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

Final Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program

Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima Counties

Washington
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Acronyms and Abbreviations

ac	acre
a.i.	active ingredient
AChE	acetylcholinesterase
APHIS	Animal and Plant Health Inspection Service
BCF	bioconcentration factor
BLM	Bureau of Land Management
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
EA	environmental assessment
e.g.	example given (Latin, exempli gratia, "for the sake of example")
EIS	environmental impact statement
E.O.	Executive Order
FONSI	finding of no significant impact
FR	Federal Register
FS	Forest Service
g	gram
ha	hectare
HHERA	human health and ecological risk assessments
i.e.	in explanation (Latin, id est "in other words.")
IPM	integrated pest management
lb	pound
MBTA	Migratory Bird Treaty Act
MOU	memorandum of understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIH	National Institute of Health
ppm	parts per million
PPE	personal protective equipment
PPQ	Plant Protection and Quarantine
RAATs	reduced agent area treatments
S&T	Science and Technology
ULV	ultra-low volume
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Services

Site-Specific Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program

Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima (eastern Washington Counties)

I. Need for Proposed Action

A. Purpose and Need Statement

An infestation of grasshoppers or Mormon crickets may occur on rangeland in the twenty eastern Washington counties listed above. The Animal and Plant Health Inspection Service (APHIS) may, upon request by land managers or State departments of agriculture, conduct treatments to suppress grasshopper infestations as part of the Rangeland Grasshopper and Mormon Cricket Suppression Program (program). The term “grasshopper” used in this environmental assessment (EA) refers to both grasshoppers and Mormon crickets, unless differentiation is necessary.

Populations of grasshoppers that trigger the need for a suppression program are normally considered on a case-by-case basis. Participation is based on potential damage such as; grasshoppers which defoliate grasses by direct feeding on leaf and stem tissue and by cutting off leaves or stems and heads while feeding. High populations of grasshoppers on rangeland can damage plant crowns so severely that many grass plants will not recover. Some grasshopper species not only reduces grass forage by consuming it but also by cutting it down. The cut grass may become litter on the ground where it may also be used for food by grasshoppers or becomes wasted biomass. Potential areas where large populations may occur can be found in the 2022 Grasshopper Hazard Map in appendix B. The benefits of treatments include the suppressing of overabundant grasshopper populations to lower adverse impacts to range plants and adjacent crops. Treatment would also decrease the economic impact to local agricultural operations and permit normal range plant utilization by wildlife and livestock.

The goal of the proposed suppression program analyzed in this EA is to reduce grasshopper populations below economical infestation levels in order to protect rangeland ecosystems or cropland adjacent to rangeland.

This EA analyzes potential effects of the proposed action and its alternatives. This EA applies to a proposed suppression program that would take place from May through September 2022 on rangeland in the twenty eastern Washington 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 the current year Control Program in Washington.

B. **Background Discussion**

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

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

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

APHIS surveys grasshopper populations on rangeland in the Western United States, provides technical assistance on grasshopper management to landowners and managers, and may cooperatively suppress grasshoppers when direct intervention is requested by a Federal land management agency or a State agriculture department (on behalf of a State or local government, or a private group or individual). APHIS' enabling legislation provides, in relevant part, that 'on request of the administering agency or the agriculture department

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

of an affected State, the Secretary, to protect rangeland, shall immediately treat Federal, State, or private lands that are infested with grasshoppers or Mormon crickets'… (7 U.S.C. § 7717(c)(1)). The need for rapid and effective response when an outbreak occurs limits the options available to APHIS. The application of an insecticide within all or part of the outbreak area is the response available to APHIS to rapidly suppress or reduce grasshopper populations and effectively protect rangeland.

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

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

Section 417 of the PPA (7 U.S.C. § 7717) authorizes APHIS' efforts to minimize the economic impacts of grasshoppers. Section 417(a) states that subject to the availability of funds, the Secretary "shall carry out a program to control grasshoppers and Mormon crickets on all Federal lands to protect rangeland." Section 417(c) (1) states that "Subject to the availability of funds pursuant to this section, on request of the administering agency or the agriculture department of an affected State, the Secretary, to protect rangeland, shall immediately treat Federal, State, or private lands that are infested with grasshoppers or Mormon crickets at levels of economic infestation, unless the Secretary determines that delaying treatment will not cause greater economic damage to adjacent owners of rangeland." Section 417(c)(2) states, "In carrying out this section, the Secretary shall work in conjunction with other Federal, State, and private prevention, control, or suppression efforts to protect rangeland."

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

- to conduct surveys for grasshopper and Mormon cricket populations on rangelands in the western United States,
- to provide technical assistance on grasshopper management to landowners/managers, and
- subject to the availability of funds, to suppress grasshoppers and Mormon crickets on rangeland when direct intervention is requested by the landowner/manager.

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

On September 16, 2016, APHIS and the Bureau of Indian Affairs (BIA) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on suppression of grasshoppers on BIA managed lands. This MOU clarifies that APHIS will prepare and issue to the public, site-specific environmental documents that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents will be prepared under the APHIS NEPA implementing procedures with cooperation and input from the BIA.

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

In November 2019, APHIS and the Forest Service (FS) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on suppression of grasshoppers on FS managed lands (Document #19-8100-0573-MU, November 6, 2019). This MOU clarifies that APHIS will prepare and issue to the public, site-specific environmental documents that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents will be prepared under the APHIS NEPA implementing procedures with cooperation and input from the FS.

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

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 managed lands (Document #15-8100-0870-MU, October 15, 2015). This MOU clarifies that APHIS will prepare and issue to the public, site-specific environmental documents that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents will be prepared under the APHIS NEPA implementing procedures with cooperation and input from the BLM. The MOU further states that the responsible BLM official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on BLM land is necessary. The BLM must also approve a Pesticide Use Proposal for APHIS to treat infestations.

