one alternative. An example of APHIS technical guidance is the agency’s work on integrated pest management (IPM) for the grasshopper program. IPM for grasshoppers includes biological control, chemical control, rangeland and population dynamics, and decision support tools.

APHIS has funded the investigation of various integrated pest management (IPM) strategies for the grasshopper program. Congress established the Grasshopper Integrated Pest Management (GIPM) to study the feasibility of using IPM for managing grasshoppers.

The major objectives of the APHIS GIPM program were to: 1) manage grasshopper populations in study areas, 2) compare the effectiveness of an IPM program for rangeland grasshoppers with the effectiveness of a standard chemical control program on a regional scale, 3) determine the effectiveness of early sampling in detecting developing grasshopper infestations, 4) quantify short- and long-term responses of grasshopper populations to treatments, and 5) develop and evaluate new grasshopper suppression techniques that have minimal effects on non-target species (Quinn, 2000). The results for the GIPM program have been provided to managers of public and private rangeland including ways to manage grasshopper populations in the long-term, such as livestock grazing methods and cultural control by farmers.

APHIS issued the GIPM User Handbook describing biological control, chemical control, environmental monitoring and evaluating, modeling and population dynamics, rangeland management, decision support tools, and future directions.

Federal and State land management agencies, State agriculture departments, and private groups or individuals may carry out a variety of preventative IPM strategies that may reduce the potential for grasshopper outbreaks. Some of these activities include grazing management practices, cultural and mechanical methods, and prescribe-burning of rangeland areas. These techniques have been tried with varying success in rangeland management, and some have been associated with the prevention, control, or suppression of harmful grasshopper populations on rangeland.

Regardless of the various IPM strategies taken, the primary focus of the risk analysis contained in the EAs is on the potential impacts from chemical treatments needed during an outbreak of economic importance. While APHIS provides technical expertise regarding grasshopper management actions, the responsibility for implementing most land management practices lies with other Federal (i.e., BIA, BLM, and USDA's FS), State, and private land managers.

Comment 5: "Given that much of APHIS's work on grasshopper and Mormon cricket suppression is on lands that span a range of ownership types including significant portions of federal public lands, it would only make sense that APHIS would employ a method that is well known by these land managers."

See previous response. APHIS supports the use of IPM to prevent grasshopper outbreaks on or near Federal lands. These actions are and should continue to be considered by agencies as part of proper land management. APHIS treatments are a component of the IPM strategies that may be employed by Federal land management agencies. APHIS also adheres to any restrictions proposed by Federal or State land management agencies that may be part of their IPM strategies.

Comment 6: "APHIS must adopt an alternative that harmonizes its mandates in regard to grasshoppers and Mormon crickets with the IPM mandates of the federal lands that it operates on."

See previous response. A Memorandum of Understanding between land management agencies, i.e., the Department of Interior's Bureau of Indian Affairs and Bureau of Land Management, and USDA's Forest Service, indicates that while APHIS provides technical expertise, namely advice, regarding grasshopper management actions, the responsibility for implementing most land management practices, including IPM measures, lies with other Federal (i.e., BIA, BLM, and USDA's FS), State, and private land managers (page 32 of the 2019 EIS).

Comment 7: "APHIS must conduct an adequate analysis of human health effects… APHIS's failure conduct a proper analysis of their impacts to human health is a far cry from the level of analysis demanded by NEPA and due care for public health."

APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019).

Adherence to label requirements and additional Program measures designed to reduce exposure to workers (e.g., PPE requirements include long-sleeved shirt and long pants and shoes plus socks) 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.

Comment 8: "APHIS fails to look at the effects of the proposed action on migratory birds."

Executive Order 13186 directs Federal agencies taking actions with a measurable negative effect on migratory bird populations to develop and implement a Memorandum of Understanding with the USFWS that promotes the conservation of migratory bird populations. On August 2, 2012, a Memorandum of Understanding between APHIS and the USFWS was signed to facilitate the implementation of this Executive Order.

Specifically to the grasshopper and Mormon cricket program, APHIS evaluated potential impacts to birds in the final EIS and associated human health and ecological risk assessments. These documents are incorporated by reference into the final EA.

Comment 9: "APHIS needs to take a hard look at the impacts of the proposed action, including direct and indirect effects."

The EA incorporated the analysis from the EIS and associated human health and ecological risk assessments into the analysis. The EIS, and in particular, the risk assessments evaluated potential indirect effects to non-target organisms, relying on available toxicity data and estimates of risk.

Comment 10: "A direct effect of not spraying insecticides is abundant food for migratory birds. Conversely, a direct effect of spraying is reduced abundance of food for insectivorous migratory birds. Another potential direct effect of insecticide spraying is poisoning. An example of an indirect effect is the cumulative effect of continuous low level pesticide exposure from numerous sites over many years. APHIS must take a hard look at all these impacts."

APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019). The risk assessments discuss the risk to birds for each program insecticide. Available laboratory and field effects data were used to evaluate risks to birds through direct exposure as well as indirect effects that could result from the loss of prey items such as terrestrial arthropods.

The goal of APHIS programs is not to eradicate grasshopper species, rather to reduce their populations to acceptable levels, which will still allow for normal predation levels. Further, buffers of sensitive bird species will allow for ample grasshopper predation.

Comment 11: "APHIS's handling of impacts to non-target species and species of concern wholly fails to meet NEPA's requirement that the agency take a hard look at the impacts of its proposed action."

APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the grasshopper and Mormon cricket suppression program (November 2019). The EIS and risk assessments evaluated available effects data and risk to non-target species. These documents are incorporated by reference into the final EA. The risk assessments provided the basis for summary statements in the EA that is tiered to the EIS.

Comment 12: "The EA cannot be finalized until APHIS actually takes a hard look at the impacts on non-target and species of concern."

APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the grasshopper and Mormon cricket suppression program (November 2019). The EIS and risk assessments evaluated available effects data and risk to non-target species. These documents are incorporated by reference into the final EA. The risk assessments provided the basis for summary statements in the EA that is tiered to the EIS.

APHIS has implemented protective measures for species of concern which may be closely related to a T&E species. This is a cooperative effort by APHIS between FWS and Requesting Land Management agency, among others such as Oregon Department of Fish & Wildlife and academia.

Comment 13: "The affected environment includes tremendous biodiversity, including rare rare habitats. There are species that may live no where else except these tiny remnant habitats. However, APHIS fails to take a hard look at the effects on these species. For example, APHIS fails to properly consider impacts to native bees."

APHIS works with Tribal, Federal and State land managers and their local biologists, natural resource specialists, and range conservationists to implement measures that reduce risks of Program treatments to native bees. These measures may include reduced insecticide applications associated with treatments limited in area as well as by RAATS, avoidance measures and use of carbaryl bait, where applicable. APHIS also prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019). The risk assessments summarized available effects data for nontarget species including pollinators.

Comment 14: "The EA have not adequately analyzed the cumulative impacts of the program with other governmental or private entity actions."

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 draft EIS, from page 79 to 83. It is unlikely there would be significant overlap between APHIS programs and the grasshopper program and coordinated treatments would mitigate impacts if there is ever overlap; current label and 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 (page 82 to 83 of draft EIS).

Comment 15: "The EA does not take into account the background level of exposure to humans and animals from pesticides and other pollutant sources that exist in the environment from other actions or the synergistic effects of the enhanced toxicity that many mixtures exhibit."

The commenter assumes that the rangeland in covered in the EA is exposed to pesticides and pollutants and that there is a synergistic effect which enhances toxicity to the environment. The land managers that manage the areas covered document all pesticide applications. The activities, or lack thereof, are discussed in the cumulative impacts section of the EA.

Comment 16: "There is no mention of widespread mosquito spraying that takes place in many areas."

Mosquito treatments would be focused on water bodies near populated areas, which is the exact opposite of the proposal in the EA, and specifically excluded by the methodologies described, which include large buffers for all water bodies and sensitive sites such as human dwellings, cropland and general human infrastructure.

Comment 17: "As cattle are grazing these pesticides will be washed off their bodies or excreted through waste and contaminate surrounding land and water bodies."

The labels for Dimilin 2L and Carbaryl 2% bait specify that there is no grazing restrictions. Any pesticide residues that may be present on forage in treated areas after treatment is typically metabolized and excreted as metabolites that have lower toxicity than the parent compound. In addition the low application rates employed by APHIS relative to the current maximum labelled rates for each Program insecticide would result in very low residues in livestock waste.

Comment 18: "A substantial acreage of rangeland is adjacent to lands used for plant agriculture, and the EAs state that they also aim to protect these agricultural lands. These areas generally have a high potential for crossover contamination through drift or runoff of pesticides. Large quantities of pesticides, including insecticides and fungicides that may be synergistic with the insecticides included in the EAs, may be used on these lands. In addition, herbicide use on crops already significantly impacts insects by destroying habitat and food sources in agricultural lands."

APHIS does not treat crops as part of this program. Further private land in the area of treatments but outside of the treatment blocks is generally buffered by a reasonable amount to avoid drift onto crops as a precaution and especially for sensitive sites such as buildings. The opinion that high levels of contamination from drift and runoff is coming off of private land and currently impacting rangelands substantially is not supported by any cited research, nor has APHIS found any.

Comment 19: "None of these issues were disclosed or analyzed in the Draft EIS and add to the already large cumulative exposures from pesticides used in 1) the boll weevil eradication program, 2) fruit fly cooperative eradication program, 3) the gypsy moth cooperative eradication program, and 4) invasive plant control."

The commenter refers to the Draft EIS. The EIS has been finalized and the ROD has been signed. The final EIS does address the cumulative exposures from other APHIS programs on a programmatic level. The documents in question are the Draft EA's. The programs mentioned by the commenter are not relevant to the Rangeland Grasshopper and Mormon Cricket Suppression Program in Arizona.

There is no geographical overlap in Oregon now or in the foreseeable future between pesticide applications of the Grasshopper Program and the pest control programs mentioned by the commenter.

Comment 20: "These cumulative exposures cannot only adversely affect human and environmental health but can also negatively impact biological control programs that try to manage insect and weed pests with natural predators."

The Grasshopper Program personnel are also the lead biocontrol program personnel in Oregon and are aware of the locations of biocontrol programs. All grasshopper treatments are coordinated with the land managers and other non-grasshopper programs are discussed if the land managers are concerned about an overlap with other programs.

Comment 21: "How these pesticides act in conjunction with one another to additively or synergistically increase toxicity is not discussed and no mitigation measures were proposed. Therefore, APHIS must fully analyze the impacts from cumulative exposures and identify ways in which risk can be mitigated or prohibited."

The Grasshopper Program does not apply treatments more than once per year to any rangeland area. Cumulative exposures from pesticides applied by external parties are not anticipated in most cases due to coordination between APHIS, land managers and other cooperators, on rangeland that may be receive grasshopper or Mormon cricket treatments. The EA details many procedures APHIS employs to mitigate risk.

Comment 22: "The project is vague and ill-defined, it improperly precludes the disclosure of environmental effects because the information on the project and its impacts is incomplete."

The proposed Grasshopper treatment program described in the EA could occur within a specific area, using a limited number of insecticides and application methods. The environmental consequences of suppressing or not suppressing grasshopper infestations are analyzed in the EA and other programmatic risk analysis documents.

Comment 23: "The agency must give the public a more precise definition of when the threshold for spraying has been met (i.e. number of grasshoppers or crickets/acre and a full description of the economic interests at stake)."

APHIS utilizes and provides links to extensive resources for determining when a grasshopper outbreak is exceeding economic thresholds including, “a level of economic infestation”. The Purpose and Needs section of the EA and supporting documents adequately define the multiple factors that must be evaluated before APHIS decides a treatment is necessary. Establishing a treatment threshold based on the number of grasshoppers ignores a variety of factors that must be considered by program managers before treatments. Some examples include how voracious the individual species are that compose a grasshopper infestation and the hardiness of rangeland vegetation within a proposed treatment block. These factors are also discussed in the recently published final EIS and are incorporated by reference in the final EA.

Comment 24: “**APHIS must also convey what metrics will be used to determine the area that will be sprayed in any given outbreak**.**”**

The size and exact configuration of a treatment block cannot be accurately forecast prior to the emergence of the grasshoppers, requests from land managers and other cooperators, and other environmental considerations such as buffers from water and sensitive species. The program procedures and mitigation measures are adequately described in the EA and supporting documents.

APHIS is unable to predict exactly what areas will be treated before conducting surveys and completing the EA. For ground applications, the terrain is key to be able to treat safely. If the terrain is too rough to safely drive a UTV, then the area is not treated even though other factors warrant a treatment. There are many variables taken into account before an area is treated. Another factor that must be considered is the movement of populations. If for any number of reasons, a treatment can be delayed there is a risk that, depending on species, the boundaries will have to be readjusted to account for the movement of populations.

For example, it is documented that Melanoplus sanguinipes, the Migratory Grasshopper can swarm and fly up to 5-10 miles normally. The longest migrations recorded in 1938 were made by swarms that traveled from northeastern South Dakota to the southwestern corner of Saskatchewan, a distance of 575 miles (Pfadt, 1994). This is why it is critical to have a rapid response to outbreaks. Population dynamics of grasshoppers and Mormon crickets are fluid and responses have to be adaptable to the most current assessments to ensure successful suppression treatments while minimizing environmental impacts.

Comment 25: “The agency must accurately and comprehensively disclose and analyze the range of rare, sensitive, threatened, and endangered species, ecological areas, communities, Native American gathering grounds and sensitive receptors that could potentially be significantly affected by the proposed project. Without this baseline data the EA cannot disclose the environmental effects of the project”.

In Oregon, Native American gatherings are considered by some Tribes as Holy Ground and is only made available to APHIS when necessary. This will not be published or disclosed to the public as per Local Tribal Agreements. It is addressed in general terms when published in the EA. The more specific details are addressed with each individual Tribal Nation during the Tribal meetings. T&E species are analyzed during the FWS Section 7 consultations. APHIS adheres to protective measures which have been agreed upon with FWS and addressed in the letters of concurrence. APHIS also works with Federal and State land managing agencies to protect other sensitive resources managed on their lands.

APHIS adequately summarized available data for current baseline conditions in the draft EA. This includes cultural resources as well as the potential for any overlap of federally listed species with the proposed areas of treatment.

Comment 26: "APHIS's description of the environmental effects of the pesticides at issue failed to properly capture many of their environmental effects".

APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019). These documents and the associated final EIS are incorporated by reference.

Comment 27: "Long-term exposure to carbaryl is associated with decreased egg production and fertility in birds".

APHIS would make a single application per year to a treatment area, and could apply insecticide at an APHIS rate conventionally used for grasshopper suppression treatments, or more typically as reduced agent area treatments (RAATs The study cited by the commenter noted Carbaryl is practically nontoxic to birds on both an acute oral exposure (LD50 >2,000 mg/kg) and subacute dietary exposure basis (LC50 >5,000 mg/kg of diet). In addition, no chronic effects were observed at a dietary exposure of 300 mg/kg of diet.

Comment 28: "Carbaryl is considered moderately toxic to mammals with decreased pup survival being the most sensitive effect"

APHIS would make a single application per year to a treatment area, and could apply insecticide at an APHIS rate conventionally used for grasshopper suppression treatments, or more typically as reduced agent area treatments (RAATs), which use sub-label rates. For bait in particular, it is not clear what the route of uptake or exposure would be or which mammals would be at risk.

Comment 29: "EPA has designated carbaryl as "highly toxic" to bees on a short-term exposure basis and ranged from moderately to highly toxic to other insects, mites and spiders."

The potential exposures of bees and other pollinators to carbaryl bait are minimal. The risks of carbaryl to bees and other non-target organisms are summarized in the human health and ecological risk assessment that was prepared to support the final EIS. This analysis is incorporated by reference into the final EA.

Comment 30: "Carbaryl is considered 'highly toxic' to certain species of fish when exposed to short-term bursts and can reduce the number of eggs spawned when fish are exposed to lower levels over a longer period of time".

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Carbaryl Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. Comparison of the distribution of acute, sublethal and chronic effects data for fish to the residues estimated using ground and aerial ultra-low volume spray and bait applications show that the range of residues do not overlap with acute toxicity values, suggesting there is no acute risk to fish species. APHIS determined there is some overlap with chronic and sublethal effect values and estimated residues. However, carbaryl half-lives in water are typically short and with the proposed one time application chronic exposure and risk to fish is not anticipated. Effects from consumption of contaminated prey are also not expected to be a significant pathway of exposure, based on the low residues and low bioconcentration factor values reported for carbaryl.

APHIS guidelines to buffer for bodies of water, streams and rivers are addressed this EA generally, and specifically with FWS Section 7 consultations and FWS letters of concurrence. All of which reduce the exposure to fish species.

Comment 31: "Carbaryl has been designated 'very highly toxic' to aquatic invertebrates on an acute exposure basis by the EPA and mesocosm studies that analyze how the pesticide affects aquatic community structure have found significant negative effects at low levels."

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Carbaryl Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. The risk assessment summarizes the available laboratory and field effects data for aquatic invertebrates and carbaryl. The risk assessment also summarized the potential exposure and risk to aquatic invertebrates. The EIS and carbaryl risk assessment are incorporated by reference into the EAs.

Comment 32: "The EPA identified potential interactions between carbaryl and the androgen pathway in fish, indicating that carbaryl is an endocrine disruptor in male aquatic vertebrates."

Carbaryl half-lives in water are typically short and with the proposed one time application chronic exposure and endocrine disruption risk to fish is not anticipated. Effects from consumption of contaminated prey are also not expected to be a significant pathway of exposure, based on the low residues and low bioconcentration factor values reported for carbaryl. Chronic risk is also a conservative estimate because chronic toxicity data is based on long-term exposures that what would not be expected to occur from a single application, based on the environmental fate of carbaryl in aquatic environments. The final EIS and human health and ecological risk assessment for carbaryl provides additional information regarding the effects of carbaryl to fish. APHIS guidelines to buffer for bodies of water, streams and rivers are addressed this EA generally, and specifically with FWS Section 7 consultations and FWS letters of concurrence. All of which reduce the exposure to fish species.

Comment 33: "On March 12, 2020, the EPA released a draft biological opinion finding that carbaryl is likely to adversely affect 1542 out of 1745, or 86% percent of all listed species in the U.S. and 713 out of 776 designated critical species' habitats across the U.S.".