According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and BLM approves the Pesticide Use Proposal.

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

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

C. About This Process

The NEPA process for grasshopper management is complicated by the fact that there is very little time between requests for treatment and the need for APHIS to act swiftly with respect to those requests. Surveys help to determine general areas, among the millions of acres where harmful grasshopper infestations may occur in the spring of the following year. Survey data provides the best estimate of future grasshopper populations, while short-term climate or environmental factors change where the specific treatments will be needed. Therefore, examining specific treatment areas for environmental risk analysis under NEPA is typically not possible. At the same time, the program strives to alert the public in a timely manner to its more concrete treatment plans and avoid or minimize harm to the environment in implementing those plans.

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

Public involvement under the CEQ Regulations for Implementing the Procedural Provisions of NEPA distinguishes federal actions with effects of national concern from those with effects primarily of local concern (40 CFR 1506.6). The grasshopper and Mormon cricket suppression program EIS 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 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. **The comment period will begin March 29 and end April 29, 2022. (Comment period ended April 30 due to one-day delay in posting to website.)**
Comments can be sent to USDA, APHIS, PPQ, 222 N. Havana St., Spokane, Washington 99202 or by accessing the Rangeland Grasshopper and Mormon Cricket Program website for contact information: http://www.aphis.usda.gov/plant-health/grasshopper or email: george.a.bruno@usda.gov

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

II. Alternatives

To engage in comprehensive NEPA risk analysis APHIS must frame potential agency decisions into distinct alternative actions. These program alternatives are then evaluated to determine the significance of environmental effects. The 2002 EIS presented three alternatives: (A) No Action; (B) Insecticide Applications at Conventional Rates and Complete Area Coverage; and (C) Reduced Agent Area Treatments (RAATs), and their potential impacts were described and analyzed in detail. The 2019 EIS was tiered to and updated the 2002 EIS. Therefore the 2019 EIS considered the environmental background or ‘No Action’ alternative of maintaining the program that was described in the 2002 EIS and Record of Decision. The 2019 EIS also considered an alternative where APHIS would not fund or participate in grasshopper suppression programs. The preferred alternative of the 2019 EIS allowed APHIS to update the program with new information and technologies that not were analyzed in the 2002 EIS. Copies of the complete 2002 and 2019 EIS documents are available for review at USDA, APHIS, PPQ, 222 N Havana St.; Spokane, Washington 99202. These documents are also available at the Rangeland Grasshopper and Mormon Cricket Program web site: http://www.aphis.usda.gov/plant-health/grasshopper.

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

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 rangeland in Arizona and therefore the environmental baseline should describe a no treatment scenario in those rangeland areas.

A. **No Suppression Program Alternative**

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

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

Under Alternative B, the Preferred Alternative, APHIS would manage a grasshopper treatment program using techniques and tools discussed hereafter to suppress outbreaks. The insecticides available for use by APHIS include the U.S. Environmental Protection Agency (USEPA) registered chemicals carbaryl and diflubenzuron. These chemicals have varied modes of action. Carbaryl works by inhibiting acetylcholinesterase (enzymes involved in nerve impulses) and diflubenzuron inhibits the formation of chitin by insects. APHIS would make a single application per year to a treatment area and could apply insecticide at an APHIS rate conventionally used for grasshopper suppression treatments, or more typically as reduced agent area treatments (RAATs). APHIS selects which insecticides and rates are appropriate for suppression of a grasshopper outbreak based on several biological, logistical, environmental, and economical criteria. The identification of grasshopper species and their life stage largely determines the choice of insecticides used among those available to the program. RAATs are the most common application method for all program insecticides, and only rarely do rangeland pest conditions warrant full coverage and higher rates. Typically, the decision to use diflubenzuron, the pesticide most commonly used by the program, is determined by the life stage of the dominant species within the outbreak population. Diflubenzuron can produce 90 to 97% grasshopper mortality in nascent populations with a greater percentage of early instars. If the window for the use of diflubenzuron closes, because of treatment delays, then carbaryl are the remaining control options. Certain species are more susceptible to carbaryl bait, and sometimes that pesticide is the best control option.

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

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

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 100 feet for carbaryl and 200 feet for diflubenzuron. The selection of insecticide and the use of an associated swath widths is site dependent. Rather than suppress grasshopper populations to the greatest extent possible, the goal of this method is to suppress grasshopper populations to less than
the economic infestation level.

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

Applicators use of Trimble GPS Navigation equipment is used to navigate and capture shapefiles of the treatment areas. All sensitive sites are buffered out of the treatment area using flagging which is highly visible to the aerial applicator. All sensitive sites are reviewed in the daily briefing with APHIS personnel including the applicator working on the treatment site. Treatments are conducted to suppress large grasshopper populations to protect rangeland vegetation. Treatments are conducted using the Reduced Agent Area Treatment (RAAT's) method. This method of skipping swaths (fig.1) decreases the amountof chemical and acreage treated still maintaining an effective kill rate. Swath widths usually range from 40-45 feet depending on ground equipment used. In Arizona, only ground equipment is used, no aerial treatments are conducted. Grasshoppers in untreated areas will tend to move to treated areas, thus becoming exposed to the insecticide. For example, if the area in figure 1 was 100 acres, with 50% RAAT's the acreage actually treated would be 50 acres. Protection would include the entire 100 acres, only exposing half the area with half the chemical amount compared to a conventional blanket treatment covering the entire 100 acres and the label rate of application.

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

- 16.0 fluid ounces (0.50 lb a.i.) of carbaryl spray per acre.
- 10.0 pounds (0.50 lb a.i.) of 5 percent carbaryl bait per acre.
- fluid ounce (0.016 lb a.i.) of diflubenzuron per acre; or

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

C. Experimental Treatments (For Research Purposes Only)

APHIS-PPQ continues to refine its methods of grasshopper and Mormon cricket management in order to improve the abilities of the Rangeland Grasshopper and Mormon Cricket Suppression Program (herein referred to as the Program) to make it more economically feasible, and environmentally acceptable. These refinements can include reduced rates of currently used pesticides, improved formulations, development of more target-specific baits, development of biological pesticide suppression alternatives, and improvements to aerial (e.g., incorporating the use of Unmanned Aircraft Systems (UAS)) and ground application equipment. A division of APHIS-PPQ, Science and Technology's (S&T) Phoenix Lab is 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 and Mormon crickets. The Rangeland Unit tests and develops more effective, economical, and less environmentally harmful management methods for the Program and its federal, state, tribal, and private stakeholders.

To achieve this mission, experimental plots ranging in area from less than one foot to 640 acres are used and often replicated. The primary purpose of these experiments is to test and develop improved methods of management for grasshoppers and Mormon crickets. This often includes testing and refining pesticide and biopesticide formulations that may be incorporated into the Program. These

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

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

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.

2. Pesticides and Biopesticides Used in Studies

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

1) Liquids: diflubenzuron (e.g., Dimilin 2L and generics: currently Unforgiven and Cavalier 2L) and carbaryl (e.g., Sevin XLR-PLUS). Program standard application rates are: diflubenzuron - 1.0 fl. oz./acre in a total volume of 31 fl. oz./acre; carbaryl - 16.0 fl. oz./acre in a total volume of 32 fl.oz./acre. Experimental rates often vary, but the doses are lower than

standard Program rates unless otherwise noted.

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

3) 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:

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

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

At this time, we are unsure where in the 17 states we will be doing most of the following proposed experimental field studies. The final location decision is dependent upon grasshopper and/or Mormon cricket population densities, and availability of suitable sites.

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 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 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 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 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 then be observed for a duration of time to determine efficacy.

III. Affected Environment

A. Description of Affected Environment

1. Geology, Topography and Climate

APHIS conducts adult grasshopper surveys in rangeland throughout the assessment area during the late summer of each year. The twenty-county assessment area (Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman and Yakima Counties) located in Central and Eastern Washington, encompass approximately 41,828 square miles. This represents about 62.9 percent of the state's total area. The Federal Plant Protection Act of 2000 authorizes APHIS to treat rangeland.

The assessment area borders British Columbia, Canada to the North, Idaho to the East, Oregon to the South and the Cascade Range to the West. Portions of rangeland within the assessment area may be identified as having grasshopper populations that could indicate significant infestations in the following year.

The Columbia Basin, also known as the Columbia Plateau, is the predominate area in eastern Washington. The physiographic province is characterized by incised rivers, extensive plateaus, and anticlinal ridges rising to 4,000 feet above sea level. The region is underlain by Miocene Columbia River Basalt Group rocks and interbedded Neogene terrestrial sediments. To the southeast of the Columbia Basin are the Blue Mountains. The Blue Mountains are characterized by a broad uplift, reaching elevations of more than 6,000 feet above sea level. Windows of Paleozoic or Mesozoic metamorphic rocks are exposed at four locations where streams and rivers have incised deep canyons through the overlying rocks of the Columbia River Basalt Group. The basement rocks consist of Jurassic-Triassic limestone lenses, amphibole-quartz schist, greenstone, graywacke, sandstones, cherty dark argillite, and diorite

(Washington Department of Natural Resources, DNR, 2010).

The Okanogan Highlands province is situated east of the Cascade Range and north of the Columbia Basin. To the east and north, the highlands extend into northern Idaho and southern British Columbia, respectively. They are characterized by rounded mountains with elevations up to 8,000 feet above sea level and deep, narrow valleys. The Columbia River divides the Okanogan Highlands into two geographic regions: to the east of the river are the Selkirk, Chewelah, and Huckleberry Mountains; to the west are the Kettle, Sanpoil, and other mountains. The eastern portion of the Okanogan Highlands contains the oldest sedimentary and metamorphic rocks in the state. Precambrian Belt Supergroup, Windermere Group, and Deer Trail Group metasedimentary rocks extend from British Columbia south to the Columbia River. The nation's second largest magnesium operations are located near Addy, in Stevens County. Dolomite and magnesite are mined from the Stensgar Formation dolomite of the Deer Trail Group. Precambrian dikes and sills cut these ancient rocks. In the vicinity of Spokane, mountains such as Mica Peak consist of Precambrian high-grade metasedimentary rocks (DNR, 2010).

To the west of the Columbia Basin and the Okanogan Highlands is the Cascade Range. The Cascade Range is part of a vast mountain chain that extends from British Columbia to northern California. It separates the coastal Pacific lands from the interior of North America. The Cascades consist of an active volcanic arc superimposed upon bedrock of Paleozoic to Tertiary age. Pliocene to recent uplift has created high topographic relief. A major northwest-southeast structural break separates the Washington Cascades into northern and southern portions. In a general way, the structure follows the trace of Interstate 90 between Seattle and Ellensburg. The North Cascades consist of jagged mountains with numerous glaciers and are composed predominantly of Mesozoic crystalline and metamorphic rocks. The South Cascades contain mainly Tertiary to Holocene volcanic rocks. In the north, the structural fabric is extremely complex because of the unrelated "rock packages", called terranes, that have been brought in contact with each other by strike-slip and thrust faults. The North Cascades are also known for mylonite development, extensive areas of crushed and jumbled exotic rocks called melange, and plates of rock thrust over each other (DNR, 2010).