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.

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 34: "EPA found many Oregon species were likely to be adversely affected, as discussed below. This is a chemical far too toxic for APHIS to consider using across wide swaths of land in Oregon."

Carbaryl is presently approved by the EPA and registered in Oregon. The APHIS proposed use for carbaryl in Oregon is not proposed for use across wide swaths of the state but in small grazing allotments that require a suppression treatment, as a bait treatment. It should be noted that the current labeled uses for carbaryl grasshopper treatments are at much higher labels and can be applied with more frequency than what APHIS is proposing. In addition carbaryl use by the Program is minor compared to the preferred alternative diflubenzuron. APHIS has evaluated the risk of carbaryl use in the Program and in general the conclusions are consistent with other risk assessments demonstrating low risk when adhering to label requirements. Additional mitigation measures used by APHIS further reduces the risk to human health and the environment.

APHIS consulted with the FWS on federally-listed species that may occur within the county or areas where grasshopper and Mormon cricket treatments may be required. APHIS works 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.

Comment 35: "The European Union banned carbaryl in 2007 due to, among other things, "…a high long-term risk for insectivorous birds and a high acute risk to herbivorous mammals, a high acute and long-term risk to aquatic organisms and a high risk for beneficial arthropods."

APHIS summarizes the risk of carbaryl to non-target organisms in final human health and ecological risk assessment that was part of the recently published final EIS. Available effects data and the exposures that would be expected from proposed use in the grasshopper and Mormon cricket program are reduced based on mitigation measures (ex. RAATS, aquatic buffers) application methods and formulation types which further reduce risk.

Comment 36: "Carbaryl is classified as 'likely to be carcinogenic to humans' based on treatment-related hemangiosarcoma development in mice."

The levels of carbaryl that caused the above-mentioned effects to mice are above exposure concentrations that would be expected to occur for the public as well as workers and applicators in the APHIS grasshopper and Mormon cricket suppression program. The risk to human health from carbaryl use, including the proposed APHIS use, have been evaluated by APHIS and are discussed in the final human health and ecological risk assessment for carbaryl. It should be noted that other agencies have evaluated the risk to carbaryl at much higher application rates than those used in the grasshopper and Mormon cricket program.

Comment 37: "EPA has determined that humans can be exposed to more than 4 times the amount of carbaryl known to cause neurotoxicity from some legal uses of the pesticide. EPA also found that the current labelled uses of carbaryl may result in neurotoxic harms to mixers, loaders and applicators."

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Carbaryl Rangeland Grasshopper and Mormon Cricket

Suppression Applications are published. APHIS evaluated the potential human health risks from the proposed use of carbaryl bait applications and determined that the risks to human health are low. The lack of risk to human health is based on the low probability of human exposure and the favorable environmental fate and effects data.

APHIS treatments are conducted in rural rangeland areas where agriculture is a primary economic factor. Rural rangeland areas consist of widely scattered, single dwellings in ranching communities with low population density. Risk to the general public from carbaryl ground or aerial applications is also expected to be minimal due to the low-population areas proposed for treatment, adherence to label requirements, and additional Program measures designed to reduce exposure to the public. APHIS is not obligated to analyze the risk posed by all legal uses of carbaryl, but rather the Grasshopper Program formulations and application rates.

The proposed use of carbaryl bait, and adherence to label requirements substantially reduces the potential for exposure to humans. APHIS does not expect adverse health risks to workers because of the low potential for exposure to carbaryl when applied according to label directions and use of personal protective equipment. APHIS quantified the potential risks associated with accidental exposure of carbaryl for workers during mixing, loading, and application. The quantitative risk evaluation results indicate no concerns for adverse health risk for Program workers from carbaryl applications in accordance with program standard operating procedures for safety.

Comment 38: "Diflubenzuron is considered 'highly' to 'very highly toxic' to aquatic invertebrates. In a 2018 analysis, EPA found that the registered, labeled uses of diflubenzuron may result in freshwater invertebrate exposure at up to 550 times the level known to cause harm. Diflubenzuron exposure to honeybees and other pollinators at the larval stage was estimated to be more than 500 times the level known to cause harm. Although arthropods are not a part of EPA's ecological risk assessment, the European Food Safety Authority found that 'Juvenile non-target arthropods were very sensitive to diflubenzuron.' Very large in-field no-spray buffer zones would be needed to protect nontarget arthropods. There is no reason for APHIS to exclude consideration of impacts to arthropods in its analysis of this pesticide." and "APHIS also acknowledges the pollinator impacts but attempts to diminish them without providing evidence on how or why they are not significant".

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Diflubenzuron Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. The EPA risk assessment evaluated risk to aquatic organisms and pollinators based on application rates, methods of application and use patterns that would result in greater exposure and risk to aquatic and terrestrial invertebrates. APHIS evaluated risks to these groups of non-target organisms based on methods of application consistent with Program applications and other mitigation measures for diflubenzuron. The exposure potential is reduced compared to label uses due to many factors. This includes but is not limited to reduced application rates, one application per season, use of RAATs and buffers from aquatic habitats. APHIS relied on laboratory and field collected data regarding diflubenzuron effects to aquatic and terrestrial invertebrates to show that risk is low for most non-target invertebrates.

Characterization of risk to aquatic species from Program-specific diflubenzuron applications was made by comparing the residue values in the exposure analysis from ground and aerial applications to the distribution of available acute and chronic fish toxicity data. Residue values were below the distribution of acute and chronic response data, suggesting that direct risk to aquatic species is not expected from diflubenzuron applications. More specifically, the distribution of aquatic invertebrate toxicity data is above the residues estimated from spray drift models for Grasshopper Program ground and aerial applications of diflubenzuron.

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 Grasshopper Program treatments employ methods and diflubenzuron application rates that result in substantially lower freshwater invertebrate exposures than the rate cited by the EPA and the commenter.

The EPA Preliminary Risk Assessment to Support Re-registration Review examines all legal uses of diflubenzuron, of which the Grasshopper Program constitutes a small fraction. APHIS is not obligated to examine all legal uses of the pesticide, but rather those contemplated by the program. The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Diflubenzuron Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. Characterization of risk to aquatic species from diflubenzuron applications was made by comparing the residue values in the exposure analysis from ground and aerial applications to the distribution of available acute and chronic fish toxicity data. Residue values were below the distribution of acute and chronic response data, suggesting that direct risk to aquatic species is not expected from diflubenzuron applications. More specifically, the distribution of aquatic invertebrate toxicity data is above the residues estimated from spray drift models for Grasshopper Program ground and aerial applications of diflubenzuron.

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Diflubenzuron Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. The APHIS analysis noted Diflubenzuron has low toxicity and risk to some nontarget terrestrial invertebrates, including pollinators such as honey bees.

Comment 39: "APHIS also acknowledges the pollinator impacts but attempts to diminish them without providing evidence on how or why they are not significant. It does not mention that Oregon is home to an amazing abundance of native bees and pollinators, and does not recognize that native pollinators are far more sensitive than the honeybees that are often used as a surrogate by both EPA and APHIS due to the lack of hive buffering effects."

Grasshopper 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 7 to 76 days after treatment. Although ant populations exhibited declines of up to 50%, these reductions were temporary, and population recovery was described as immediate (Catangui et al., 1996). No significant reductions in flying non-target arthropods, including honey bees, were reported. Within one year of diflubenzuron applications in a rangeland environment, no significant reductions of bee predators, parasites, or pollinators were observed for any level of diflubenzuron treatment (Catangui et al., 1996).

Comment 40: "Diflubenzuron is commonly fed to ranging cattle as a way to control flies. This pesticide is present in the excreted manure and urine of cattle where they range. Therefore, any decision on whether to use diflubenzuron in these areas must consider that listed or non-listed species can be exposed to other sources of the pesticide."

APHIS recognizes that some diflubenzuron resides may be present in urine and feces from cattle that feed on forage immediately after diflubenzuron treatment; however this pathway of exposure is expected to be minor based on the proposed use pattern of diflubenzuron in the Program. Low application rates applied only once per season will reduce the amount of diflubenzuron present in manure and urine. In addition some metabolism of diflubenzuron occurs in animals, and there will be further environmental degradation once excreted.

Comment 41: "After one application of diflubenzuron, myriapoda populations were nearly eradicated (73% reduction), gamasina mites were reduced by 40%, and uropodina mites were reduced by 57%. Diflubenzuron treatment reduced the populations of oribatid mites, prostigmata mites, and soil arthropod larvae, mostly comprised of coleoptera and diptera, by nearly 15%."

The cited research does not suggest Grasshopper Program applications of diflubenzuron will result in significant impacts to soil microfauna. The researchers applied diflubenzuron to plots and investigated the effects on Collembola, Insecta, Myriapoda, and 4 groups of mites for 6 months. The observed taxa abundance fluctuated seasonally, but for a majority of taxa no significant differences were noticed between the control and exposed plots. The total number of microarthropods was insignificantly lower in exposed groups. While myriapods were the only taxon that was close to extinction after a single exposure to diflubenzuron the pesticide was applied directly to the soil at a rate four times greater than the maximum conventional application rate used by the program. The researchers noted their data proved that soil has some buffering capacity, and this fact should always be taken into consideration when estimating the risk for the environment.

Comment 42: "In a field study, collembola populations were negatively affected by diflubenzuron and did not recover for one and a half years. The earthworms, Dendrobaena rubidus and Lumbricus rubellus were reduced in plots treated with concentrations of diflubenzuron at half the recommended field rate. Gamasid and oribatid mite populations were additionally reduced, and oribatida were observed migrating into deeper soil layers to avoid the pesticide."

The commenters have cited a study where the researchers applied two treatments of diflubenzuron wettable powder directly to the forest floor at a rate 37% higher than the maximum rate used by the Grasshopper Program. Contrary to the characterization of the research findings presented by the commenter, the mean population size of earthworms did not differ significantly during the potential effect phase between control and the 137% the Grasshopper Program rate treatment plot. The populations of the enchytraeid species E. buchholzi, E. minutus, E. norvegicus and M. clavata did not respond to this 137% treatment of diflubenzuron applied twice per growing season. While the number of oribatids decreased after the application of the insecticides in all experimental plots including the control, these differences were only significant in the plot were diflubenzuron was applied directly to the forest floor at a rate nearly 14 times greater than the maximum Grasshopper Program rate.

Where Brachychthoniid populations declined significantly in the diflubenzuron treated plots, the reductions were in part compensated by changes in numbers of the dominant genus Oppiella.

The researchers explained the half-life of diflubenzuron in soil is reported to range from 1 to 27 days, which was borne out by their data. Therefore, residue accumulations in the organic layer is unlikely if diflubenzuron is only applied once per year.

The researchers acknowledged that there could be several potential reasons for differences in populations of soil invertebrates between the study plots. First, the plots could differ independent of any treatment.

APHIS agrees this is a reasonable interpretation because of the small sample sizes during the pre-application, potential effect and early recovery data recording phases (I.e. four plots including the control, five sample dates, two replicates, n=10). The testing of natural variation during the 9 month pre-application phase may not have been sufficient. They decided to interpret deviations as a response to a treatment, if numbers in the potential effect phase were different to those in the other phases in the same plot and to the control in the same phase.

Comment 43: "Diflubenzuron treatment resulted in a total loss in brood production of male Bombus terrestris, and 100% inhibition of egg hatching success and larval growth. Transovarial transport and accumulation of the pesticide in deposited eggs explained the total loss of reproduction. Abnormal cuticle formation, which can lead to mechanical weakness and death, was observed in dead larvae that worker bees were observed removing from treated nests."

The commenters have cited a study where the B. terrestris was directly dosed with diflubenzuron to test acute toxicity. Adult worker bees were exposed via contact by topical application and orally via drinking sugar water and by eating pollen. For contact application, 50 µL of the aqueous concentration was topically applied to the dorsal thorax of each worker with a micropipette. The worker bumblebees were also provided diflubenzuron treated sugar-water for drinking for 11 weeks. Bumblebees can also be exposed orally to pollen sprayed until saturation with a diflubenzuron concentration. Both the sugar water and pollen were supplied for unlimited oral consumption.

While APHIS acknowledges the effects of acute diflubenzuron exposures on the egg hatching and larval stages of bumble bees is a concern, the direct dosing conducted by the researchers is not comparable to any exposure levels that could result from the Grasshopper Program diflubenzuron ultra-low volume spray treatments.

In addition, APHIS would like to note, no acute mortality was observed after topical application, nor after oral exposure to treated sugar-water or treated pollen. In all cases, the number of dead worker bees in the treated nests over a period of 11 weeks was not above that of the control groups using water (0–10%).

Comment 44: "APHIS must ensure that consultation addresses all species and critical habitat that could be directly and indirectly affected by the proposed project." The comment also states that APHIS has not complied with its responsibilities under Section 7 of the ESA. Concerns were raised about specific species in Oregon such as the norther spotted owl.

APHIS consulted with the FWS on federally-listed species that may occur within the county or areas where grasshopper and Mormon cricket treatments may be required. APHIS works 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.

Comment 45: "APHIS would unlawfully be making an irreversible or irretrievable commitment of resources if it allows insecticide application on rangeland grasshoppers and/or Mormon crickets to occur prior to fulfilling its Section 7 obligations. APHIS will run afoul of its Section 7 ESA requirements if it chooses to move forward, and it will also likely violate the ESA's prohibition against the take of endangered species as described by Section 9 of the statute if it moves forward with this project prior to properly completing its Section 7 duties. Even where there is a letter of concurrence, APHIS may still fail

to comply with the ESA because informal consultation does not authorize the incidental take of federally-listed species nor does it authorize the adverse modification or destruction of critical habitat."

APHIS has been able to complete informal consultation with the FWS regarding the APHIS Grasshopper Program at the State level. 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 46: "Grasshopper spraying in or near riparian areas can decrease prey populations for these species as well as produce chronic sub-lethal effects as a result of drift or ingesting pesticide through the insects they consume."

Protective measures were developed during the lengthy local FWS Section 7 consultations for each of the T&E species and species of concern within proposed treatment areas. APHIS protective measures were determined using the FWS Recommended Protection Measures for Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service" (USFWS 2007). The FWS letters of concurrence agree with our determinations.

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c. Center for Biological Diversity Appendix C, 2021 Xerces Comments and Responses

"For Open Comment Period on the Draft Environmental Assessments Rangeland Grasshopper and Mormon Cricket Suppression Program Oregon, 2021, EA Number: OR-21-1" March 15,2021
(Text in full provided, which is divided into comment topic, each of which are followed by APHIS responses.)

Intro:
We appreciate the opportunity to comment on the APHIS EA addressing grasshopper suppression in 2021 within the areas designated in the identified EA in the State of Oregon.
The Xerces Society for Invertebrate Conservation (Xerces Society) is an international nonprofit organization that protects the natural world through the conservation of invertebrates and their habitats. We work to raise awareness about the plight of invertebrates and to gain protection for the most vulnerable species before they decline to a level at which recovery is impossible. Pesticide use is one of the contributing factors to the loss of many invertebrate species. The use of pesticide can also hinder recovery efforts for imperiled species.
Please accept the following comments on the subject documents.

Comment 1: The EA Fails to Disclose Treatment Request Locations and Does Not Adequately Describe the Affected Environment or Analyze Impacts to the Affected Environment
APHIS claims that its grasshopper suppression efforts are akin to an "emergency." For example, the following is stated in the EA: *"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 theactual application. The emergency response aspect is why site-specific treatment details cannot be known, analyzed, and published in advance."*

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 EA, APHIS only conducts treatments after receiving requests. 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, and there is no valid reason for not disclosing more specific treatment maps, together with an estimate of acres to be treated and likely method and chemical -- in the Draft EA and certainly by the Final EA. After all, treatments commonly occur within weeks after the Final EA is published, so APHIS doesn't start planning for these after the Final EA.

Instead, as published, the Draft EA provides almost no information in the way of solid information about where, how, and when the treatments may actually occur within the counties covered under the EA, during the year 2021. As a result, it is impossible to determine if applications might occur to sensitive areas or species locations within the specified counties. Similarly, the scale of potential applications is left out. Without a description of the average size of treatments in this state and the range over say, the last 25 years, we don't know how to assess the potential impact of the treatments.

This lack of transparency about the location of actual treatment areas, particularly on public lands, is a disservice to the public and prevents the public 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 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 project impacts, APHIS should provide the treatment request areas with the EA, even if actual treatments end up less than these.

Recommendation: Our recommendation is the same as last year since this EA possesses the same inadequacies in terms of specific information. We urge APHIS to delay the publication of a FONSI until after 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 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.

In future years, we urge APHIS to delay release of the EA until after treatment requests are received and all treatment areas have been delineated and are identified to the public.

Response 1:

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 potential treatment area is described in the EA, however the exact locations within that cannot be determined in advance of spring hatch, and that timeframe does not allow for additional review during the active season, unless the commentor would prefer knowing exact details of an area that would need treatment over the demand of the public to have economically and ecologically effective treatment (e.g. spraying broad spectrum pesticides in July in an area the public has had time to review in detail). This is not how modern Integrated Pest Management (IPM) science best management practices work, and would not be in anyone's best interest, certainly not the public's.

Annual reports are provided to all interested parties in the fall of the year prior which show areas around the state where (public or private) treatments may be warranted. APHIS would refer interested parties to this for a rough forecast of precise locations, rather than the EA, though the EA is specific to 17 eastern Oregon counties which share many relevant features. Furthermore, APHIS programs frequently repeat in specific areas where the public demand for such work is high and this information could also be reviewed for trends, such as was provided in 2020 by APHIS and other agencies for a FOIA request. Specific criticism of the work from those angles would be welcome, however this demand does not seem to be that practical, rather it seems to be intended to prevent APHIS from using IPM.

Finally, when an actual program location is considered by APHIS in early spring, it is reviewed for any possible considerations that may not be covered in this EA, and any possible considerations suggesting significant impacts that were not discussed in the Draft EA, might require major revision of APHIS' analysis and another public comment period before completing the Final EA In sum, APHIS does not agree that "almost no information in the way of solid information about where, how, and when the treatments may actually occur" is stated in this EA, rather this is precisely the purpose of this document. If the commentor can specify where, how, and when this EA actually fails to do so, that would be most constructive and welcome input.