The assessment area has a highly varied climate ranging from near desert conditions in the south-central Columbia basin (below 10 inches of precipitation a year) to over 40 inches in the mountainous areas found in both the northeastern and southeastern corners of the region. The area is part of the large inland basin between the Cascade and Rocky Mountains. In an easterly and northerly direction, the Rocky Mountains shield the inland basin from the winter season’s cold air masses traveling southward across Canada. In a westerly direction, the Cascade Range forms a barrier to the easterly movement of moist and comparatively mild air in winter and cool air in summer. Some of the air from each of these source regions reaches this section of the State and produces a climate which has some of the characteristics of both continental and marine types. Most of the air masses and weather systems crossing eastern Washington are traveling under the influence of the prevailing westerly winds. Infrequently, dry continental air masses enter the inland basin from the north or east. In the summer season this air from over the continent results in low relative humidity and high temperatures, while in winter clear, cold weather prevails. Extremes in both summer and winter temperatures generally occur when the inland basin is under the influence of air from over the continent. East of the Cascades, in the assessment area, summers are warmer, winters are colder, and precipitation is less than in western

Washington (Western Regional Climate Center, WRCC, 2010).

The average number of clear or only partly cloudy days each month varies from five to 10 in winter, 12 to 18 in spring and fall, and 20 to 28 in summer. The percent of possible sunshine received each month is from 20 to 30 percent in winter, 50 to 60 percent in spring and fall and 80 to 85 percent in summer. The number of hours of sunshine possible on a clear day range from approximately eight in December to 16 in June. In the driest areas, rainfall is recorded on 70 days each year and on 120 days or more in the higher elevations near the eastern border and along the eastern slope of the Cascades (WRCC, 2010).

Annual precipitation ranges from seven to nine inches near the confluence of the Snake and Columbia Rivers, 15 to 30 inches along the eastern border and 75 to 90 inches near the summit of the Cascade Mountains. During July and August, it is not unusual for four to eight weeks to pass with only a few scattered showers. Thunderstorms can be expected on one to three days each month from April through September. Most thunderstorms in the warmest months occur as isolated cells covering only a few square miles. A few damaging hailstorms are reported each summer. Maximum rainfall intensities to expect in one out of ten years are .6 of an inch in one hour; 1.0 inch in three hours; 1.0 to 1.5 inches in six hours; and 1.2 to 2.0 inches in 12 hours (WRCC, 2010).

During the coldest months, a loss of heat by radiation at night and moist air crossing the Cascades and mixing with the colder air in the inland basin results in cloudiness and occasional freezing drizzle. A “chinook” wind which produces a rapid rise in temperature occurs a few times each winter. Frost penetration in the soil depends to some extent on the vegetative cover, snow cover and the duration of low temperatures. In an average winter, frost in the soil can be expected to reach a depth of 10 to 20 inches. During a few of the colder winters with little or no snow cover, frost has reached a depth of 25 to 35 inches (WRCC, 2010).

During most of the year, the prevailing direction of the wind is from the southwest or west. The frequency of northeasterly winds is greatest in the fall and winter. Wind velocities ranging from four to 12 mph can be expected 60 to 70 percent of the time; 13 to 24 mph, 15 to 24 percent of the time; and 25 mph or higher, one to two percent of the time. The highest wind velocities are from the southwest or west and are frequently associated with rapidly moving weather systems. Extreme wind velocities at 30 feet above the ground can be expected to reach 50 mph at least once in two years; 60 to 70 mph once in 50 years and 80 mph once in 100 years (WRCC, 2010).

2. **Soil**

In the area to the west (Cascade Range) and to the north (Okanogan Highlands) of the assessment area the predominant soil type is a cool, stony soil developed in a mantle of volcanic ash over loess and glacial till with medial or ashy topsoils. While in the valleys and near the rivers there are *soils derived from glacial outwash on river terraces; most soils are strongly loess-influenced in the upper part, gravelly or sandy in the lower part, and have low water-holding capacity; some are influenced by volcanic ash in the upper part.* In the western portion of the Columbia Basin there is also an area of *soils on unglaciated hills; loess-influenced, but primarily derived from weathered granitic rocks, andesite, sandstone or schist; soils have dark-colored, humus-rich topsoils; many have clay-enriched subsoils*

(Washington State University, WSU, 2010).

The portion in the east and south of the assessment area in the Columbia Basin is comprised of soil types ranging from fine-silty, somewhat cool loessial soils that have clay enriched subsoils in the center and east portions of the assessment area to dry, coarse-silty loessial soils that formed under shrub-steppe vegetation in the south and center portions. Dry, sandy soils on terraces and dunes that have formed under sparse dune vegetation and have low water-holding capacity comprise much of the center portion of the assessment area stretching to the south where most of the problems with Mormon crickets have occurred (WSU, 2010).

A large portion of the assessment area was shaped by a final cataclysmic event known as the Spokane Flood. Toward the end of the last ice age, a glacial ice dam at the site of Pend Oreille Lake backed up the Clark Fork River flooding mountain valleys of western Montana. When the ice dam broke, the water surged across eastern Washington scouring away soil and eroding channels into the basalt. This significantly different landscape, prevalent throughout much of the assessment area is found nowhere else in the world. It has become known as the channeled scablands. Much of the rangeland is confined to places like the channeled scablands where cultivation may not be practical due to the shallow soil deposits.

3. **Water Resources**

The Columbia River is the largest river in the area. A large portion of the Columbia River that flows through this assessment area is actually a reservoir known as Franklin D. Roosevelt Lake. Grand Coulee Dam created this reservoir which extends 151 miles to the Canadian border and includes 82,000 acres of surface area. There are numerous dams in the Columbia River, creating smaller reservoirs within the assessment area.

There are several other major rivers and numerous mountain streams within this assessment area. The major rivers include: Snake River, Yakima River, Tieton River, Natches River, White Salmon River, Cle Elum River, Klickitat River, Palouse River, Pend Oreille River, Asotin River, Touchet River, Tucannon River, Joseph River, Grande Ronde River, Spokane River, Colville River, Kettle River, Sanpoil River, Okanogan River, Methow River, and Wenatchee River. Wildlife, recreation, fishing, irrigation, power, and navigation are a few of the important ways in which these rivers are utilized. Many other smaller streams also flow through this area providing habitat and water resources.

A prominent natural lake in the assessment area is Moses Lake in Grant County. However, most of the surface water in the assessment area is associated with the Columbia River Project which began with the completion of Grand Coulee Dam in 1941. Water pumped from Lake Roosevelt, the 125-mile lake formed by Grand Coulee Dam, is used to fill the reservoir of Banks Lake. Banks Lake captures enough water to irrigate over one million acres of Columbia Basin plateau through a network of canals extending as far south as the Oregon border. There are more than 6,000 miles of south leading canals, laterals, and wasteways. Drainage and seepage from this canal system have caused the formation of literally hundreds of new lakes in this region. Primary irrigation facilities are the Feeder Canal, Banks Lake, the Main, West, East High, and East Low Canals, Potholes Reservoir, and Potholes Canal.

There are numerous less prominent natural lakes throughout the assessment area. Many of the lakes are located at a high elevation in the Okanogan Highlands and the Cascade Range.

Several of the natural lakes occurring in the assessment area are associated with the channeled scablands. Abundant perennial and intermittent lakes exist in the eroded scabland channels. Most of these lakes can be found in south central Lincoln, southwestern Spokane, northeastern Adams, and northwestern Whitman Counties. Other prominent natural lakes associated with rangeland areas include Rock Lake (Whitman Co.), Sprague Lake (Lincoln Co. and Adams Co.), Jameson Lake (Douglas Co.), and Kahlotus Lake (Franklin Co.).

Less prominent areas that may be classified as wetlands will be identified through local contact with state and Federal wildlife agencies prior to any program. Standard operational procedures (See Appendix 1 – rangeland treatment guidelines for grasshoppers) will be followed relative to treatments in areas with rivers, creeks, lakes, ponds, potholes, wetlands, irrigation canals and drains and intermittent bodies of water.

4. **Vegetation and Agricultural Resources**

In terms of natural vegetative cover, the assessment area is predominantly classified as sagebrush steppe. Exceptions would be the northern portion (Okanogan Highlands), the western portion (Cascade Range) and the Blue Mountains in the Southeast portion consisting primarily of conifer forests. Grasses, including various types of wheatgrass and fescue, are an important component to rangeland throughout the area providing feed for livestock and wildlife.

Approximately 14 million acres of this assessment area has been classified as land in farms for the 2018 Agricultural Census which represents over 90 percent of the total land in farms in Washington State. Wheat is grown on over 2 million acres in the assessment area. Approximately 300,000 acres are planted in orchards, primarily apples, with some pear and sweet cherries. Other crops grown include hay, grapes, barley, oats, corn and potatoes. Washington is the leading producing state in the nation for some of the commodities grown in this assessment area including apples, pears, and sweet cherries (U.S. National Agricultural Statistics Service, NASS, 2018).

The total value of agricultural crops in Washington State for 2018 was nearly 8 billion dollars. A vast majority of this total value is produced in the 20-county assessment area. Fruit production ranked as the number one value of production among the principle agricultural commodities produced in Washington State at a value of over 2 billion dollars in 2018. Grain, hay, dairy products and cattle are also important to the economy of this assessment area (NASS, 2018).

5. **Other Environmental Resources**

There is a significant amount of protected federal land in the assessment area. Along the western edge of the assessment area there are several federally designated wilderness areas. They include the Goat Rocks Wilderness, Mount Adams Wilderness, William O. Douglass Wilderness, Norse Peak Wilderness, Alpine Lakes Wilderness, Henry M. Jackson Wilderness, Glacier Peak Wilderness, Lake Chelan-Sawtooth Wilderness and the Pasayten Wilderness. In the Northwest portion of the assessment area there is a small segment of North Cascades National Park and Lake Chelan National Recreation Area. In the most northeast portion of the assessment area is the Salmo-priest Wilderness Area. The Southeast corner holds the Wenaha-Tucannon Wilderness Area. Juniper Dunes Wilderness and the Hanford Reach National Monument are located in the Columbia Basin. There are small areas of land managed by the Bureau of Land Management and the Bureau of Reclamation throughout the assessment area.

In addition, there are also six National Forests in the assessment area including the Umatilla, Gifford Pinchot, Mt. Baker-Snoqualmie, Wenatchee, Okanogan and the Colville. Also, there are seven National Wildlife Refuges located in the assessment area including Conboy Lake, Saddle Mountain, Columbia, McNary, Toppenish, Turnbull and Little Pend Oreille.

The State of Washington Department of Natural Resources also has designated several areas as Natural Area Preserves and Natural Resources Conservation Areas in the assessment area. Additionally, Washington State Parks has designated several parks throughout the region.

Four Indian Reservations in eastern Washington are in this assessment area. The largest is the Yakama Indian Reservation located in the southwest corner of the assessment area in Yakima County and Klickitat County. Just slightly smaller is the Colville Reservation which includes the southeast quarter of Okanogan County and the southern onehalf of Ferry County. The Spokane Reservation is in southern Stevens County and the Kalispel Reservation is located in south-central Pend Oreille County. Timber, leased grazing, and mining are important to the economy of these reservations. All land managers will be consulted to identify specific boundaries and sensitive areas prior to any suppression program.

B. Site-Specific Considerations

1. Human Health

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

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

No treatments will occur over congested or residential areas, recreation areas, or schools. In less populated areas, mitigation measures will be implemented to ensure buffer zones are established surrounding any existing homes or schools. Refer to the Operational Procedures, Specific Procedures for Aerial and Ground Applications in Appendix A for further information.