Comment 2: 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 EA go 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 EA 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. In addition, APHIS should separate the conventional from the RAATs method into two different alternatives, and analyze them accordingly.

Response 2:
APHIS is not authorized to address issues of lost ranching income by any conceivable means; however it is required by the Plant Protection Act to help control economic grasshopper outbreaks. There have been instances in Oregon where Federal neighbors did supply ranchers with hay, however this is far outside of APHIS' mandate, except that it would be a potential consequence of the non-treatment option considered in the EA.

The RAATs method and the conventional treatment method are not significantly different in measurable terms that have been documented, as is perhaps clear from a lack of a citation in the comment. RAATs is the preferred method in Oregon and is almost always employed if timing is good to have an ecological effect, if for no other reason than the cost to the tax-payer is cut in half, and is often required by the land management agency requesting treatment, since this is the most efficient and least damaging method available, and has been since USDA developed and proved these methods several decades ago.

Comment 3: Impacts are described as "reduced" in many portions of the environmental consequence 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 EA, APHIS described risk as "reduced." Reduced compared to what, exactly? The inexactness and lack of specificity of such statements make

the EA of little utility for a citizen trying to determine the actual predicted impacts of insecticide spray on large blocks of Western rangelands.

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

Response 3:

Specific citations where the use of this term is unclear are not provided. This would be a contextual argument, so it is not possible to determine exactly what is in question here. In general, "reduced" can be defined as: "to diminish in size, amount, extent, or number". Impacts are expected to be reduced by reduction of application and/or volume of pesticides or other mitigation measures such as buffers that are described in detail in the EA. Beyond this, it is hard to respond to this comment in detail.

Comment 4: APHIS has not demonstrated that treatments in Oregon in 2021 meet the "economic infestation level." No site-specific data is presented in the EA that justifies the treatmentbased on the "economic infestation level."

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 authority 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 available forage or crops; grasshopper species, age, and density present; rangeland productivity and composition; accessibility and cost of alternative forage; andweather 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 gainedby 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.

One would expect that APHIS would 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 EA at all, nor is site-specific data presented for any of these, and 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." (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 FOIArequest.) 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.

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.

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 Oregon, it takes from 1-19 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 average 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 receives an estimated $0.14 per acre for the forage value on BLM or USFS federal rangelands in Arizona.

Given that the direct costs of grasshopper treatments to the taxpayer appear to range from $3.99 up to $14.61/acre, it is clear that the economic threshold is nowhere near being met. The program makes no economic sense from the point of view of the taxpayer.

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 analysis that it has determined the lands to be treated meet the level of economic infestation according to its definition, and APHIS must demonstrate in each EA, that treatment is justified by meeting an 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.

Response 4:
This comment is very editorial in nature and it is difficult to parse out which of the demands it places on APHIS are possibly grounded in actual law. Furthermore it would seems that these are primarily fiscal argument that may not be covered by NEPA at all (i.e. it is not clear that APHIS has to demonstrate economic analysis in an Environmental Assessment, since that would not specifically have an impact on the environment as it’s generally defined). This is more of a political argument and could certainly proceed in other venues, however it’s grounding in environmental law is not presented here, which is specifically a venue for NEPA and associated laws. The assumption that the public is quick to demand the intervention by APHIS in targeted treatments to suppress damaging grasshopper outbreaks in Oregon is far from reality, let alone making it through the APHIS review process. Rather, erroring on the side of inaction has been the demonstrable norm. The EA does goes to length to set out economic principals which are adhered to the greatest extent possible. If FOIA requests of 2020 or other records of many years of treatment can demonstrate that this is not the case, than these criticisms would be taken to heart by the program, if not necessarily in this NEPA specific venue. Finally, to suggest that the local inhabitants of the land adjacent to

federal lands with outbreaks should have their concerns ignored is a fairly radical position, that APHIS does not agree with. The comment as to APHIS buying forage rather than treat was responded to already (see comment 2).

Comment 5: 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 claim 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).
- Oregon 2021 EA: "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."

However, the width of the skipped swaths is not designated in advance in the EA, and 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:

1) 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 EA.

2) 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 bothranches, 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 several features of the study make it less than useful forpredicting impacts under APHIS' current program. We note that:

3) This study only investigated RAATs effects to non-targets for carbaryl, malathion, and fipronil, not on diflubenzuron.

4) 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 2021 Treatment Guidelines (10 mph for aerial applications, no maximum wind speed specified for ground applications).

5) 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 EA 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.

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 basedon a boom height of 10 feet while APHIS aerial release heights are typically much higher.

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 similarto 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.

According to information APHIS provided to NMFS in a 2010 Biological Assessment (obtained through a FOIA request), actual aerial release heights are likely to be in the area of 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 resultsand 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. (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 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 found 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:

1) The APHIS AgDISP analysis only analyzed deposition at the lower end of the application rate corresponding to 0.75 lb/acre (0.012 lb/A) rather than the upper end of the application rate thatcorresponds to 1 oz/acre (0.016 lb/A) which is a rate often specified in contracts.
2) The APHIS aerial AgDISP analysis was conducted with a VMD of 137.5, far larger than thosepredicted for other ULV analyses. APHIS never explains exactly why.
3) 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 havea major impact*" on drift (Teske et al. 2003).
4) APHIS Program operational guidelines (included as an appendix in the EA) do not specify any minimum or maximum droplet size therefore it is unknown what nozzles are actually being usedand 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 treatment 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.

Response 5:

APHIS has specific requirements for its treatment contracts, including nozzles specs that are tested for efficacy. Though not discussed in the EA since its relevance to NEPA is not immediately clear, in general, vastly over-spraying a treatment block as stipulated (e.g. not having sufficient non-spray widths or spraying out of bounds) would be flagged and considered a breach of contract in arial treatments.

As mentioned above, RAATs and conventional treatment are considered as a single option, since there is very little difference in outcome that is demonstrable between the two approaches, and in theory either would be acceptable. In practice, RAATs have become the standard, and generally has been implemented many times with the expected reduction in volume and acreage in evidence. Furthermore, real time environmental monitoring occurs to watch for wind or temperature conditions that might cause unacceptable levels of drift.

Comment 6: The EA understate the risks of the insecticides diflubenzuron and carbaryl for exposed bees and other invertebrates.

The single action alternative identifies two insecticide options (liquid diflubenzuron and carbaryl bait), and states that the choice of which to use will be site-specific, without being clear about how that choice of insecticide is made. Still, according to the EIS, diflubenzuron was used on 93% of all acres treated between 2006 and 2017 and the Program used malathion only once since 2006. In addition, the EA indicate that ground treatments may occur, but the EIS states "*In most years, the Program uses aircraft to apply insecticide treatments."* If past is prologue, then we can expect that a majority of treatments that will occur under this EA will be with diflubenzuron (Dimilin 2L; EPA Reg. No. 400-461) applied via aircraft.

The EA give almost no actual information on how either of these two chemicals will impact bees in the sprayed swaths, in the unsprayed swaths, or beyond the treatment block. This is unfortunate, as pollinators, including bumble bee species within the range of potential treatments, are facing significant declines (National Research Council 2007; Cameron et al. 2011).

Diflubenzuron*:* 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.

While insect growth regulators are often considered "selective", pollinators such as native bees and butterflies have no inherent protection against diflubenzuron and immatures are vulnerable to injury and death if exposed.

The risk assessment included for diflubenzuron (attached to the 2019 EIS) makes little to no mention of an important attribute of this insect growth regulator that EPA (in its 2018 Ecological Risk Assessment) does point out. Namely that tests run according to standardized adult testing guidelines may mask effects: "Chitin synthesis is particularly important in the early life stages of insects, as they molt and form a new exoskeleton in various growth stages. Thus, aquatic guideline tests, (or terrestrial invertebrate acute tests), which typically run for 48 hours, may not capture a molting stage, and thus underrepresent acute toxicity. Single doses may cause mortality, if received at a vulnerable time.

Consequently, conclusions from RQs based on acute toxicity studies for invertebrates may not fullyrepresent actual risk."

Given its toxicity to juveniles, rather than adults, the relevant laboratory toxicity data that should be reported by APHIS in the EA for its analysis of effects is larval toxicity data. However, while the EA discloses that diflubenzuron would result in greater activity on immatures, APHIS leaves out key information, such as the expected environmental concentration (EEC) from application, and how those concentrations compare to toxicity levels for immatures. After all, for bees, pollen collected by adults during breeding season (which coincides, for many species, with grasshopper spray windows) will mean exposure to developing larvae of bees, who may consume contaminated pollen placed in the nest by adults.

Forced to do this analysis ourselves, we located this relevant information elsewhere. There is a standard tool, known as Bee Rex, that calculates EECs from deposition to pollen and/or nectar, based on application rate (USEPA 2017). Bee Rex also allows for a comparison between the estimated environmental concentration and the acute or sublethal toxic endpoint for adults and/or larvae. For honey bees (the surrogate species for invertebrate risk assessment in the absence of other data), USEPA (2018) reported a chronic 21-day ED50 and NOAEL of 0.012 and <0.0064 µg a.i./larva, respectively.

Using these values, we conducted an assessment of the potential chronic dietary risk to bee larvae. Weutilized deposition values assuming no drift under both the full and reduced rates as specified in the EA(0.75 or 1.0 fluid ounce per acre (0.012-0.016 lb a.i./ac)). We also utilized deposition values using the point zero and point 500 feet (since we could not deduce an actual value for a 100-foot or 200-foot deposition rate, we used the deposition rate at 500 feet from the APHIS BA to NMFS. This would be a low end estimate since it's 2.5-5X further than the furthest edge of an unsprayed swath) analyses presented in the APHIS drift analysis included in its BA to NMFSas mentioned above. Table 1 shows the outputs with Expected Environmental Concentrations and Risk Quotients, as calculated by the BeeRex tool. (APHIS presents no information in the EA that indicates the EECs would be any less than this, therefore these values are assumed to be the correct EECs within treated swaths at these two rates.)

Table 1. DIFLUBENZURON Bee Risk Assessment

Application Rate (lb ai/A)	Scenario	Pollen/necta rEEC (mg/kg)	Pollen/nectar EEC (ppb)	Larval RQ Chronic dietary	Numberof timesLOC (Larval)
0.16	Full	1.76	1760	18.1	18
0.12	RAATS	1.32	1320	13.6	14
0.009	pt. zero APHIS drift analysis in 2010 BA	0.981	981	10.1	10
0.0078	pt. 500 APHIS drift analysis in 2010 BA	0.858	858	8.8	9

Risk quotients (RQ) of 1.0 based on ED50 indicate that the estimated environmental concentration is sufficient to kill 50% of exposed bees after the chronic exposure. 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. Chronic risk to bees is still evaluated with an LOC at RQ=1.0 (USEPA, 2014). As indicated in Table 1, even at 500 feet from the application site, using APHIS predictions for deposition, RQs range from 8.8 to 18.1 while LOCs range from 9-18. LOC values this high indicate a high risk of harm for exposed bee larvae.

However, APHIS discounted the risk of diflubenzuron to pollinators in the EA as follows:

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 terrestrialplants.

APHIS also cites Mommaerts et al. (2006), noting that reproductive effects were observed on bumble bees, but claiming that these effects were observed at much higher use rates than those used in the program. Unfortunately, this is incorrect. Mommaerts et al. (2006) conducted dose-response assays and found that exposure to diflubenzuron resulted in reproductive effects in *Bombus terrestris*, with only the doses at 0.001 (one thousandth) of maximum field recommended concentrations (MFRC) in pollen and 0.0001 (one ten thousandth) in sugar water resulting in effects statistically similar to controls. The MFRC for diflubenzuron is listed in the study as 288 mg/L (equivalent to 288,000 ppb). At 1/10,000 of this level, diflubenzuron effects would be similar to controls only at levels at or below 28.8 ppb while at 1/1000 of this level, diflubenzuron "no effect" concentrations would be equivalent to 288 ppb.

Recall that the EECs for diflubenzuron under the program are expected to range from 1320 ppb to 1760 ppb as shown in Table 1 (RAATs rate, full rate, respectively). The Mommaerts study thus shows the opposite of what APHIS claims – that reproductive effects would be expected at the EECs expected for grasshopper suppression, even at the lower rate anticipated to be used under RAATS and even at 500 feet away. This raises concern that the application of diflubenzuron at the specified RAATS rates may cause severe impacts to bumble bee reproduction within treated areas.

Moreover, APHIS points out 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. Additionally the EIS discloses 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. Rangeland persistence is unfortunately not available, but diflubenzuron applied to plants remains adsorbed to leaf surfaces for several weeks.

Carbaryl: 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 EA describes the oral LC50 value as

0.1 ug/bee. (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.) Larval bee toxicity was not available from the APHIS 2019 EA.

Oregon has chosen to only allow the bait formulation of carbaryl this year. It is our understanding that baits as used in the grasshopper suppression program do not represent an exposure risk to bees since they do not pick it up deliberately. Therefore, carbaryl bait, while highly toxic to those insects that would ingest it, at least avoids some of the exposure concerns of carbaryl spray.

Recommendation: Faced with significant and concerning pollinator declines, APHIS should take into account the risk to native bees and butterflies from these treatments. At a minimum, 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 treatments.

Response 6:
Information on the possible effects of diflubenzuron on bees and pollinators is provided in the EA, which is also tiered to more extensive analysis in the 2019 EIS (page 45-46 and 55-57) and the HHERAs for Carbaryl (page 21 and 44) and Diflubenzuron (pages 13-14, 29-30) that addresses risk to pollinators including bees and their larval stages.

The commenter's risk quotient (RQ) analysis compares their calculated estimated environmental concentration (EEC, from the BeeREX Tier 1 risk screening tool) to the dietary LC_{50} and NOAEL. The residues are based on T-REX, an EPA terrestrial plant residue model, that is used to estimate exposure to food items consumed by birds and mammals. In the case of BeeREX they use residues that would be expected from direct application onto long grass. These values would not be anticipated to occur on pollen. Additionally, nectar pesticide residues may be as much as an order of magnitude below levels that would occur on pollen (EFSA, 2017). The BeeREX model assumes that pesticide residues are equal in pollen and nectar. It is unclear how the commenter used effect concentrations expressed in mg/L (cited in the literature) to mg/kg which is not a direct conversion. APHIS invites them to share their modelling assumptions and inputs. APHIS notes that as is appropriate for a Tier 1 risk screening tool, BeeREX is very conservative method for estimating residues on pollen and nectar.

APHIS conducted a thorough risk analysis based on published toxicological studies for carbaryl and diflubenzuron and that analysis is provided in the HHERAs. The commenter asserts that APHIS incorrectly evaluated the exposure data presented in the Mommaerts et al. study of chitin synthesis inhibitors, including diflubenzuron. The researchers exposed bees via a contact application of 288 mg/L aqueous concentration which was topically applied to the dorsal thorax of each worker with a micropipette. Bumblebees also ingested orally sugar/water treated with the same concentration of diflubenzuron solution over a period of 11 weeks. Pollen was sprayed with the same concentration of diflubenzuron until saturation and then supplied to the nests. The bumble bees were not restricted in how much of these contaminated solutions they could consume.

APHIS's review of the study did not identify findings of effects caused by diflubenzuron at the concentrations represented above by the commenter, "Mommaerts et al. (2006) conducted dose-response assays and found that exposure to diflubenzuron resulted in reproductive effects in Bombus terrestris, with only the doses at 0.001 (one thousandth) of maximum field recommended concentrations (MFRC) in pollen and 0.0001 (one ten thousandth) in sugar water resulting in effects statistically similar to controls." The researchers instead estimated mean LC_{50} concentrations based on the chronic exposure routes described above. These were 25 mg a.i/L dermal contact, 0.32 mg a.i/L ingested sugar-water, and 0.95 mg a.i/L pollen. The researchers noted, "In practice, bumblebees will rarely be exposed to such high concentrations, but these experiments have been undertaken to evaluate with certainty the safety and compatibility of compounds with bumblebees." They elaborated, "the present authors agree that, before making final conclusions, it is necessary that the laboratory-based results are validated with risk assessments for these insecticides in field related conditions."

APHIS believes conversion and comparison of program applied foliar spray rates to the concentrations of the solutions applied in this study would rely on unrealistic exposure scenarios. An exposure scenario where pollinators are exposed continuously for 11-weeks is not expected to occur in the APHIS grasshopper and Mormon cricket suppression program. In field applications diflubenzuron levels would decline over the 11-week exposure period due to degradation, flowering plants that have diflubenzuron residues would no longer be available for foraging by pollinators as flowers naturally die and do not provide pollen and nectar, and other plants would bloom after application without residues of diflubenzuron.

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 season further reducing the risk to pollinators when compared to the current number of applications that can be made in a year to rangeland.

Comment 7: 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 untreated 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 rationalizes its program, often stretching 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 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.

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 will have a maximum impact on nontarget arthropods."* (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 insinuate 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 naturalenemies. 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 forthe future, as they are released from the control of natural enemies."

Recommendation: In its EA, 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.

Response 7:

The science does not support the substance of this comment, including a thorough reading of the ARS cited source. For other citations it is not clear how applicable they are, such as how they would apply to the specific application methods being proposed.

Of fundamental mischaracterization, is the assumption that the proposals in this EA result in widespread treatments in Oregon, rather than the targeted programs that occur in limited areas in any given year and err on the side on non-treatment. When grasshoppers are in outbreak conditions, they are generally only limited by disease and climatic conditions, not predators or parasitoids which become quickly satiated, as it well established in literature, including the ARS developed IPM handbook: IPM Handbook Overview : USDA ARS.

The quote from taken from the ARS publication, which APHIS frequently provides to cooperators for IPM reference, is given out of context and does not apply to the proposed work in the way that is implied, for the following reasons:

We agree that protecting beneficial species is an important part of crop and rangeland management, and that treatment of low-productivity sites where grasshoppers can be limited by natural enemies may do more long-term harm than good. However we also agree with the further points in the ARS publication which state that in other situations, especially where ample food is available for grasshoppers, that natural enemies play an insignificant role in providing any level of control under most climatic condition.

Therefore, as outlined in our operating procedures, APHIS recommends that land managers look at many ecological factors before formally requesting treatments, and we will happily provide them with information such as the quote given, that will recommend moderation under low to moderate productivity areas. The authors recommendation does not however, at any time, apply to areas with quantitatively high levels of grasshoppers.