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

2. Non-target Species

Threatened & Endangered Species and Sensitive Species of Concern

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

i) FEDERALLY LISTED ENDANGERED SPECIES

Animals:
Pygmy rabbit (Brachylagus idahoensis) – Columbia Basin distinct population segment
Gray wolf (Canis lupus)
Woodland caribou (Rangifer tarandus caribou)
Sockeye Salmon (Oncorhynchus nerka), Snake River
Chinook Salmon (O. tshawytscha), Upper Columbia River Spring-run

Plants:
Hackelia venusta (Showy stickseed)
Sidalcea oregana var. calva (Wenatchee Mountains checker-mallow)

ii) FEDERALLY LISTED THREATENED SPECIES

Animals:
Bull trout (Salvelinus confluentus) – Columbia River distinct population segment
Grizzly bear (Ursus arctos horribilis)
Canada lynx (Lynx Canadensis)
Northern Spotted owl (Strix occidentalis caurina)
Coho Salmon (O. kisutch), Lower Columbia River
Chinook Salmon (O. tshawytscha), Snake River Spring/Summer-run, Snake River Fall-run, Lower Columbia River

Chum Salmon (O. keta), Columbia River
Steelhead (O. mykiss), Upper Columbia River, Middle Columbia River, Lower Columbia River, Snake River Basin
Marbled murrelet (Brachyramphus marmoratus)
Oregon Spotted frog (Rana pretiosa)
Yellow-billed cuckoo (Coccyzus americanus)

Plants:
Spiranthes diluvialis (Ute ladies'-tresses)
Silene spaldingii (Spalding's catchfly)
Lesquerella tuplashensis (White Bluffs bladderpod)
Eriogonum codium (Umtanum Desert buckwheat)

Critical habitat has been designated within the assessment area for the Bull trout (Columbia River distinct population segment), Chinook Salmon (O. tshawytscha), Chum Salmon (O. keta), Coho Salmon (Lower Columbia River), Steelhead (O. mykiss), Canada lynx, Gray wolf, Marbled murrelet, Northern Spotted owl, Oregon Spotted frog, Umtanum Desert buckwheat, White Bluffs bladderpod and the Wenatchee Mountains checker-mallow.

In addition, the U.S. Fish and Wildlife Service has listed five candidate species within the assessment area as follows:

iii) FEDERALLY LISTED CANDIDATE SPECIES

Animals:
Washington ground squirrel (Spermophilus washingtoni)
Greater sage-grouse (Centrocercus urophasianus) – Columbia Basin distinct population segment

Insects:
Monarch butterfly (Danaus plexippus)

Plants:
Artemisia campestris ssp. borealis var. wormskioldii (Northern wormwood)
Pinus albicaulis (Whitebark pine)

Also, the Washington Department of Fish and Wildlife maintains a list of species of concern within Washington State and the assessment area on their web site < http://wdfw.wa.gov/conservation/endangered >.

A test was conducted in North Dakota relative to the effect of carbaryl bait on the nestling growth and survival of vesper sparrow. This study was designed to simulate the treatment of a small grasshopper infestation with carbaryl bait. There was no difference reported in any of the productivity parameters between nests on treated and untreated sites (Adams et al., 1994). Adult sparrows on treated sites had to forage farther from the nests to obtain food but did so successfully (McEwen et al., 1996). Any effects on non-target species due to bait treatments can be considered indirect; that is, the prey populations are affected, while no direct toxicity to the non-target species is likely to occur.

3. Bald and Golden Eagle Protection Act (BGEPA)

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

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

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

Under the no action alternative, destruction of grasses and forbs by grasshoppers could cause localized disruption of food and cover for a number of wildlife species. Under chemical control there is a possibility of indirect effects on local wildlife populations, particularly insectivorous birds that depend on a readily available supply of insects, including grasshoppers, for their own food supply and for their young. We have found no valid data which suggests that (absent a spill) any species other than certain mice would be subjected to a dosage in excess of 1/5 of the LD50 for carbaryl (Pg. B-37 GH EIS.) Therefore, it is not apparent that any fatalities would be likely to occur as a result of carbaryl intoxication.

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

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

The wildlife risk assessment in APHIS FEIS 2002 estimated wildlife doses of Malathion and carbaryl to representative rangeland species and compared them with toxicity reference levels. No dose of Malathion will approach or exceed the reference species LD50. Some individual animals may be at risk of fatality or behavioral alterations that make them more susceptible to predation resulting from ChE level changes in Malathion spraying for grasshopper control. However, most individual animals would not be seriously affected.

Carbaryl also poses a low risk to wildlife, with few fatalities likely to occur and a low risk of behavioral anomalies caused by cholinesterase depression. There is some chance of adverse effects on bird reproduction through the use of any of these chemicals or diesel oil through direct toxicity to developing embryos in birds' eggs.

Some species of herbivorous mammals and birds may consume wheat bran bait after it has been applied to grasshopper-infested areas. Carbaryl is moderately toxic to mammals and slightly toxic to birds. We have found no valid data which suggests that (absent a spill) any species other than certain mice would be subjected to a dosage in excess of 1/5 of the LD50 for carbaryl (Pg. B-37 GH EIS.) Therefore, it is not apparent that any fatalities would be likely to occur as a result of carbaryl intoxication. Additionally, we note that carbaryl 5% bait is labeled at 3 lbs. /1000ft^2 in poultry houses when poultry are present. (http://www.cdms.net/manuf/)

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

While immature grasshoppers and other immature insects can be reduced up to 98 percent in area covered with diflubenzuron, some grasshoppers and other insects remain in the treatment area. Although the density of grasshoppers and other insects may be low, it is most likely sufficient to sustain birds and other insectivores until insect populations recover. Those rangeland birds that feed primarily on grasshoppers may switch to other diet items. However, in some areas the reduced number of invertebrates necessary for bird survival and development may result in birds having less available food. In these cases, birds will either have less than optimal diets or travel to untreated areas for suitable prey items, causing a greater foraging effort and a possible increased susceptibility to predation. It also should be noted that suppressing grasshopper populations conserves rangeland vegetation that often is important habitat to rangeland wildlife. Habitat loss is frequently the most important factor leading to the decline of a species and reducing grasshopper densities can be an aid in reducing habitat loss.