Here is a fuller discussion of the above ecological questions described in the publication cited (https://www.ars.usda.gov/ARSUserFiles/30320505/grasshopper/Extras/PDFs/IPM%20Handbook/IV8.pdf):

The quote was unfortunately used significantly out of context. Here's why:

- There is a strong distinction between low-productivity land which: Can be damaged by low densities of grasshoppers; but is generally controlled by trophic means (pests, predators and disease); and may want to be treated by land manager but is often not advisable for various reasons (including the specific long-term effects Xerces references), and is usually discouraged by APHIS.
- Mid-productivity, a hybrid of the two extremes. (Also generally not something that APHIS focus much control efforts on, at least in Oregon, unless they are part of a larger strategy.)
- Finally, high productivity sites where in essence, grasshoppers are never controlled by trophic webs, except for them not having enough food to eat, or weather conditions making them very vulnerable. The generally available amount of food makes control by trophic means not scalable even under poor conditions. These are the situation that warrant control in Oregon, where high productivity meets grasshopper population booms and natural enemies do not ever scale, regardless of land management decisions or treatment history.

Comment 8: 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, 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.

Recommendation: APHIS must address the potential for indirect impacts to rangeland birds, especially those experiencing declining populations from these or other stressors.

Response 8:

It should be reiterated that treatments are done only when requested by a land manager and APHIS has determined through technical assistance that a suppression treatment is warranted, making treatments infrequent and limited in scale, and also minimizing the risk of pesticide exposure to nontarget species when compared to other pesticide options not considered and full label application rates, as well as other mitigation measures developed during NEPA consolation which exceed requirements of pesticide labels.

Birds are highly mobile predators and will search for prey in areas within the treatment blocks where APHIS does not apply pesticides. For example, this would include the skip swaths where the RAATs method is employed or within protective buffers established around water resources or other sensitive sites. APHIS implements conservation measures by creating treatment buffers to protect migratory birds and native bird species that may be in the project area. Protective measures are taken to avoid habitat of ground-nesting birds when driving vehicles off designated roads or trails. Treatment activities also do not occur near trees to protect potential active raptor nesting sites. Greater sage-grouse is less mobile, but protective measures specific to their protection is provided.

In addition to this, land management agencies requesting treatments may specify additional protective measures.

Comment 9: 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."

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 EA is 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.

Response 9:

As previously acknowledged in these comments, the EA does not involve Sevin XLR Plus, which is the basis of most of this comment. As to not impacting bee species with Dimilin, that is discussed in the EA. To briefly summarize, adult foraging insects are not impacted by this growth regulator chemical. Further, the preferred, often required method of RAATs will leave about 50% of the project area untreated, and the project area is limited to specific areas leaving adjacent areas similar in habitat for native bee species untreated. Finally, beekeepers in the area are notified and their hives are considered sensitive sites and buffered. In sum, it is very realistic to assume that the EA proposal as described will not significantly impact native or livestock bee species.

Comment 10: The EA lacks information to justify its determination of No Effect and Not Likely to Adversely Effect to species listed under the Endangered Species Act

According to the EA, programmatic consultation with the US Fish and Wildlife Service on species listed under the Endangered Species Act was initiated in 2015, but is not yet complete. The backup is for APHIS to consult at the local level.

The EA includes a cover letter to US Fish and Wildlife Service which discloses its NLAA calls on certain species, but does not include the species for which it determined No Effect. The cover letter does not contain information on critical habitat or the justification for any determinations. Since the Services do not evaluate No Effect calls to listed species, including justification for such calls in the body of the EA is especially important.

No concurrence letter is included. Due to the absence of such concurrence at this stage, it is incumbent upon APHIS to disclose its determinations for all species and the measures it plans to implement to avoid impacts to listed species.

Operationally, how will listed species' protected locations be identified for ground and aerial applicators? How will such locations, buffer widths listed in the protective measures, and any specific instructions (i.e. use of carbaryl bait only) for some species be mapped and communicated to applicators? The EA are silent on these important questions that would support its ESA conclusions.

Recommendation: APHIS should include its consultation submittal to the services in the Draft EA, even (and especially) if a letter of concurrence is not yet available. In the Final EA, the letters of concurrence should be attached. 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. Pesticide 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.

For each species to be protected within the project area, APHIS must provide to applicators a set of clear set of 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.)."

Response 10:

The species listed in the 2021 USF&WS Official Species Lists for the action areas during the consultation process for OR-21-01 have been finalized with USFWS. Consultation with the USF&WS was still ongoing at the time that the Draft EA was submitted for comments.
The letter from the USFWS Biologist with discussion of no-effect calls for the proposed action areas was received and is included in the appendix of this final draft. [This comment is not relevant to OR-22-01 but the response is included for reference.]

Comment 11: Within the last year, the monarch butterfly has been designated a candidate species under the Endangered Species Act, but the EA contains no information about impacts to or consultation for this

species.

No information is available about the potential for effects to the monarch butterfly, recently designated a Candidate species under the Endangered Species Act,[sic]

In fall 2018 and fall 2019, the annual Xerces Western Monarch Thanksgiving Count showed that the population hit a new low: volunteers counted under 30,000 monarchs—less than 1% of the population's historic size.

Habitat suitability modeling for monarch butterfly in the counties covered by this EA shows there are concentrations of potentially highly suitable monarch habitat in Oregon within the area 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).

Recommendation: APHIS must not conduct any treatments prior analyzing effects to the monarch butterfly as required under the ESA. As detailed by Pelton and McKnight in a blog post dated January 19, 2021, only 1,914 monarchs were counted at all the 246 western overwintering sites during the 2020-2021 overwintering season. This is a shocking 99.9% decline since the 1980s. Given this horrendous decline of the western monarch population, it is beyond conceivable that APHIS would determine a No Effect. Therefore, no grasshopper suppression work should proceed in 2021 until the USFWS office, with full awareness of the extreme plight of the western monarch, issues its concurrence, this is made public, and APHIS implements any required conservation measures. Given the NRCS guidelines about placement of habitat, any insecticide use in or near existing or potential habitat should be out of the question**.**

Response 11:

The Monarch butterfly was listed as a candidate species on December 15, 2020. The U.S. Fish and Wildlife Service's (USFWS) 12-month status review determined that it was "warranted but precluded". The Endangered Species Act (ESA) provides for a "warranted-but-precluded" finding when the Service does not have enough resources to complete the listing process, because the agency must first focus on higher-priority listing rules. "Warranted-but-precluded" findings require subsequent review each year until the USFWS undertakes a proposal or makes a not-warranted finding. APHIS is not required by ESA Section 7 consultations to consult on species that have been precluded from being listed as threatened and endangered (T&E) species.

The 2021 USFWS official species list for this Environmental Assessment (EA) (WA-21-01) covering the rangeland action areas for ESA Section 7 consultations with U.S. Fish and Wildlife Service, covered consultations on species from this official list. The USFWS does not give concurrence for candidate species.

The commenter cited an article by the USDA - National Resource Conservation Service (NRCS) (2016) for Monarch Butterfly Wildlife Habitat Evaluation Guides, but these guides deal with crop lands not rangelands. According to (USDA NCRS (2020), the NRCS agency's primary geographic focus for monarch habitat has been in Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Ohio, Oklahoma, Texas, and Wisconsin, the primary eastern monarch migration corridor in a 10-state area of the central United States (USDA NRCS,. 2020).

On August 26, 2014, a petition to protect the Monarch Butterfly under the ESA was submitted on behalf of the Center for Biological Diversity, Xerces Society, Center for Food Safety, and Dr. Lincoln Brower. In this petition under the factors and the justification listed

,"The ESA states that a species shall be determined to be endangered or threatened based on any one of five factors (16 U.S.C. § 1533 (a)(1)): 1) the present or threatened destruction, modification, or curtailment of its habitat or range; 2) overutilization for commercial, recreational, scientific, or educational purposes; 3) disease or predation; 4) the inadequacy of existing regulatory mechanisms; and 5) other natural or manmade factors affecting its continued existence". The monarch is threatened by all five of these factors and thus warrants protection under the Act. The petition failed to describe in any manner, under the factors listed in the petition if any decline of milkweed populations occurred in rangeland habitats. All descriptions under the factors described dealt with decline of populations in cropland settings due to the heavy use of chemicals to control pests to crops. APHIS believes the types and amounts of chemicals being used in cropland settings are more varied and greater than chemicals being used in open rangeland settings where relatively rare grasshopper suppression treatments occur. The commenter did not provide data or justification to explain any decline in the amount of milkweed or if any milkweed is even present on rangelands was given.

Monarchs require milkweed for both oviposition and larval feeding. The correct phenology, or timing, of both monarchs and nectar plants and milkweed is important for monarch survival (USFWS, 2020). The ecological requirements of a healthy monarch population are summarized by Redford et al. (2011). In order to be self-sustaining, a population must be demographically, genetically, and physically healthy without the following ecological requirements sufficient seasonally and geographically specific quantity and quality of milkweed, breeding season nectar, migration nectar, and overwintering resources to support large healthy population sizes can occur.

Milkweed poisons cattle and other livestock. The toxic agents are cardiac glycosides. To be poisoned, cattle can eat as little as 1.0 percent of their body weight in broad-leafed milkweed; amounts as low as 0.15 percent have poisoned sheep and goats (Clayton, 2021).

Due to this factor, rangeland with milkweed would be at risk to cattle foraging, and is unlikely to be treated.

Comment 11: 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 EA.

The EA do not mention a recent nationwide consultation effort on carbaryl's effect to listed species. In its Biological Evaluation that it forwarded to the Services, EPA determined that carbaryl is likely to adversely affect 1,542 species (see https://www.epa.gov/endangered-species/draft-national-level-listed-species-biological-evaluation-carbaryl). Such a determination by EPA is cause for a high level of concern. At a minimum, one would expect to find disclosure of these determinations and inclusion of mitigation for carbaryl's harmful effects to listedspecies. Instead, no mention is made.

Recommendation: The listed species determinations for carbaryl should be disclosed in the EA and should preclude the use of carbaryl 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.

Response 11:

Carbaryl is proposed for used in a responsible way as described in this EA, and is not represented by the focus of this study. The results of this broad study do not clearly negate the plans laid out for its responsible use in this EA.

Comment 12: Vulnerable pollinators and arthropods as a group are put at risk by the proposed action, despite widespread reports of insect decline and affirmative federal obligations for federalagencies 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 EA.

Many of the pollinators that call Oregon home are already considered at-risk. See lists of at risk pollinators found in Oregon in Attachments 1 and 2 from our comment letter submitted in 2020, (these comments are also attached to our 20201 email submitting this comment letter).

Unfortunately, pollinators are just a piece 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 EA does not 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 Oregon designates any invertebrates as species of greatest conservation need.

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 EA. 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 EA 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 include:

- the 2014 Presidential Memorandum -- Creating a Federal Strategy to Promote the Health ofHoney Bees and Other Pollinators
- the National Strategy to Promote the Health of Honey Bees and Other Pollinators
- the Pollinator-Friendly BMPs for Federal Lands
- The Pollinator Research Action Plan

Under the *Presidential Memorandum* executive departments are directed as follows:

Executive departments and agencies shall, as appropriate, take immediate measures to support pollinators during the 2014 growing season and thereafter. These measures may include planting pollinator-friendly vegetation and increasing flower diversity in plantings, limiting mowing practices, and avoiding the use of pesticides in sensitive pollinator habitats through integrated vegetation and pest management practices.

Under the *Pollinator-Friendly BMPs for Federal Lands*, federal agencies are directed to:

- Determine the types of pollinators in the project area and their vulnerability to pesticides, takinginto consideration pesticide chemistry, toxicity, and mode of action. Consult local

Cooperative Extension or state departments of agriculture for more information.

- Minimize the direct contact that pollinators might have with pesticides that can cause harm andthe contact that they might have with vegetation sprayed with pesticides that are toxic to pollinators. Try to keep portions of pollinator habitat free of pesticide use.
- Plan timing and location of pesticide applications to avoid adverse effects on pollinator populations. Apply pesticides that are harmful to pollinators when pollinators are not active orwhen flowers are not present.

And the *National Strategy to Promote the Health of Honey Bees and Other Pollinators* includes as a one of three key goals:

Restore or enhance 7 million acres of land for pollinators over the next 5 years through Federalactions and public-private partnerships.

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 EA and map their ranges prior to approving any treatment requests. To assist APHIS in this analysis, we appended tables of at-risk bee and butterfly species potentially located within the project area in last year's 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.
- 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 large 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. 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.)

Response 12:

It is generous to have these extensive protective measures laid out in whole cloth, but perhaps it would be more productive at this stage in the process to look at the protective measures that are currently proposed in this EA are and note specifically where they might possibly be deficient. APHIS would argue that they are sufficient to not have a significant impact on any species other than the grasshopper outbreak target in the limited area where treatment is considered warranted. Additionally of note in regards to some sections of this comment that recommend management strategies: APHIS is not a land management agency so can not actively manage for anything other than its role in limiting damaging insects as described by the PPA, including economic grasshopper infestations.

Comment 12: Freshwater mussels are at risk across the country and need particular attention.

The Dimilin label indicates that the product is toxic to mollusks.

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: While the mitigations that are identified for aquatic habitats in the EA are heartening, the diflubenzuron label indicates that the chemical is subject to runoff for months after application, and areas supporting listed mussels need greater protection. 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.

Response 12:

APHIS buffers waterways to the current extent described herein to prevent injury to any aquatic species. This is also verified by environmental monitoring of sensitive sites (i.e. spray cards). Should species achieve protected status under the ESA they would be buffered by an additional distance. Consultation on these matters is on going and significantly helps the program to be more focused, far in excess of what is required by law from the pesticide label (FIFRA).

Comment 12: The EA is 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 EA does 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.

Response 12: Stock tanks are considered sensitive sites and are buffered like other water bodies or wetlands.

Comment 13: APHIS includes no information about whether an NPDES permit has been obtained, and what provisions it includes.

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.

Recommendation: APHIS must disclose whether its program has obtained an NPDES permit, or whether this requirement has been waived (and if so, why).

Response 13: APHIS does not apply pesticide to surface water under this program, and the buffers described herein assure that this is the intention. In Oregon, it has been determined that NPDES permits are not required for drift or other unintended spills into water bodies. That would be considered an accident and handled as such. Finally, APHIS uses environmental monitoring to detect such accidents and has plans in place to respond quickly.

Comment 14: Special status lands

The EA makes mention of the presence of various special status lands. However, there is no mention of impacts to or any specific protections to be accorded to special status lands such as Wilderness areas, Wilderness study areas, National Monuments, Research Natural Areas, National Wildlife Refuges, and designated or proposed Areas of Critical Environmental Concern within potential treatment areas.

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.

Response 14:

It is taken for granted that such spaces are not likely to have grasshopper treatment requests. If there is somewhere in particular in the 17 counties that are covered in this EA where this is a likely concern, that would be constructive information to help with this EA. There is no information available to APHIS to expect that this is a reasonable concern.

Comment 15: Cumulative effects analysis

The EA does not adequately disclose the locations where spraying has occurred in the past, nor did the APHIS 2019 EIS. The EA does include a map “Economic Infestation of Grasshoppers in Oregon 1953 through 2020.” At first glance this map is helpful but it is not clear if the colors represent the number of years in which a location has had repeat infestations? In addition, the areas that were actually treated are not shown in the map (as opposed to the areas infested).

In the EA, APHIS states that cumulative effects “are not significant” partly because the probability of an outbreak occurring in the same area as a previous outbreak is unlikely. However, the map does not support this (again, if we are to interpret the colors as the number of years of infestation during the 67 year period shown). Also, APHIS does not disclose the scale of treatments in any of those years, nor the impact of those treatments. APHIS 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.

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.

Response 15:

This critique is highly speculative, in that even if such impacts were noted in areas where treatments have occurred, correlation does not equal causation. APHIS is glad that the map showing high populations of grasshoppers over the last near century of survey was of interest. Treatments frequently occur that are not monitored by APHIS. Essentially we have outbreak information presented here, and it is unclear how any amount of further information would lead to an understanding of cumulative impacts of anything, let alone the very targeted work that APHIS does for this program. The FOIA request of 2020 could be an avenue for pursuing this question, but it is unclear what further role it would be suitable for APHIS to play in this investigation.

Comment 16: 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 simplycannot adequately address such concerns.

Unfortunately APHIS also makes no mention in the EA 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. 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 (see item 8 in this comment letter), 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 [sic]. 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.
- 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.

Response 16:
APHIS is not specifically tasked with these responsibilities, however the ARS IPM website—cited by the commentor above—is shared frequently, and the general understanding of the most practical IPM science available is included whenever possible in outreach efforts. As stated previously however, APHIS does not agree that there are always viable alternatives to selective pesticide use during grasshopper outbreaks, rather the alternative to non-action is often simply a continued and prolonged duration of damaging grasshopper populations, which are potentially limiting to the health and flora species abundance of the ecosystems in general.

Comment 17: 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 thefollowing recommendations:

- Actual proposed treatment areas should be mapped and shared with the public wheneach state APHIS office submits its treatment budget request. Special status lands andsensitive 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 fortreatments 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 ithas been transmitted to APHIS.
- Results of environmental monitoring associated with treatments (i.e. drift cards, watersamples) should be disclosed.

Response 17:
Please see the response to the first comment for a more complete response on this same topic. APHIS proactively provides notification to anyone who has expressed interest and to the public at large via notice in the Oregonian newspaper as well as extensive public meetings and similar outreach efforts to increase public engagement on this topic, particularly in areas impacted by grasshopper outbreaks directly.

Conclusion and Works Cited:
Thank you for the opportunity to comment on these actions. We recognize that it is challenging to balance various uses of these rangelands. With mounting science showing concerning declines in pollinators and other insects, APHIS should use its influence with land management agencies to ensure lands are maintained in a manner that prevent spikes of pest grasshoppers to avoid use of harmful pesticides on native grasshopper populations and habitats. Such forward thinking would not only could [sic] avoid harmful pesticide uses, it also would allow our valuable rangelands to better support pollinators and healthy ecosystems.
Please feel free to contact us should you have questions on our comments.

Sincerely,

Sharon Selvaggio
Pesticide Program Specialist
The Xerces Society

Aimée Code
Pesticide Program Director
The Xerces Society

Scott Hoffman Black
Executive Director
The Xerces Society

Lori Ann Burd
Environmental Health Director
Center for Biological Diversity

Adam Bronstein
Oregon/Nevada Director
Western Watersheds Project

Hardy Kern
Director of Government Relations
Pesticides and Birds Campaign

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31
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d. Center for Biological Diversity Appendix D, 2020 Xerces Comments

"**For Open Comment Period on the Draft Environmental Assessments Rangeland Grasshopper and Mormon Cricket Suppression Program, April 13, 2020**
(Text in full, followed by summary and response.)

We appreciate the opportunity to comment on the APHIS EA addressing grasshopper suppression in 2020 within the subject area in the State of Oregon.

The Xerces Society for Invertebrate Conservation (Xerces Society) is an international nonprofit organization that protects the natural world through the conservation of invertebrates and their habitats. We work to raise awareness about the plight of invertebrates and to gain protection for the most vulnerable species before they decline to a level at which recovery is impossible.

Pesticide use is one of the contributing factors to the loss of many invertebrate species. The use of pesticide can also hinder recovery efforts for imperiled species.

This letter is co-signed by the Center for Biological Diversity. The Center is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has 1.7 million members and online activists dedicated to the protection and restoration of endangered species and wild places, including 13,900 members and supporters in Nevada. The Center has worked for many years to protect imperiled plants and wildlife, open space, air and water quality, and overall quality of life.

Please accept the following comments on the subject document.

1. **Lack of Specificity in the EA Undermines Claim of No Significant Effect**

The EA explains how the brief decision making window leaves little time for evaluation: "The EA process for grasshopper management is complicated by the fact that there is very little time between requests for treatment and the need for APHIS to take action with respect to those requests."

The EA provides little in the way of solid information about where, how, and when the treatments may actually occur within the counties covered under the EA, during the year 2020. As a result, it is impossible to determine if effects would actually be significant or not.

Despite this, APHIS apparently does have an internal process for determining whether treatment requests will be approved, a process for delineating areas to be treated, and a process for determining what treatments will actually be applied, under what method, and what RAATS methods (if any) will be put into place. Yet actual treatment areas are still not shared with the general public, if at all. This lack of transparency about the location of actual treatment areas, particularly on public lands, is a disservice to the public and prevents the public from reviewing sufficient information to be able to gauge justification for and the risks involved in the suppression effort.

Recommendation: We urge APHIS to delay the publication of a FONSI until after treatment requests are received and all treatment areas have been delineated and are identified to the public. This would provide the public with 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.

If this is impossible, we urge APHIS to provide the public with maps of specific treatment areas and proposed treatment strategies (including proposed date of application and chemical and rate to be used), immediately after approving any treatment and at least 14 days prior to implementation of any treatment. 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.

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.

2. **It is unclear how analyses of projected economic injury levels and ultimately, treatment decisions, might be determined in the absence of site-specific data.**

The EA includes a map (Figure 1) that show relative densities of grasshoppers per square yard within Oregon, based on 2019 survey data. The map legend identifies areas in pink as "economic" (presumably meaning that grasshopper densities were measured at a level commonly considered above economic thresholds) but does not disclose the density nor other information that was used to determine this.

However, the EA states in a footnote: “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.” Yet none of these other variables are further discussed in the EA, nor is site-specific data presented for these.

APHIS procedure is that treatment requests are approved or disapproved based on a cost-benefit analysis performed using the “Hopper” model. This is in accordance with general IPM principles that treatments should only occur if it is judged that an outbreak would have detrimental economic consequences. For grasshopper suppression programs on rangeland, at least seven variables determine the economic justification (Berry et al. 1996):

- Rangeland productivity and composition
- Precipitation and soil moisture
- Accessibility and cost of alternative forage
- Effectiveness of treatment
- Cost of treatment
- Timing of treatment, and
- Grasshopper population density, life stage, and species composition.

Because the EA does not include data on these variable, and even the density variable is not actually transparent, it is not clear whether APHIS will have the data to make an informed, site-specific analysis of economic injury and costs versus benefits for each treatment requested. The EA does not make clear how APHIS will conduct its decision-making response in the absence of needed data. What values will APHIS default to if the data that the model relies on are not available?

Recommendation: APHIS must give the public a more precise definition of when the threshold for spraying has been met. APHIS should disclose its analysis for each of the seven variables. If site-specific data are not available or current, APHIS must use protective values as defaults in Hopper. For example, if species composition is not known, the analysis should not assume that higher density areas are comprised wholly or largely of "pest" species. In addition, efficacy of treatments should not be assumed to be optimal.

3. **The EA understates the risks of the insecticides diflubenzuron and chlorantraniliprole for exposed bees and other invertebrates, and makes no mention of recent jeopardy calls for malathion and carbaryl on more than 1,000 species nationwide.**

The EA lists three insecticide options (diflubenzuron, carbaryl, and chlorantraniliprole), and states that the choice of which to use will be site-specific, without being clear about how that choice of insecticide is made. Still, according to the EIS, diflubenzuron was used on 93% of all acres treated between 2006 and 2017. In addition, the EA indicates that ground treatments may occur, but the EIS states "In most years, the Program uses aircraft to apply insecticide treatments." If past is prologue, then we can expect that a majority of treatments that will occur under this EA will be with diflubenzuron (Dimilin 2L; EPA Reg. No. 400-461) applied via aircraft. However, since the chemical chlorantraniliprole has been added to the program, according to the EIS, we anticipate that the Program may make heavy use of this chemical in 2020 as well. Our comments in this section focus on these two chemicals since it appears likely that these two active ingredients will be preferred.

Diflubenzuron: The EA indicates that under the preferred Alternative, diflubenzuron would be applied at 0.75 or 1.0 fluid ounce per acre (0.012-0.016 lb a.i./ac), with the potential for skipped widths under RAATS.[1] At the 0.016 lb ai/ac rate, BeeREX calculates the expected environmental concentration (EEC) in pollen and nectar from foliar overspray as 1.76 mg/kg, which is equivalent to 1760 ppb.

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 risk assessment included for diflubenzuron (attached to the 2019 EIS) makes little to no mention of an important consideration regarding interpretation of standardized acute lab testing for this insect growth regulator that EPA (in its 2018 Ecological Risk Assessment) does point out. Namely: "Chitin synthesis is particularly important in the early life stages of insects, as they molt and form a new exoskeleton in various growth stages. Thus, aquatic guideline tests, (or terrestrial invertebrate acute tests), which typically run for 48 hours, may not capture a molting stage, and thus underrepresent acute toxicity. Single doses may cause mortality, if received at a vulnerable time. Consequently, conclusions from RQs based on acute toxicity studies for invertebrates may not fully represent actual risk."

While insect growth regulators are often considered "selective", pollinators such as native bees and butterflies have no inherent protection against diflubenzuron and will be vulnerable to injury and death if exposed.

For honey bees (the surrogate species for risk assessment in the absence of other data), USEPA (2018) reported a chronic 21-day ED50 and NOAEL of 0.012 and <0.0064 µg a.i./larva, respectively. Utilizing these values in BeeREX (EPA's model that calculates risk quotients for bees) and assuming an application rate of 0.016 lb ai/ac, BeeREX calculates an acute dietary risk quotient of 18.13 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.

However, APHIS discounted the pollinator risk by claiming that studies finding significant effects to pollinators utilized doses far above levels that would be used in grasshopper control. Unfortunately, this does not appear to be true for all studies cited. For example, Mommaerts et al. (2006) conducted dose-response assays and found that exposure to diflubenzuron resulted in reproductive effects in Bombus terrestris, with only the doses at at 0.001 of maximum field recommended concentrations (MFRC) in pollen and 0.0001 in sugar water resulting in effects statistically similar to controls. The MFRC for diflubenzuron is listed in the study as 288 mg/L (equivalent to 288,000 ppb). At 1/10,000 of this level, diflubenzuron effects would be similar to controls only at levels at or below 28.8 ppb while at 1/1000 of this level, diflubenzuron "no effect" concentrations would be equivalent to 288 ppb. This analysis thus shows the opposite of what APHIS claims – that the effective dose for reproductive effects is actually far below the EEC expected for diflubenzuron at RAATS rates used in grasshopper suppression. This raises concern that the application of diflubenzuron at the specified RAATS rates may cause severe impacts to bee reproduction within treated areas.

Moreover, APHIS points out 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. Additionally the EIS discloses 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. Rangeland persistence is unfortunately not available, but diflubenzuron applied to plants remains adsorbed to leaf surfaces for several weeks. Bees visiting the treatment areas will likely pick up contaminated pollen, which will be brought back to the nests and ultimately be consumed by developing larvae.

Chlorantraniliprole: The EA indicates that under the preferred Alternative 2, chlorantraniliprole would be applied at 4.0-8.0 fluid ounces (0.013-0.02 lb a.i.) per acre with the potential for skipped widths under RAATS. At the 0.02 lb ai/ac rate, BeeREX calculates the expected environmental concentration (EEC) in pollen and nectar from foliar overspray as 2.2 mg/kg, which is equivalent to 2,200 ppb; while at the 0.013 lb ai/acre rate, the equivalent EEC is 1.43 mg/kg, equivalent to 1,430 ppb.

Chlorantraniliprole is an activator of the ryanodine receptor, releasing stored calcium and causing impaired regulation of muscle contraction. The insecticide is most effective via ingestion. Typically, this active ingredient is quite persistent in soil; according to the EA, soils treated in the lab demonstrate half- lives ranging from 228 to 924 days. In its 2018 ecological risk assessment, the EPA reported field dissipation half-lives up to 1130 days in studies on bareground plots.

The EA does not disclose that this is an insecticide that is systemic in plants. This is an important characteristic of this insecticide that should be disclosed. Residues persisting in the soil may translocate to pollen and nectar, even in subsequent years.

The persistence in soil raises another concern. About 70% of native bee species nest in the soil. Due to this, even if not active at the time of spray, native bees will likely come into contact with it, and may ingest residues in the soil.

While chlorantraniliprole is often considered non-toxic to honey bees, Smagghe et al. (2013) reported that in bumble bee nests exposed to 0.4 mg/L, (400 ppb, or less than a third of the residue concentration expected from the RAATS rate specified for the grasshopper suppression program), workers and drones did not take their defensive position upon stimulation and they were less active than non-exposed insects.

Chlorantraniliprole has been studied for its effect on monarch butterflies. A study by Krishnan et al (2019)[2]—which investigated contact and dietary exposure of chlorantraniliprole to monarch larvae—determined a dietary LC50 value of 8.3 x10-3 µg/g leaf for second instars (equivalent to 8.3 ppb) and LC50 of 4.6 x 10-2 µg/g leaf (equivalent to 46 ppb) for third instars. For contact exposure, the authors reported a 96-hour LD50 of 1.2 x 10-2 µg/g larvae (equivalent to 12 ppb).

These studies indicate that monarch butterflies will be at risk if exposed to foliar chlorantraniliprole treatments. We don't know if effects on monarchs are indicative of potential effects to other butterfly species present in the treatment area, but an analysis conducted by Forister et al (2016) found a negative association between annual observations of butterfly species in California and increasing neonicotinoid usage and the effect was more severe for smaller-bodied species.

Carbaryl: Carbaryl is currently being examined for its effect on listed species under nationwide consultations. Just this year, EPA determined that carbaryl is likely to adversely affect 1,542 species. (see https://www.epa.gov/endangered-species/draft-national-level-listed-species-biological-evaluation-carbaryl).

Recommendation: Together, these research findings portend worrying results for native pollinators exposed in the treated areas. Faced with significant and concerning pollinator declines, APHIS should take into account the risk to native bees and butterflies from these treatments, especially those designated species of greatest conservation need. More specifically, APHIS should constrain its treatments to take into account pollinator conservation needs, and improve its monitoring capability to try to understand what non-target effects actually occur as a result of the different treatments.

The LAA calls for carbaryl should be addressed in the EA and should preclude the use of these chemicals.

[1] It is worth noting out that the low end of this range (0.12 lb ai/ac) is still double what APHIS presented as the "average" RAATS rate in the Final EIS (p. 35).

[2] This study was not included in the Final Human Health and Ecological Risk Assessment for Chlorantraniliprole Rangeland Grasshopper and Mormon Cricket Suppression Applications (November 2019) which accompanied the 2019 EIS.

4. **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 is likely to expose beneficials in untreated swaths at unacceptable levels.**

This EA and the EIS claim 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).

● EA p. 36: “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.”

However, the width of the skipped swaths is not designated in advance in the EA, and there is no minimum width specified. Instead, APHIS states that for aerial applications, the skipped swath width is typically “no more than 200 feet” for diflubenzuron. This is the widest width rate specified in the EA; which states that “For aerial applications, the skipped swath width is typically no more than 100 feet for carbaryl and 200 feet for chlorantraniliprole and diflubenzuron.”

The inclusion of the evidence from Lockwood et al. 2000 is helpful, but this study only investigated RAATs on carbaryl, malathion, and fipronil, not on diflubenzuron or chlorantraniliprole which appear to be the chemicals most likely to be used in most areas. In addition, the study had average wind speeds well below the maximum rate allowed under the operating guidelines indicated in the EA. More glaringly, the study makes clear that reduced impact to non-target arthropods was “presumably due to the wider swath spacing width [30.5 and 60 m]”. Without knowing minimum (rather than maximum) swath widths that will be applied under this EA, it is hard to compare results from this study to the results on non-targets expected under RAATS in this EA.

In addition, although the EIS included a quantitative analysis of drift anticipated from ULV aerial applications to estimate deposition into aquatic areas, an analysis is not presented or available to back up the assumption that untreated areas (skipped swath widths) will act as refugia for natural enemies, bees, and other wildlife. The drift analysis described in the EA assumed a droplet spectra size of fine to very fine (median diameter = 137.5 µm). However, labels do not require a minimum droplet size for ULV applications over rangeland, and other uses of ULV technology for pest control assume much smaller droplet sizes. For example, for ULV applications used in adult mosquito control operations, volume median diameter (VMD) measures between 8 and 30 µm and 90% of the droplet spectrum should be smaller than 50 µm (Schleier et al. 2012).

Schleier et al. (2012) performed field studies to measure environmental concentrations of ground-based ULV-applied insecticides and developed a validated model to predict their deposition. 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 measurement 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.

EPA’s (2018) Ecological Risk Assessment for diflubenzuron uses AgDrift to estimate the drift fraction from aerial LV applications, although it is unclear whether AgDrift is validated for the purposes of predicting deposition of insecticides applied using ULV technology. 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.

One can only conclude, in review of these analysis, that a skipped swath width of 200 feet won’t do much to protect insects in skipped swaths from drift. Hence, the value of these skipped swaths for pollinator or natural enemy conservation cannot be relied upon.

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 percent drift 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.

5. **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 (USEPA, 2012d). 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) are more sensitive, as a group, than other species.

The Dimilin 2L label instructs the user to minimize exposure of the product to bees. In the EIS, APHIS states that it will adhere to these recommendations for Dimilin (p. 57). However, if treated habitat is flowering and bees are active (as would be anticipated during any of the proposed treatment months of April-September), 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 EA is silent on how it will avoid impact to pollinators. This is more egregious since pollinators are mentioned in the EA as invertebrates of special interest. 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).

Recommendation: APHIS must not ignore requirements listed on pesticide labels, nor make assumptions about its compliance with these when RAATS measures that will actually be taken are vague and unspecified. While flexibility with these may have been appropriate at the EIS stage, it is not appropriate at the EA stage. APHIS must fully disclose its RAATS plan for each treatment in the EA, including specifying application method, chemical to be used, rate, and width of untreated swaths. In addition, to be consistent with the Pollinator-Friendly BMPs for Federal Lands (see Comment 7), APHIS must go beyond the general statements on the pesticide labels and specify more exactly how its spray plan will further reduce exposure and risk to bees.

6. **Listed species within the project area appear to lack adequate consultation.**

The EA reports that "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." However, NMFS concurrence on a "not likely to adversely effect" call for salmonids for use of chlorantraniliprole, a new chemical is still outstanding.

According to the EAs, programmatic consultation with the US Fish and Wildlife Service on species listed under the Endangered Species Act was initiated in 2015, but is not yet complete. The backup is for NMFS to consult at the local level. The EA includes a letter for concurrence from USFWS, but that was specific to the 2018 EA written for Oregon, not the 2020 EA.[3]

What is the status of consultation on the 2020 EA, including for the new chemical chlorantraniliprole, which was not addressed in the 2019 letter of concurrence? Does USFWS concur with the Not Likely to Adversely Affect or No Effect calls for each of the species present within the proposed project areas? If so, what additional mitigation measures (if any) does USFWS suggest? Operationally, how will listed species' protected locations be identified for ground and aerial applicators? How will such locations, buffer widths listed in the protective measures, and any specific instructions (i.e. use of carbaryl bait only) for some species be mapped and communicated to applicators? The EA is silent on these important questions that would support its ESA conclusions. In addition, the letter of concurrence included specified the need for APHIS to:

a) "survey to ensure the known distribution of certain species whose distribution is unknown or poorly understood," and

b) to monitor treatments; "emphasis should be on determining the effectiveness of avoidance buffers for listed species including indirect affects to prey animals and pollinators and indirect transportation of insecticide products to non-target areas, including all water bodies."

Recommendation: APHIS should include the letter of concurrence from USFWS for its 2020 program in the Final EA for public review. APHIS must not utilize active ingredients for which consultation is incomplete. Under the ESA there must be 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. Pesticide 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.

In the Final EA, APHIS should clearly outline its surveying and monitoring procedures to protect listed species.

For each species to be protected within the project area, APHIS must provide to applicators a set of clear set of 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.)."

[3] This is ironic, since presumably any treatment requests for the 2018 season would have been completed in 2018, and APHIS did not have a letter of concurrence in hand till May 2019.

7. **Vulnerable and listed pollinator species are provided no real protections under the EA, despite affirmative federal obligations for federal agencies put into place several years ago.**

APHIS acknowledges in the EA that "The majority of rangeland plants require insect-mediated pollination. Native, solitary bee species are important pollinators on western rangeland."