All APHIS biological control programs for invasive weeds in Washington are coordinated with Federal and State agencies, County Weed Districts, City Municipalities, and private landowners. Noxious weed biological control agents are important in reducing weed density and all release sites would be considered on an individual basis in consultations with FWS and the land manager to determine if insecticide might be used and/or how much treatment buffer area should be allowed.

4. Socioeconomic Issues

Agricultural producers, including livestock producers, tree fruit and cultivated crop growers, are a major social group that could be impacted by grasshopper infestations. Relative to cooperative rangeland grasshopper suppression programs on private land, livestock owners would not request assistance unless they were confident that the program was cost-effective and economically justified. The chief commercial use of U.S. rangeland (including the assessment area) is livestock grazing to produce food, fiber, and draft animals (National Research Council (NRC), 1994). The protection of rangeland near crop production areas would likewise provide a measure of protection for adjacent crops. The 2019 EIS describes in detail the socioeconomic impacts expected for each of the alternatives.

Livestock grazing is one of the main uses of most of the affected area, which provides summer range for ranching operations. A substantial threat to the animal productivity of these rangeland areas is the proliferation of grasshopper populations. These insects have been serious pests in the Western States since early settlement. Weather conditions favoring the hatching and survival of large numbers of grasshoppers can cause outbreak populations, resulting in damage to vegetation. The consequences may reduce grazing for livestock and result in loss of food and habitat for wildlife. Livestock grazing on public lands contributes important cultural and social values to the area. Intertwined with the economic aspects of livestock operations are the lifestyles and culture that have co-evolved with Western ranching.

Ranchers displaced from public lands due to early loss of forage from grasshopper damage would be forced to search for other rangeland, to sell their livestock prematurely or to purchase feed hay. This would affect other ranchers (non-permittees) by increasing demand, and consequently, cost for hay and/or pasture in the area. This would have a beneficial effect on those providing the hay or range, and a negative impact on other ranchers who use these same resources throughout the area. In addition, grazing on private lands resulting from this impact would compound the effects to vegetation of recently drought conditions over the last four fears (e.g.., continual heavy utilization by grasshoppers, wildlife and wildfire), resulting in longer-term impacts (e.g., decline or loss of some preferred forage species) on grazing forage production on these lands. The lack of treatment would result in the eventual magnification of grasshopper problems resulting in increased suppression efforts, increased suppression costs and the expansion of suppression needs onto lands where such operations are limited. For example, control needs on crop lands where chemical options are restricted because of pesticide label restrictions. Under the no action alternative, farmers would experience economic losses. The suppression of grasshoppers in the affected area would have beneficial economic impacts to local landowners, farmers, and beekeepers. Crops near infested lands would be protected from devastating migrating hordes, resulting in higher crop production; hence, increased monetary returns.

Recreation use is moderate over most of the affected area. There are several dispersed camping sites. Hunting seasons increase recreation use in the form of dispersed camping and general hunting activity. Hunting season occurs later in the year during a time when grasshopper populations have begun to dwindle, thus fewer are present. Hunters probably would not be affected. ATV use is fairly prevalent throughout. The presence of high densities of grasshoppers would result in fewer people engaging in recreational activities during the spring and summer within the affected areas. High grasshopper densities in the campsite detract considerably from the quality of the recreational experience. Grasshoppers tend to get into unsecured tents and food. The quality of the recreational experience for ATV users and horseback riders would also be indirectly impaired by high densities of grasshoppers. Large quantities of grasshoppers crossing roads and trails are killed by vehicle traffic, leaving windrows of dead grasshoppers in the travel way as well as providing a vehicular safety hazard by leaving slick residues on local roads. People who normally recreate in areas that are heavily infested would likely relocate them to areas that are not infested. Displacement of users would be more of an inconvenience to the public than an actual effect on the recreational values of the area.

Displacement would also increase pressure on other public lands as people move to new locations to camp and to engage in other recreational activities. Social capacity tolerances would be impacted. The potential for user conflict would increase, in particular as motorized recreationists displace to other already heavily used areas. Such locations would experience more pressure and may experience site degradation. Areas currently not impacted or used by dispersed campers may become subject to use and development as people look for areas for recreation which are not infested with grasshoppers. Small towns near the affected areas receive limited business from recreationists who visit public lands. Many local gas stations/public stores rely fairly heavily on summer business to support their operations.

5. Cultural Resources and Events

Treatments would not be expected to occur at cultural sites. A treatment is of short duration and generally would occur once in a program area during the season. However, to ensure that historical and cultural sites, monuments or buildings, or artifacts of special concern are not adversely affected by program treatments, APHIS will include these concerns, along with recommended protective measures, in the pretreatment planning and discussions with the land managing agencies. APHIS will also confer with tribal authorities and, as needed, with the BIA office to ensure that the timing and location of a planned program treatment does not coincide or conflict with cultural events or observances on tribal and other Federal lands.

6. **Special Considerations for Certain Populations**

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

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

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

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

IV. Environmental Consequences

Each alternative described in this EA potentially has adverse environmental effects. The general environmental impacts of each alternative are discussed in detail in the 2002 and 2019 EIS. The specific impacts of the alternatives are highly dependent upon the particular action and location of infestation. The principal concerns associated with the alternatives are: (1) the potential effects of insecticides on human health (including subpopulations that might be at increased risk); and (2) impacts of insecticides on nontarget organisms (including threatened and endangered species).