We agree that 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 plant species is not addressed in the EA.

The EA makes 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 include:

- the 2014 Presidential Memorandum -- Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators
- the National Strategy to Promote the Health of Honey Bees and Other Pollinators
- the Pollinator-Friendly BMPs for Federal Lands
- the Pollinator Research Action Plan

Under the Presidential Memorandum executive departments are directed as follows:

- Executive departments and agencies shall, as appropriate, take immediate measures to support pollinators during the 2014 growing season and thereafter. These measures may include planting pollinator-friendly vegetation and increasing flower diversity in plantings, limiting mowing practices, and avoiding the use of pesticides in sensitive pollinator habitats through integrated vegetation and pest management practices.

Under the Pollinator-Friendly BMPs for Federal Lands, federal agencies are directed to:

- Determine the types of pollinators in the project area and their vulnerability to pesticides, taking into consideration pesticide chemistry, toxicity, and mode of action. Consult local Cooperative Extension or state departments of agriculture for more information.
- Minimize the direct contact that pollinators might have with pesticides that can cause harm and the contact that they might have with vegetation sprayed with pesticides that are toxic to pollinators. Try to keep portions of pollinator habitat free of pesticide use.
- Plan timing and location of pesticide applications to avoid adverse effects on pollinator populations. Apply pesticides that are harmful to pollinators when pollinators are not active or when flowers are not present.

And the National Strategy to Promote the Health of Honey Bees and Other Pollinators includes as a one of three key goals:

- Restore or enhance 7 million acres of land for pollinators over the next 5 years through Federal actions and public-private partnerships.

The geographic area covered by this EA may be home to 200-700 species of native bees (McKnight et al. 2018 – see Figure 1). Among these, some are at risk but not provided protection under the Endangered

Species Act. The proposed treatment area supports a large number of at-risk native bees and at-risk native butterflies, whose status may be worsened by insecticide treatments for grasshopper control. See Attachments 1 and 2.

The EA does not 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 Oregon designates any invertebrates as species of greatest conservation need.

Monarchs: Within the EA, protections for at risk species, including the monarch butterfly which is currently being assessed for listing under the Endangered Species Act, are practically non-existent. The EA mentions monarchs only in passing.

Monarch population decline is real; by the mid-2010s, the western monarch population had declined by about 97%, and starting in 2018, monarch butterflies had tough seasons in their migratory and breeding grounds in the western states. In fall 2018 and fall 2019, the annual Xerces Western Monarch Thanksgiving Count showed that the population hit a new low: volunteers counted under 30,000 monarchs—less than 1% of the population's historic size.

Habitat suitability modeling for monarch butterfly in the counties covered by this EA shows there are notable concentrations of potentially highly suitable monarch habitat east of the Cascades in Oregon, and numerous sightings of adult monarchs (Dilts et al. 2018), especially within the Columbia Plateau and in Central Oregon. 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).

Recommendation: In the face of declining pollinator 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 EA and map their ranges prior to approving any treatment requests. To assist APHIS in this analysis, we are appending a table of at-risk butterfly species potentially located within the project area. Prior to treatment, APHIS should survey for presence of host plants and ensure that it has identified specific, actionable measures it will take to protect monarch habitat and the habitat of at-risk butterfly species from contamination that may occur as a result of exposure to treatment, such as designating a 125-ft buffer around identified habitat.

Some ways to enact protections for at-risk species 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.
- Do not apply pesticides (especially insecticides) when monarchs (adult and immature) are present or expected to be present.
- Avoid aerial applications.
- Avoid using liquid carbaryl.
- Include large 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. 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.

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

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.

Recommendation: APHIS should use the buffers that have been designated along streams supporting listed salmonids to protect freshwater mussels, regardless of the presence of listed salmonids. 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. The Prevathon label indicates that this product is toxic to oysters, which indicates that freshwater mussels may also be at risk if exposed. The Dimilin label also indicates that the product is toxic to mollusks.

9**. The EA is 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 EA does not discuss water bodies of anthropogenic origin, such as stock tanks or stock ponds, nor 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.

10. **Special status lands**

The EA does not make mention of any specific protections to be accorded to special status lands such as Wilderness areas, Wilderness study areas, Research Natural Areas, National Wildlife Refuges, and designated or proposed Areas of Critical Environmental Concern.

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.

11. **Public notice of site-specific EAs**

We appreciate that public notice of this site-specific EA and its comment period was posted at the APHIS website. It does not appear to have been the practice to post the Draft EAs in the last several years, but limiting public notice is contrary to the spirit of the NEPA process. Grasshopper suppression efforts are of more than local concern and as federal actions, should be noticed properly, i.e. beyond local stakeholder audiences, local newspapers, etc.

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.

It is challenging to balance various uses of these rangelands. With mounting science showing concerning declines in pollinators and other insects, it behooves APHIS to use its influence with land management agencies to ensure lands are maintained in a manner that prevent spikes of pest grasshoppers and avoid use of harmful pesticides on native grasshopper populations and habitats. Such forward thinking would not only could avoid harmful pesticide uses, it also would allow our valuable range lands to better support pollinators and healthy ecosystems. Also, APHIS must reassess its treatment thresholds and whether treatments are needed as the current EA does not share enough information to determine if this is the case. Finally, when treatment is planned, sufficient mitigations must be incorporated.

Thank you for your efforts. Please feel free to contact us should you have questions on our comments.

Lori Ann Burd

Environmental Health Director and Senior Attorney

Center for Biological Diversity

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Attachments: At-Risk Bee Species Potentially Present within the Project Area and At-Risk Butterfly Species Potentially Present within the Project Area

These tables were not included because they could not be formatted for 508 Compliance (https://www.section508.gov/). Additionally, they were for reference only, not actual comments. If you are interested in reviewing these reference materials, please contact the Xerces Society for their latest version. Specific information found in these reference tables that has some direct bearing on a draft EA that is out for comment should be provided in the form of a comment, which can be responded to, not as reference material which is not sufficiently clear in terms of relevance and/or interpretation of the submitter.

Comment Summary and Response

No comments relevant to OR-22-01 were found in this appendix that are not already addressed in Appendix C and responses to Xerces Society’s 2022 letter (see part 3), which is to be expected since this is just an earlier iteration of these letters. It is unclear what the purpose of providing this appendix is considering how lengthy and redundant it is, but for the sake of completeness it was included.

2. Oregon Department of Fish and Wildlife

April 4, 2022: "Oregon Department of Fish and Wildlife comments on U.S. Department of Agriculture APHIS Environmental Assessment Number OR-22-1: DRAFT Environmental Assessment for Rangeland Grasshopper & Mormon Cricket Suppression Program"

(Text in full, followed by comment summaries and responses.)

Thank you for the opportunity to comment on the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) 'DRAFT Environmental Assessment for Rangeland Grasshopper & Mormon Cricket Suppression Program' (published March 4, 2022, at http://www.aphis.usda.gov/plant-health/grasshopper). Please accept these comments on behalf of the Oregon Department of Fish and Wildlife (ODFW).

The DRAFT Environmental Assessment (Draft EA) describes considerations for Greater Sage-Grouse (Centrocercus urophasianus; Sage-Grouse or GRSG) under Alternative B, the Preferred Alternative, and commits APHIS to 'implement conservation objectives and measures recommended by U.S. Fish and Wildlife Service (USFWS) and Bureau of Land Management (BLM) for protection of Greater Sage-Grouse.' ODFW manages the wildlife in the State of Oregon (Oregon Revised Statute [ORS] 496.012), and is authorized by statute (ORS 496.164) to advise, consult, and cooperate with agencies of the federal government in regard to fish and wildlife management. We encourage APHIS to collaborate with ODFW during implementation of any Grasshopper Control Program in eastern Oregon to ensure pesticide application practices outlined in the Draft EA are consistent with the Oregon Conservation Strategy, Oregon's 2011 Sage-Grouse Conservation Assessment and Strategy (Conservation Strategy), the 2015 Oregon Sage-Grouse State Action Plan (Action Plan), and the State's objectives for management and conservation of Strategy Species (Species of Greatest Conservation Need, SGCNs) identified by the Oregon Conservation Strategy in Oregon.

ODFW would like to further reiterate the importance of the considerations for Sage-Grouse conservation in Oregon if the Preferred Alternative is selected. Direct effects of exposure to solid bait formulations of carbaryl and liquid formulations of diflubenzuron on Sage-Grouse are unknown, but there is potential for direct effects. Additionally, application of these chemicals in Sage-Grouse habitat would have indirect impacts on the species through reduced food availability. During the early brood-rearing season, typically mid-May through July, Sage-Grouse chicks rely on invertebrates for a significant portion of their diet. ODFW encourages APHIS to follow guidelines from the Sage-Grouse Conservation Strategy, which recommends 3 steps to addressing insect (grasshopper) outbreaks in Sage-Grouse habitat; 1) evaluate the necessity of insecticide application, 2) avoid use of any insecticide in brood-rearing habitats, and 3) avoid use of non-specific insecticides in Sage-Grouse habitats. Additionally, ODFW recommends APHIS refer to the Sage-Grouse Action Plan (Section vi. g. Insecticides and Appendix 4) when planning a Grasshopper Control Program in Sage-Grouse range in Oregon. Action GRZ-5 should be considered to 'minimize direct impacts (mortality) and indirect impacts (reduction of forage) to Sage-Grouse when applying insecticides within Sage-Grouse habitat.'

ODFW supports APHIS in its commitment to 'abide by the protective measures in the December 22, 2011, BLM Instruction Memorandum No. 2012-043' and to implement conservation objectives and measures recommended by the BLM 2015 Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA). Management Decision (MD) VEG 7 within the ARMPA directs the BLM to 'not use non-specific insecticides in brood-rearing habitat during the brood-rearing period. Use instar-specific insecticides to limit impacts on Greater Sage-Grouse chick food sources.' This language from BLM's ARMPA was incorrectly cited in the USDA Draft EA, which specified the brood-rearing season to be July 1 to October 31. However, these dates are not specified in the BLM's ARMPA under MD VEG 7 and should not be used to define the Sage-Grouse brood-rearing season in Oregon. Rather, the early brood-rearing season should also be included in this date range; under MD VEG 3 and MD VEG 5, 'breeding and brood-rearing typically occur from March 1 to June 30.' More specifically the ARMPA Glossary [Chapter 5] defines Sage-Grouse breeding habitat as 'leks and the sagebrush habitat surrounding leks that are collectively used for prelaying, breeding, nesting, and early brood-rearing, from approximately March through June,' and late brood-rearing habitat as 'a variety of GRSG habitats used from July through September. Habitat includes mesic sagebrush and mixed shrub communities, wet meadows, and riparian areas, as well as some agricultural lands, such as alfalfa fields.' To avoid the greatest impact to Sage-Grouse chicks during the brood-rearing season, ODFW recommends no application of insecticides in occupied or likely occupied Sage-Grouse brood-rearing habitat during May through July.

In a letter to USDA APHIS re: 'Concurrence on the effects to listed species and critical habitat from Oregon Grasshopper Mitigation by USDA APHIS PPQ' (Draft EA, Appendix C.2.), USFWS provided considerations and recommendations to APHIS regarding additional (non-listed) species protection. On page 7 of this letter, Sage-Grouse considerations were detailed. ODFW agrees with the Sage-Grouse related recommendations detailed by the FWS in this letter, and, similarly, requests APHIS provide ODFW with detailed information regarding how a Grasshopper Control Program in areas occupied by Sage-Grouse will avoid direct and indirect impacts to the species during the early and late-brood rearing season (May through July). This letter additionally addresses considerations for the protection of Columbia spotted frog (Great Basin DPS). ODFW concurs with recommendations of the FWS for protection of the Columbia spotted frog, and requests similar consideration for all populations of Columbia spotted frogs to minimize and avoid impacts to populations identified as sensitive-critical in the Blue Mountains and Northern Basin and Range ecoregions.

The affected environment within the proposed suppression area includes rangeland within 17 counties that comprise most of the eastern two thirds of Oregon, including the Columbia Plateau, East Cascades, Northern Basin and Range, Blue Mountains, Snake River Plain, and Central Basin and Range ecoregions. This landscape includes habitat for species identified within the Oregon Conservation Strategy as Strategy Species that may be vulnerable to direct or indirect effects of application of insecticides, that predate grasshoppers and Mormon crickets, or may otherwise be impacted by actions included within a Grasshopper Control Program. In addition to Greater Sage-Grouse, vertebrate Strategy Species within this landscape that may be impacted include (but are not limited to) Columbia spotted frog, Swainson's Hawk, Burrowing Owl, Loggerhead Shrike, Grasshopper Sparrow, Long-Billed Curlew, Brewer's Sparrow, northwestern pond turtle, and western painted turtle. Sensitive pollinators and other invertebrates identified as Strategy Species in the Oregon Conservation Strategy are also likely to be directly affected by a Grasshopper Control Program in eastern Oregon. The Oregon Department of Fish and Wildlife reiterates a request for the opportunity to consult on proposed suppression sites to ensure that impacts to sensitive wildlife species identified within the Oregon Conservation Strategy are minimized to the extent possible and encourages APHIS to consult with other state agencies as appropriate on species or habitats within their jurisdiction.

The Oregon Department of Fish and Wildlife thanks APHIS for the opportunity to comment on this Draft EA and for the consideration of these comments. We look forward to your reply and opportunities to partner with APHIS to ensure Grasshopper Control Programs are compatible with the conservation of sensitive wildlife species and their habitats.

Sincerely,

Skyler Vold

Sage-Grouse Conservation Coordinator
Oregon Department of Fish and Wildlife

Emily VanWyk

Conservation Strategy Coordinator (Acting)
Oregon Department of Fish and Wildlife

Comment Summary and Response

ODFW's review and response to the draft EA is a welcome addition to this process. APHIS greatly appreciates hearing this knowledgeable perspective and the EA has been updated as recommended in terms of the brood rearing period listed for the protection of Greater Sage Grouse.

Future coordination with ODFW on protecting the described resources is important and APHIS will attempt to do so wherever practical and feasible. There isn't a statutory requirement to follow recommendations to protect state species of concern that APHIS is aware of, but seeking to meet goals provided by subject matter experts and representative of the state of Oregon is important, while recognizing APHIS has a statutory requirement under the Plant Protection Act to treat to suppress grasshopper populations when feasible. APHIS also only makes these treatments when received request from a landowner/land manager and have met the requirements to justify a suppression treatment in the estimation of designated administrator. Land managers like BLM work closely with ODFW already, and typically do recommend protections above and beyond those provided in the EIS, EA or USFW consultation alone, much of which is reiterated as a recommendation by USFW in their Letter of Concurrence, and our BAs.

APHIS applications are done in a way to minimize the risk of pesticide treatments to nontarget species when compared to the other insecticides that can be used, application rates, application frequency, as well as other mitigation measures in the program that exceed pesticide label requirements.

The potential for direct effects to sage-grouse from bait carbaryl and diflubenzuron applications in the comment, would be limited by single and infrequent treatments (rarely in consecutive years if ever), and lower than less selective chemistries, or higher rates as available on the FIFRA/EPA licensed pesticide labels.

For BLM lands, as with others, APHIS follows what the land management agency requires. APHIS adheres to BLM's requirements for protection of the greater sage grouse, or any other species, or natural or cultural resource, so that BLM consultation with ODFW remains the primary method of consultation for species not currently listed for ESA Section 7 protection.

3. Xerces Society et al. 2022 Comments

April 1, 202

For Open Comment Period on the Draft Environmental Assessments Rangeland Grasshopper and Mormon Cricket Suppression Program Oregon, 2022, EA Number: OR-22-01

We appreciate the opportunity to comment on the APHIS EA addressing grasshopper suppression in 2022-2023 within the areas designated in the identified EA in the State of Oregon.

The Xerces Society for Invertebrate Conservation (Xerces Society) is an international nonprofit organization that protects the natural world through the conservation of invertebrates and their habitats. We work to raise awareness about the plight of invertebrates and to gain protection for the most vulnerable species before they decline to a level at which recovery is impossible.

Pesticide use is one of the contributing factors to the loss of many invertebrate species. The use of pesticide can also hinder recovery efforts for imperiled species.

The Center is a non-profit environmental organization dedicated to the protection of

native species and their habitats through science, policy, and environmental law. The Center has

1.7 million members and online activists dedicated to the protection and restoration of endangered species and wild places, including thousands of members and supporters in Arizona, where our headquarters are located. The Center has worked for over thirty years to protect imperiled plants and wildlife, open space, air and water quality, and overall quality of life.

Western Watersheds Project is a nonprofit environmental conservation group with 12,000 members and supporters founded in 1993 and has field offices in Idaho, Montana, Wyoming, Arizona, Utah, Nevada and California. WWP works to influence and improve public lands management throughout the West.

American Bird Conservancy is a 501(c)(3), non-profit membership organization whose mission is to conserve native birds and their habitats, working throughout the Americas to safeguard the rarest bird species, restore habitats, and reduce threats.

Please accept the following comments on the subject documents.

1. The EA Fails to Disclose Areas Likely for Treatment and Does Not Adequately Describe the Affected Environment or Analyze Impacts to the Affected Environment

APHIS states in the EA:

"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 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 EA, 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 likely method and chemical -- 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 EAs or as an Addendum to the Final EA.

As published, the Draft EA provides almost no solid information about where, how, and when the treatments may actually occur in 2022 (or 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, we do not have a basis of comparison to know if 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 (see above) and treatment request maps.

APHIS' lack of transparency about the location of actual 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 after 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 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.

If APHIS chooses to finalize its EA 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 the EA until after treatment requests are received and all treatment areas have been delineated and are identified to the public.

2. 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. Oregon even includes such a map in its EA, showing where "economic infestations" of grasshoppers have occurred since 1953, and differentiating areas where high densities have been noted

in many years vs few. Other states have similar information -For example see Cigliano et al. (1995) which identified areas most prone to outbreak in Montana, and Lockwood and Schell (1997) which did the same in Wyoming.

Even armed with this information, and even disclosing that most treatment requests are received in three counties (Harney, Lake and Malheur) APHIS did not bother to take a closer look at the areas 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 prime fishing areas (Mann Lake), and areas known to be frequented by declining birds such as meadowlark and sage- grouse (Pueblo/East Steens areas).

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.

3. 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 four potential insecticides in its operating guidelines included with the EAs: carbaryl, malathion, diflubenzuron, and chlorantraniliprole.

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.

Recommendation: APHIS should cease claiming that it preferentially uses selective chemicals. This is untrue and misleading.

4. 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 EA go 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 EA 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.

In the description of Alternative B, APHIS appears to have a typo in its conversion of lb ai/acre for diflubenzuron in the 2022 EA. The EIS analyzed a maximum rate of 0.016 lb ai/acre but the Oregon EA says 0.032 lb ai/acre.

In addition the text has been added "still a sub-label rate." We have observed that APHIS commonly states that their chemical applications are "below label rates". In fact, the Dimilin 2L label, a product commonly specified by APHIS, indicates exactly the RAATS rate range used by APHIS, therefore APHIS is not indicating a use "below label rates" or a "sub-label" rate. The fact that agricultural use sites may be permitted higher rates, perhaps for suppressing other pests, is generally irrelevant to the discussion.

This kind of variation is very common on labels. Risk depends not only on rate, but also exposure to species of interest. In this case the potential exposure is quite high given the scale of impact that may occur under the suppression program to wildlands.

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. In addition, APHIS should separate the conventional from the RAATs method into two different alternatives, and analyze them accordingly. Please correct the typo. And we recommend APHIS cease its practice of claiming it is using below label rates – this is untrue.

5. 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 EA, APHIS described risk as “reduced.” Reduced compared to what, exactly? The inexactness and lack of specificity of such statements make the EA of little utility for a citizen trying to determine the actual predicted impacts of insecticide spray on large blocks of Western rangelands.

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.

6. APHIS ignores the significance of Oregon 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 EA.

Many of the pollinators that call Oregon home are already considered at-risk. See lists of at risk pollinators found in Oregon in Attachments 1 and 2 from our comment letter submitted in 2020. We ask you to incorporate those attachments by reference.

Pollinators, including bumble bee species within the range of potential 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 Silene spaldingii. 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 Oregon are within the range of at least two bumble bee species that have experienced declines in abundance and range contractions: Bombus morrisoni and B. occidentalis. Their decline statistics and range contractions are captured in a valuable IUCN overview of North American bumble bee species (Hatfield et al. 2015). For B. morrisoni, its relative abundance is just 17.4% compared to historic values. B. occidentalis abundance relative to historic values is only 28.5%. This species is being considered for listing under the Endangered Species Act by the US Fish and Wildlife Service.

Additional bumble bee species are known to occur near areas that have been the target of spraying by APHIS repeatedly in recent years. Bombus nevadensis, a species for which declines in abundance have been documented, has been sighted in the area slightly north of Denio and east of the Pueblo Mountains, as well as around Wildhorse Valley. Bombus fervidus, a vulnerable species that has experienced nearly a 50% decline, has also been sighted just north of there, east of Frenchglen by Sheepshead Mountains, right in a treatment area, and just adjacent to the recent treatment areas around Malheur Lake. Bombus huntii has been sighted just north by Lambing Canyon near these areas.

In Britain and the Netherlands, where multiple bumble bee and other bee species have gone extinct, there is evidence of decline in the abundances of insect pollinated plants.

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 EA does not consider the threats that treatments could pose to dwindling bumble bees or other native bees that are dwindling but not yet on the Endangered Species List. The EA further fails 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 Oregon designates any invertebrates as species of greatest conservation need.

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 EA. 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.

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 EA 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 EA 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.

●	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 large 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. 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.

7.	APHIS has not demonstrated that treatments in Oregon will 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 authority 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 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 EA 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.

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.

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 Oregon, it takes from 1-19 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 average 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 receives an estimated $0.14 per acre for the forage value on BLM or USFS federal rangelands in Oregon.

Given that the direct costs of grasshopper treatments to the taxpayer appear to range from $3.99 up to

$14.61/acre, it is clear that the economic threshold is nowhere near being met. The program makes no economic sense from the point of view of the taxpayer.

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; Cilgliano et al. 1995). At best, insecticide treatments may stem damage to forage and crops in the current year.

The EA did not include APHIS' protocol for delineation surveys which occur in spring and summer to identify treatment areas. However, we reviewed an APHIS /Oregon Department of Agriculture report of its 2021 survey, which concluded that more than 10 million acres in Oregon contained grasshopper populations at economic threatening levels in 2021. However, APHIS' analysis rested on faulty methods,[2] leading to misleading conclusions and inviting the reader to believe that most of eastern Oregon was essentially overrun by grasshoppers or Mormon crickets in 2021. A review of this report by Fred Ramsey, a Professor Emeritus from Oregon State University and wildlife statistician, found APHIS's methods to be flawed. This leads to concern that treatments are neither justified on the basis of any sound "economic" analysis nor justified based on statistically valid interpolation methods.

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 each EA, 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.

[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.

[2] Errors included failing to account for species composition, erroneously conflating nymphal densities and adult densities, and using a simplistic buffer method to arrive at estimates of total infested acreage, even though survey points were concentrated along roads, acknowledged as being concentrated in areas where treatment requests had been received – in other words, clearly not randomly distributed. There was no validation that these survey points were representative of the larger landscape. There is also no evidence that APHIS analyzed factors beyond density measurements. APHIS states in its 2019 Final EIS that the potential for economic damage should also consider grasshopper species composition, habitat condition, hay prices, and other factors.

8. The EA 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 EA, 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.

APHIS also misleadingly suggests that diflubenzuron lacks toxicity to honey bees. In fact APHIS only provides detail on toxic effects for adult bees, while ignoring effects to the life stage targeted by this insecticide: eggs and developing juveniles.

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, 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 appeared to acknowledge the risk to bees in many of the 2020 EAs by instituting a 4-mile buffer around any known managed leafcutter or alkali managed bees and by including notification to all apiarists before a treatment. However, these prudent measures are missing entirely from the 2022 treatment guidelines

APHIS mangled important studies examining pollinator impacts. For example, APHIS cites Mommaerts et al. (2006), noting that reproductive effects were observed on bumble bees, but APHIS claimed that these effects were observed at much higher use rates than those used in the program. Unfortunately, this is a gross mischaracterization of the Mommaerts study which found drastic reproductive failure at concentrations that would be expected from program rates.

In the EAs, APHIS left out entirely the results found in 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 bees 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)
- 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 EA when APHIS discussed risk to pollinators, lend additional urgency to the need for APHIS to seriously reconsider the effects of diflubenzuron on pollinators.

9. 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).

- Oregon 2022 EA: "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."

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 EA.

- 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 several 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).

• 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 EA 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/m2. 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.[6]

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 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 found 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 lb/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 EA) 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 treatment 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.

[6] [footnote 4-5 not included] We use these figures later in estimating the effect of these estimated environmental concentrations on non- target pollinators.

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

Carbaryl: 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 EA describes the oral LC50 value as

0.1 ug/bee.[7] Larval bee toxicity was not available from the APHIS 2019 EA.

In the 2022 EA, APHIS states that Oregon will allow only the bait formulation of carbaryl for the period covered by the EA. 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.

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.

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.

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.

[7] 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.

11. Sage-grouse conservation recommendations made by USFWS in its 2021 concurrence letter appear to be ignored in the 2022 EA.

Greater Sage-Grouse has seen its range cut in half and its population decreased 93 percent from historic numbers. Although an agreement is in place to prevent ESA listing, FWS provides conservation recommendations to prevent populations from being further threatened. In the 2021 concurrence letter provided by USFWS for the Oregon EA, FWS provided the following information and recommendations:

Insect reduction as a result of rangeland grasshopper control has been found to reduce brood sizes in a wild sage-grouse population (Johnson 1987). In order to reduce the reliance on insecticides for control of rangeland grasshoppers, Johnson (1987) recommends the use of "Integrated Pest Management" (IPM) for control of rangeland grasshoppers. IPM uses naturally occurring pest controls such as weather, disease, predators, parasites, physical and chemical control, as well as habitat modification to keep grasshoppers from surpassing intolerable levels (Johnson 1987). In addition, sage-grouse brood areas should be located if not already known, and protected from insecticide spraying (Johnson 1987). Grasshopper control should also be delayed in brood-rearing areas to allow for maximal chick development before spraying reduces their insect forage (Johnson 1987). The Service recommends APHIS use these guidelines to avoid pesticide spraying of nesting and brood-rearing areas for sage-grouse in order to prevent further declines from current sage-grouse population levels.

But APHIS's 2022 Oregon EA makes no indication of how it will use IPM to help control rangeland grasshoppers. APHIS still allows use of diflubenzuron even within brood-rearing areas, despite the documented risk of diflubenzuron to a wide range of insects (Graham et al. 2008), including grasshoppers which are important food for chicks.

In 2021, APHIS even appears to have allowed treatments to proceed in designated Priority Habitat Management Areas for sage grouse in Oregon.

Studies of diflubenzuron in the field show impacts to a wide array of insects used by sage grouse chicks for food, including grasshoppers, Coleoptera (beetles), Hymenoptera (bees, wasps, saw flies, ants), true bugs, and Lepidoptera.

Peterson (1969) identifies Coleoptera, Orthoptera, 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 (Montana).

Greg and Crawford identified Lepidoptera as important components associated w/ chick survival.

Recommendation: APHIS should address the deficiencies in its plan, and implement stronger protections for sage grouse in keeping with state and regional conservation strategies. APHIS should implement firm no-treatment buffers around leks (most chick rearing happens within a certain distance of leks) 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.

12. 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 untreated 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 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, 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[8] will have a maximum impact on nontarget arthropods." [Emphasis added]

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 EA, 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.

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

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, 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.

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 safe grouse—have suffered the largest decline (53%) among habitat-based groups since 1970, while populations of six species of grassland birds have declined by 65-94%. This is never disclosed in the EA 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 noted declines documented for grassland birds, and looking closely at how the scale of treatments may impact populations.

14. 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."

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 EA is 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.

15. The EA lacks information to justify its determination of No Effect and Not Likely to Adversely Effect to species listed under the Endangered Species Act.

According to the EA, programmatic consultation with the US Fish and Wildlife Service on species listed under the Endangered Species Act was initiated in 2015, but is not yet complete. The backup is for APHIS to consult at the local level.

The EA includes a cover letter to US Fish and Wildlife Service which discloses its NLAA calls on certain species, but does not include the species for which it determined No Effect. The cover letter does not contain information on critical habitat or the justification for any determinations. Since the Services do not evaluate No Effect calls to listed species, including justification for such calls in the body of the EA is especially important.

No concurrence letter is included. Due to the absence of such concurrence at this stage, it is incumbent upon APHIS to disclose its determinations for all species and the measures it plans to implement to avoid impacts to listed species.

Recommendation: APHIS should include its consultation submittal to the services in the Draft EA, even (and especially) if a letter of concurrence is not yet available. In the Final EA, the letters of concurrence should be attached. 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 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.

For each species to be protected within the project area, APHIS must provide to applicators a set of clear set of 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.

16. The monarch butterfly, now a candidate species under the Endangered Species Act, needs protection from liquid insecticides.

No information is available 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 impact to the monarch under the alternatives prior to implementing the action alternative.

Habitat suitability modeling for monarch butterfly in the counties covered by this EA shows there are concentrations of potentially highly suitable monarch habitat in Oregon within the area 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).

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 as it is listed in the operating guidelines. 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 rethink and strengthen 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. We recommend a 1-mile buffer from known or potential milkweed stands for ground applications to provide a reasonable margin of conservation protection.

17. 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 EA.

The EA 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.

Recommendation: The listed species determinations for carbaryl should be disclosed in the EA 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.

18. 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.

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

The Dimilin label indicates that the product is toxic to mollusks.

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, and areas supporting listed mussels need greater protection than what is provided through the standard buffers APHIS applies around aquatic areas. 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.

20. The EA is 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 EA does 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 stock tanks explicitly as covered by the buffers identified for aquatic areas in its Operational Guidelines.

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

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.

Recommendation: APHIS must disclose whether its program has obtained an NPDES permit, or whether this requirement has been waived (and if so, why).

22. Special status lands

The EA makes mention of the presence of various special status lands. However, there is no analyisi 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 designated or proposed Areas of Critical Environmental Concern within 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.

23. Extent of treatment to private lands

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. In addition to our public lands concerns, 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 on private land for listed species 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

24. Cumulative effects analysis

There is insufficient analysis of cumulative impacts in the EA. For example, the EA does not adequately disclose the locations where spraying has occurred in the past, nor did the APHIS 2019 EIS. The EA does include a map "Economic Infestation of Grasshoppers in Oregon 1953 through 2020." At first glance this map is helpful but it is not clear if the colors represent the number of years in which a location has had repeat infestations? In addition, the areas that were actually treated are not shown in the map (as opposed to the areas infested).

In the EA, APHIS states that cumulative effects “are not significant” partly because the probability of an outbreak occurring in the same area as a previous outbreak is unlikely. However, the map does not support this (again, if we are to interpret the colors as the number of years of infestation during the 67 year period shown). Also, APHIS does not disclose the scale of treatments in any of those years, nor the impact of those treatments. APHIS 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 Oregon.

It is noted that there was a large appropriation of funds by the Oregon legislature toward grasshopper suppression (in December 2021). These funds will likely mean scaled-up suppression efforts in Eastern and Central Oregon, yet the impact of a spike in suppression is not mentioned nor analyzed in the EA.

In addition, impacts to migratory species from cumulative exposures (such as honeybees which, as the EA discloses, are in large part transported to California during the almond bloom) are not addressed.

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 take into account grasshopper management that is led by other agencies or private partners, and the combined effects of these on resources of concern.

25. 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 EA 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 sanguinipes 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. 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.

● 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.

26. 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.

Thank you for the opportunity to comment on these actions. We recognize that it is challenging to balance various uses of these rangelands. With mounting science showing concerning declines in pollinators and other insects, APHIS should use its influence with land management agencies to ensure lands are maintained in a manner that prevent spikes of pest grasshoppers to avoid use of harmful pesticides on native grasshopper populations and habitats. Such forward thinking would not only could avoid harmful pesticide uses, it also would allow our valuable rangelands to better support pollinators and healthy ecosystems.

Please feel free to contact us should you have questions on our comments.

Sincerely,

Sharon Selvaggio	Aimée Code	Scott Hoffman Black
Pesticide Program Specialist	Pesticide Program Director	Executive Director
The Xerces Society	The Xerces Society	The Xerces Society
Lori Ann Burd	Adam Bronstein	Hardy Kern
Environmental Health Director Relations	Oregon/Nevada Director	Director of Government
Center for Biological Diversity Campaign	Western Watersheds Project	Pesticides and Birds
		American Bird Conservancy

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Comment Summaries and Responses

1. The EA:

a) Fails to Disclose Areas Likely for Treatment

As described in the EA, this is the most specific plan available.

Grasshopper populations are not static, and the exact locations of outbreaks are not available in advance of the short window for planning and treatment. A technological solution for this problem is presented in the comment as a general remedy for this non-technical problem, but without acknowledging the short window of opportunity for conducting this work in accordance to Integrated Pest Management (IPM) principals, which is ironic since APHIS is also criticized in other comments for not adhering closely enough to IPM ideals. Without specifics it's hard to know what the requested area for technological improvement is, but the USDA is using the best entomological technology available at this time and has been a global leader in doing so for over 150 years.

In the comment, there is an attempt to point to the budgeting necessity of providing best guess estimates of gross treatment acreage (likely to be requested each year) as being functionally equivalent to knowing months in advance the very specific areas where treatment will end up occurring, so that the EA and commentors may examine them in the greatest detail. (The comment does not acknowledge that this EA is for two years, and further is not complete for the current year yet, now mere weeks in advance.) NEPA processes often takes years of planning and have been specifically expedited to the fullest extent possible for the scheduling challenges inherent to the grasshopper program, wherein the realities of grasshopper biology and as already mentioned the principals of IPM are especially limiting factors. Since cooperators are required to move the process forward at every stage, planning with them starts as early as possible in the year prior to their actually getting their requested treatment--typically as soon as they realize they are already too late for dealing with a disastrous outbreak in a given year. At that point the cooperative process of educating them on how to actuate it, and the many steps they will need to complete, starts for the next spring window. This is not the same as having clear treatment areas worked out and available for even draft level scrutiny months or even weeks in advance, though trends in locations of overall outbreaks *are* provided to anyone by APHIS as soon as possible on an ongoing basis.

Lastly, there is a potential privacy concern in disclosing exact locations of severe grasshopper infestations deemed worthy of economic response in the level of detail being proposed to the general public, since such infestations often occur on private property. As an alternative to disclosing damaging information about pest outbreaks to the public, APHIS provides general infestation information on an on-going basis, and comprehensive plans in the EA as to how suppression treatments anywhere within the 17 counties described will be carried out without significant impacts to the environment, human health, or impacts.

The point of this EA is to cover all likely contingencies. If it turns out that as spring survey happens over just a few weeks and requests are coming in, that an area requested with the latest data is not sufficiently covered by this EA and supporting documents, an addendum will be published prior to treatment, or more likely, given the IPM treatment window of less than a month in Oregon typically, the treatment will not occur. (This is one of countless reasons a treatment would not move forward in a given year as part APHIS' responsibility for a determination of economical/ecological efficacy on behalf of the public, as required by the Plant Protection Act.)

b) Does Not Adequately Describe the Affected Environment or Analyze Impacts to the Affected Environment, "…As published, the Draft EA provides almost no solid information about where, how, and when the treatments may actually occur in 2022 (or subsequent years)."

More specific ways to describe the affected environment and potential impacts are welcome as that is the entire purpose of the environmental assessment, as well as the many documents it is tiered to. As can be seen from the Letter of Concurrence from FWS, potential impacts are considered in greatest detail with the agency tasked with ESA protection. These requirements apply to all areas considered in this EA, with support from the many documents it is tiered to. Finally, 'how and when' potential treatments may occur *are* in fact presented in high detail in the EA.

The comment goes on to state that, "we do not have a basis of comparison to know if grasshopper numbers are rising or falling relative to historic patterns." This is not really the purpose of the EA, however extensive surveys are done each year and the results are provided to the commentor and anyone else who expresses interest.

The commentor also requests descriptions of the "the average size of treatments" and a "map of such treatments over a credible period, such as 2-3 decades, accompanied by detailed nymphal information… and treatment request maps." As described, nymphal and treatment maps are not available prior to the treatment window, though they are provided on an ongoing basis to anyone expressing interest. A map of treatments over a credible period, and the average size of treatments could make an informative addition to this EA, though hardly revolutionary. Still, this is an example of constructive input that could improve such EAs and will be considered as such. The main limitation is however, that as described, grasshopper species ranges and outbreaks are not static, and this EA is not limited to past known ranges. Also, a point that seems to be missed frequently, since IPM is a science that evolves, this EA is substantially different from previous EAs for the same location (e.g. from 2010 when liquid carbaryl and malathion were considered). In short, it is unclear why providing statistics from up to 30 years ago on the grasshopper program is more informative than what is presented in the current EA, which is intended to be comprehensive for the immediate future. The commentor also has Freedom of Information Act (FOIA) requests that are providing them with this retrospective information, so perhaps soon more specifically engaged comments, focused on the present, from that information will be forth coming.

Finally, while it is specifically correct to say that APHIS currently performs quite limited treatments per year as compared to the overall acreage prepared for in this EA, the commentor is perhaps quite correct in stating overall that this EA does not fully consider the implications of pesticide treatments for grasshoppers in Oregon, though not for the reasons described: Since on average these treatments will mostly be occurring on private land, what the commentor fails to appreciate perhaps, is that this is the only published environmental assessment occurring for such treatments, and the general provisions here by default represent the best IPM methodologies available to those much larger non-APHIS treatments for the suppression of economic grasshopper outbreaks in Oregon. It is therefore in our shared interest as entomologically informed parties to 'cast a wide net' in ensuring that our EA (and supporting documents such as the ESA consultation) do adequately cover the *entire* area as described.

2. Use of "Emergency" Explanation to Avoid More Site-Specific Assessment of Impacts is Indefensible and Groundless, "The emergency explanation does not hold water when this program is given an annual budget and when grasshopper outbreak dynamics are reasonably well known… Oregon even includes such a map in its EA, showing where "economic infestations" of grasshoppers have occurred since 1953, and differentiating areas where high densities have been noted in many years vs few."

The implication that site-specific assessments of impacts is not occurring is incorrect and an unfortunate misunderstanding of the process. The assessments made in this EA are quite specific to the entire area in question, and if read carefully, lays out a process for providing for full NEPA compliance in most instances. As mentioned, if a site requested for treatment is not covered for some reason, the EA is updated, or more likely, treatment does not occur that year. Again, specific concerns for how the methodology described in this EA and the many tiered assessments are failing in any conceivable location are welcome. The examples provided however, (Mann Lake and Pueblo/East Steens areas) were absolutely covered in this EA, and would be further evaluated and protected, both through FWS consultation and with local expert (BLM in those cases) if a treatment was to be requested in those areas.

In short, there is not some different plan, waiting for a specific location, this is the entire plan, and can be critiqued specifically as such. It is further immediately bolstered by ESA consultation with FWS, as well as be consultation with local experts, such as BLM biologists or any other local experts available.

Grasshopper outbreak history is indeed presented in the EA, and is something like a historic tool for predicting treatments as they requested above, though of course APHIS is not currently active in all those areas. And as mentioned above, potential action is also in no way limited to those historical outbreaks. As far as the outbreak dynamics being reasonably well know, this does not mean that anyone knows months or years in advance where a treatment will be in the public interest. Again, ironically, this would be entirely opposed to the basic founding principles of IPM which were founded as a basic remedy to prophylactic treatments.

It is unclear how having an annual budget means that a program cannot be responding to an emergency. This seems like some kind of basic misunderstanding about how the program operates as well as a significant lack of trust, which is unfortunate and hopefully unfounded—again, perhaps the many FOIA requests responses provided recently will provide the kind of basic understanding of how the program operates in reality that is apparently not sufficiently communicated in the APHIS environmental planning documents, despite our best efforts.

3. APHIS baselessly claims that it protects pollinators through the use of insecticides that are not broad-spectrum, and should cease claiming that it preferentially uses selective chemicals.

(It is unclear what EA this is referencing overall, since it references chemicals not included in this EA.)

As to Diflubenzuron and carbaryl bait, both are limited by the mode of uptake, which is by ingestion, making them softer (i.e., not broad spectrum) alternatives to poisons that kill on contact. The quote referenced stated that APHIS emphasizes the use of insecticides that are not broad spectrum. Given the mode of uptake, Diflubenzuron and carbaryl bait generally qualify in that sense. The commentor also claims that, "The label for diflubenzuron itself calls the insecticide 'broad-spectrum' (see Durant 2L label); therefore APHIS' statement is not credible." However, a simple search of the EPA registered pesticide labels of Durant 2L, as well as the standardly used Dimilin 2L, showed that this is factually untrue, and that no such claims are made by the manufacturers of these products. But regardless, by any definition of the term, these particular pesticides are considered selective and the kind of softer chemicals that would support an integrated approach to pest management.

4.

a) APHIS includes only a single action alternative and fails to analyze other reasonable alternatives, such as buying substitute forage for affected leaseholders.

APHIS is tasked by the law to control economic populations of grasshoppers and Mormon crickets where feasible, not to make laws such as forage subsidies. Furthermore the damage caused by these pest species is not limited to 'forage for affected leaseholders'.

b) RAATs and conventional treatments are combined in a single alternative

A typo was pointed out, 1 oz does indeed equal 0.016 lb ai, and not 0.032 lb ai. Thank you very much, and that will be changed in the final version. However, an incorrect quotation of a label was presented in these comments: The full label rate is in fact 1-2 oz per acre for grasshoppers on grassland (0.016 - 0.032 lb ai) which is functionally more than the listed 'conventional' rate of just 1 oz/acre listed in the EA for consideration.

As far as combining the options of conventional and RAATs treatments into a single alternative, they are largely similar and full coverage can provide greater flexibility in providing effective treatments after the ideal treatment window in the current year. Overall, the effects are not substantially changed and may be equally suitable. In Oregon however, for APHIS programs, and also for the programs that use APHIS as and example, proper timing and RAATs treatment is required for economic reasons, if nothing else. Again, it seems this may be an example of welcome ideas for improvement to the program, though perhaps not as crucial as it may appear.

5. APHIS uses "reduced" too much and not in comparison, to create and impression of low risk, "Reduced compared to what, exactly? The inexactness and lack of specificity of such statements make the EA of little utility for a citizen trying to determine the actual predicted impacts of insecticide spray on large blocks of Western rangelands."
It is unclear who the naïve audience is that would be harmed by this, but APHIS will look at the overuse of this term.

Reduced compared to what, exactly? The inexactness and lack of specificity of such statements make the EA of little utility for a citizen trying to determine the actual predicted impacts of insecticide spray on large blocks of Western rangelands.

Reduced compared to what, exactly? The inexactness and lack of specificity of such statements make the EA of little utility for a citizen trying to determine the actual predicted impacts of insecticide spray on large blocks of Western rangelands.

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

APHIS agrees with a general concern about the potential for pesticide and land use impact to negatively impact native pollinators and is working to be a fellow advocate for this concern.

Risk to all non-target species however is mitigated by all of the following: Selective treatments (that is, treating limited areas with high grasshopper populations); use of 'softer' chemicals (that do not kill on contact but require ingestion, and/or have no lethal dose with vertebrates); and finally, by untreated swaths within the treatment block(s) by utilizing RAATs whenever feasible (and/or as specifically required/limited to by the treatment requestor).

Additionally, many of the buffers recommended at the end of this comment are already in effect, including 3 mile buffers for ESA plants, 500 ft buffers for water sources, buffering of honey bee hives and human-inhabited areas, etc.

It is worth pointing out however, that in extreme grasshopper outbreaks, there are harmful impacts to rare plants and pollinators too, so that treated areas may in fact provide a boost to these same species that are of concern.

7. "APHIS has not demonstrated that treatments in Oregon will 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. …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 EA 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."

This is factually incorrect, as the variables for such a decision, as to be determined by the APHIS administrator in the Plant Protection Act (PPA), are laid out in in detail and a general model, which seems also to be being requested, is presented. This does not however in some way require that the commentor agrees with such estimation. Indeed, the APHIS administrator would be somewhat remis in taking the commentors advice it seems, since tather than considering our IPM modle's merits, the commentor provides a new model in which the cost of grazing rights alone is simply balanced against treatment costs. This is clearly not the sum total of the loss caused by preventable multi-year grasshopper outbreaks to the public, and a better model is described in the EA. In short, economic loss described in the PPA mandate is not limited to grazing rights income loss, and the responsibility of making the IPM determination is a requirement of the public's representative, not the NEPA process itself.

Since we are in the midst of the largest grasshopper and Mormon cricket outbreak in nearly 50 years, it is unfortunate that there is so much confusion about the validity of the potential economics impacts of this longstanding cyclical pest in Oregon. Economics of this pest complex helped to found the USDA to respond to it, the founding of the discipline of Economic Entomology, and even IPM itself. It seems that the commentor does not hear from the public about their serious concerns about these pests as much as the program administer tasked by law with this role does, and has done for over a century..

8. The EA 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.
IV. 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.

Risk to non-target species is mitigated by selective treatments (that is treating limited areas with high grasshopper populations) as well as by softer chemicals (that do not kill on contact, and/or have no lethal dose with vertebrates) and finally by untreated swaths within the treatment block(s). APHIS consults with FWS to ensure a not likely to adversely impact status for the program for all ESA species, as well as other species of concern, as will continue to do so.

9. APHIS fails to acknowledge the high risks of carbaryl (even when applied as baits) to a wide variety of species, including sage-grouse.
10. Sage-grouse conservation recommendations made by USFWS in its 2021 concurrence letter appear to be ignored in the 2022 EA.

Sage-grouse buffers are in fact described in the EA and meet the highest standards currently recommended. As a non-ESA species however, this is not strictly required for NEPA compliance. Regardless, risk to non-target species is mitigated by selective treatments (that is treating limited areas with high grasshopper populations) as well as by softer chemicals (that do not kill on contact, and/or have no lethal dose with vertebrates) and finally by untreated swaths within the treatment block(s). APHIS consults with FWS to ensure a not likely to adversely impact by the program for all ESA species, as well as other species of concern, as will continue to do so.

Further, as relates specifically to sage-grouse, significant protective measure are followed, in consultation with FWS, and land managers such as BLM who consult with local experts on the issue and have requirements beyond what is required for NEPA. These protections are described in the EA, as well as the Letter of Concurrence from 2021 in the draft EA, and the recently issued 2022 version shared in this final EA.

Finally, the specific 'failures' described in the comment did not concern treatment provisions, rather they are exclusively land-management decision, in which APHIS has no direct role, though information on the topic is provided by APHIS to cooperators in outreach events and in the USDA-ARS IPM handbook (which Xerces quotes frequently, if rather selectively and out of context at times, in comments).

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

It is not entirely clear how attempting at a very selectively reduce devastating outbreak to just down to more normal levels, with the many limits described in the EA to limit non-target effect (as opposed to the negative test cases warned against in the articles quoted), would entirely disrupt an endemic ecosystem. Comparisons made in the comments to areas treated repeatedly for many years, simply does not happen for this program in Oregon, and seems unlikely to happen in the future, given the costs of such treatments and cyclic nature of the pest outbreaks that have been observed, which include multi-year downcycles typically at a minimum for areas that have been recently treated. But we will all continue to study this pest complex in a changing climate and evolve to meet the demands of the public as best we can.

Currently however, the comment is also not especially relevant to grasshopper pest populations as they are observed in the Western US, as natural checks (pests, predators, and disease) do not scale up rapidly to suppress outbreaks reliably, especially if climatic conditions that favor disease limiting conditions do not happen to occur. Taking a single study out of context to suggest otherwise is overly optimistic, especially from the perspective of the communities impacted by outbreak conditions. As clever as any such study may be, it is hard to see how APHIS should take this advice over the survey results which we ourselves provide to our cooperators, who then ask us for help with a problem that clearly does not just take care of itself, even when treatments are infrequent, and for most of Oregon, are exceedingly rare.

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

Birds are typically satiated with grasshoppers during outbreaks, and reducing those populations to normal levels would not be detrimental, unless normal levels are insufficient for some reason. Furthermore, buffers of waterways and consulted upon species of concern would be expected to fully prevent this not somewhat unclear concern (that is, linking reduction of grasshopper outbreaks and/or suppression to bird decline specifically) from being a limiting factor. Protective measures, as described repeatedly at this point, will be sufficient to prevent significant impacts to grassland birds in general, both by having no direct effects from the pesticides described, or be limited in feeding or other indirect effects as analyzed at length in the EA, EIS, as well as ESA and land-manager consultations prior to any treatment programs.

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

It is unclear what EA this is referencing overall, since it references chemicals not included in this EA. As to the Diflubenzuron specific" "minimize exposure of the product to bees" and to "minimize drift of this product on to beehives or to off-site pollinator attractive habitat." APHIS does this by buffering honey bee or other managed bee hives and of course by selective treatments (that is treating limited areas with high grasshopper populations) as well as by softer chemicals (that do not kill on contact but require ingestion by immature invertebrates only to be lethal) and finally by untreated swaths within the treatment block(s). APHIS consults with FWS to ensure a not likely to adversely impact status by the program for all ESA species, as well as other species of concern.

14. The EA lacks information to justify its determination of No Effect and Not Likely to Adversely Effect to species listed under the Endangered Species Act.

This EA is tiered to a consultation with FWS for ESA and other species of concern, and their findings are shared in the appendix, Letter of Concurrence, that states at length their reasons for agreeing with this exact finding. The commentor states falsely that no such letter is included. The letter from 2021 is included in the draft, the recently received letter from 2022 is in the final draft, which is a slight update, in the continuance of many years of such iterations.

As to the use of GPS guidance and specific exclusion zones, this is standard practice, as stated in the SOP.

15. The monarch butterfly, now a candidate species under the Endangered Species Act, needs protection from liquid insecticides.

This species is not currently listed so has no official protection status, and more importantly, given the lack of scientific literature, the range is not clearly known or shown to overlap at all with potential treatment areas. There is a way forward to provide greater, voluntary at this time, protection for this species, but this will take time, and to all reality, greater understanding of the current limiting factors of this species, which have not been shown in any way to be linked with grasshoppers or rangeland treatments such as are under consideration in this EA. To date for example, no significant host plant populations have ever been identified within an APHIS treatment for this program in Oregon. As a result, it is extremely unclear what if any protection measures could be possible to offer.

Regardless, APHIS is voluntarily considering adding protection measures officially in the next EA for Oregon. In the meantime, APHIS is reviewing the best info currently available for doing so, and will be attempting to survey for host plants within any proposed treatment areas to create exclusionary buffers prior to treatments, if host plant populations that are meeting basic quality standards (e.g., populations are robust and otherwise undisturbed) can be found at all.

16. 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 EA.

The study does not readily apply to Carbaryl bait use as described in the EA, however the EIS which this EA is tiered to deals with this topic in more detail. The comment does not seem to apply to the EA in question at this time in Oregon.

17. Aquatic areas are not adequately protected with the existing buffers

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

Strict environmental monitoring protocols have found no evidence of drift into any waterways in Oregon, or in the program generally. Program buffers apply to all waterways, not just those requiring extra ESA protection, so though no doubt freshwater mussels face many challenges in the modern world, such as acid rain and heavy metals in the atmosphere, the specific actions laid out in this EA at least are not a significant threat.

19. The EA is 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.

Stock tanks are typically buffered, though no correlation with ESA species is currently known. This is largely a decision that will be left to land managers to determine, but APHIS generally would be for buffering active (that is not empty) stock tanks.

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

National Pollutant Discharge Elimination System (NPDES) permits are not required since APHIS is not treating over waterways, further mitigated by standard operational buffers.

21. Special status lands

APHIS does not make such provisions, rather that would be the responsibility of the land manager(s) requesting treatment to determine such limitations. As part of a collaborative process, requesting parties may make special provisions for their requests, including special protective measures. Finally, as mentioned in response to comments I. and II., if a site requested for treatment is not adequately covered in this EA for some reason, the EA will be updated, and very likely treatment will simply not be possible in the given NEPA cycle.

22. Extent of treatment to private lands

Private land-owners can request APHIS treatments, though it is uncommon in Oregon. In any case, regardless of land owner or combination of land owners (i.e., federally managed, tribal, state, municipal, or private) APHIS would still need to comply fully with NEPA and the provisions agreed to for sensitive site protections, regardless. Providing full disclosure of known sensitive sites and allowing for access and survey in support for accurate identification and buffering of such sites is one of many requirements for requesting an APHIS treatment.

23. Cumulative effects analysis

Cumulative effects are analyzed in the EA, to the extent that APHIS believes is thorough and warranted. The commentor would like more disclosure of past treatment events. It is unclear how this would be added to an EA, or how the assessment of future work would be greatly helped by this, but this comment will be considered as a future possibility for greater transparency if feasible. There are however potentially privacy concerns or confidential business information concerns in making such disclosures. There are however numerous FOIA requests from the commentor that will provide this data if possible.

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

APHIS currently does this with our extensive survey, technical assistance, and IPM treatment methodologies. Land management questions in general are beyond APHIS' prevue however, since APHIS is not a land management agency. The strategies described in the EA work to build resilience, through the specific methods of IPM described, but grasshopper outbreaks are an endemic part of the Western US, and it is unclear that any management techniques will prevent this in the real world. APHIS treats only at the request of land managers, and only after extensive consultation to ensure the treatments fit within an overall IPM strategy.

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

Outreach on behalf of the program in Oregon is quite extensive. In 2021 alone, seven public meetings were held reaching hundreds of stakeholders, despite the limitations on travel and in person meetings resulting for the global pandemic. Additionally, news articles about the recent outbreak have made local to national news, and as usual, our survey results were sent out weekly to anyone who had expressed interest, currently some 250 subscribers. The commentor may be slightly misinformed as to who is most interested in this topic and what their views are, but APHIS welcomes any input on this work and values the perspectives of all.

Thank you again to the Xerces Society in particular for their continued involvement and scrutiny of this program in the 17 western states where grasshoppers are an economic pest. The unique expertise of Xerces as a global leader in invertebrate conservation is extremely welcome and while the current program fully meets the requirements of NEPA, we do hope to continually make our program better, partly with the help of such efforts.