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

A. Environmental Consequences of the Alternatives

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

1. No Suppression Program Alternative

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

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

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

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

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

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

a) Carbaryl

Carbaryl is a member of the N-methyl carbamate class of insecticides, which affect the nervous system via cholinesterase inhibition. Inhibiting the enzyme acetylcholinesterase (AChE) causes nervous system signals to persist longer than normal. While these effects are desired in controlling insects, they can have undesirable impacts to non-target organisms that are exposed. The APHIS HHERA assessed available laboratory studies regarding the toxicity of carbaryl on fish and wildlife. In summary, the document indicates the chemical is highly toxic to insects, including native bees, honeybees, and aquatic insects; slightly to highly toxic to fish; highly to very highly toxic to most aquatic crustaceans, moderately toxic to mammals, minimally toxic to birds; moderately to highly toxic to several terrestrial arthropod predators; and slightly to highly toxic to larval amphibians (USDA APHIS, 2018a). However, adherence to label requirements and additional program measures designed to prevent carbaryl from reaching sensitive habitats or mitigate exposure of non-target organisms will reduce environmental effects of treatments.

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

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

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

While sublethal effects have been noted in fish with depressed AChE, as well as some impacts to amphibians (i.e. days to metamorphosis) and aquatic invertebrates in the field due to carbaryl, the application rates and measured aquatic residues observed in these studies are well above values that would be expected from current program operations. Indirect risks to amphibian and fish species can occur through the loss of habitat or reduction in prey, yet data suggests that carbaryl risk to aquatic plants that may serve as habitat, or food, for fish and aquatic invertebrates is very low.

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

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

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

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

Adverse human health effects from the proposed program ULV applications of the carbaryl spray (Sevin® XLR Plus) and bait applications of the carbaryl 5% and 2% baits formulations to control grasshoppers are not expected based on low potential for human exposure to carbaryl and the favorable environmental fate and effects data. Technical grade (approximately 100% of the insecticide product is composed of the active ingredient) carbaryl exhibits moderate acute oral toxicity in rats, low acute dermal toxicity in rabbits, and very low acute inhalation toxicity in rats. Technical carbaryl is not a primary eye or skin irritant in rabbits and is not a dermal sensitization in guinea pig (USEPA, 2007). This data can be extrapolated and applied to humans revealing low health risks associated with carbaryl.

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

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

b) Hatching Bed Treatments Using Carbaryl Bran Bait

Recently, APHIS has employed a strategy of identifying and treating Mormon cricket hatching beds in the spring with carbaryl wheat bran bait. This seems to provide an acceptable level of suppression within traditional outbreak areas. The bait is applied using ATV mounted spreaders at a rate of 10 lbs/ac to hatching beds that are generally from 5 acres to less than an acre in size. This method of control is highly selective and has minimal impact on the environment. (See environmental effects related to carbaryl bait application under the RAATs treatment strategy above).

c) Diflubenzuron

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

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

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

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

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

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

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

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

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

Diflubenzuron is moderately toxic to spiders and mites (USDA APHIS, 2018c). Deakle and Bradley (1982) measured the effects of four diflubenzuron applications on predators of *Heliothis* spp. at a rate of 0.06 lb a.i./ac and found no effects on several predator groups. This supported earlier studies by Keever et al. (1977) that demonstrated no effects on the arthropod predator community after multiple applications of diflubenzuron in cotton fields. Grasshopper integrated pest management (IPM) field studies have shown diflubenzuron to have a minimal impact on ants, spiders, predatory beetles, and scavenger beetles. There was no significant reduction in populations of these species from seven to 76 days after treatment. Although ant populations exhibited declines of up to 50 percent, these reductions were temporary, and population recovery was described as immediate (Catangui et al., 1996).

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

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

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

Adverse human health effects from ground or aerial ULV applications of diflubenzuron to control grasshoppers are not expected based on the low acute toxicity of diflubenzuron and low potential for human exposure. The adverse health effects of diflubenzuron to mammals and humans involves damage to hemoglobin in blood and the transport of oxygen. Diflubenzuron causes the formation of methemoglobin. Methemoglobin is a form of hemoglobin that is not able to transport oxygen (USDA FS, 2004). USEPA classifies diflubenzuron as non-carcinogenic to humans (USEPA, 2015b).

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

d) Reduced Area Agent Treatments (RAATs)

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

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

B. Other Environmental Considerations

1. Cumulative Impacts

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

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

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

The insecticide application reduces the insect population down to levels that cause an acceptable level of economic damage. The duration of treatment activity, which is relatively short since it is a one-time application, and the lack of repeated treatments in the same area inthe 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 uses 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 Bureau of Land Management could apply herbicides for the control of federal noxious weeds throughout some of the potential grasshopper suppression areas. The timing of such treatments should not coincide, so there would be little reason to suspect that any adverse synergistic chemical effects would occur. In any event, before any APHIS program, discussions would be held with land-managing officials to ensure that the two programs would not cause increased injurious effects to any treatment area.

Private agricultural entities could apply herbicides or insecticides to their cropland during times which could coincide with APHIS programs. APHIS' policy requires that the grasshoppers may only be treated on private rangelands, so that cumulative impacts would not result.

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

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

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

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

Federal agencies consider a proposed action's potential effects on children to comply with E.O. 13045, "Protection of Children from Environmental Health Risks and Safety Risks." This E.O. requires each Federal agency, consistent with its mission, to identify and assess environmental health and safety risks that may disproportionately affect children and to ensure its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. APHIS has developed agency guidance for its programs to follow to ensure the protection of children (USDA APHIS, 1999).

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

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

4. Tribal Consultation

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

Prior to the treatment season, program personnel notify Tribal land managers of the potential for grasshopper and Mormon cricket outbreaks on their lands. Consultation with local Tribal representatives takes place prior to treatment programs to inform fully the Tribes of possible actions APHIS may take on Tribal lands. Treatments typically do not occur at cultural sites, and drift from a program treatment at such locations is not expected to adversely affect natural surfaces, such as rock formations and carvings. APHIS would also confer with the appropriate Tribal authority to ensure that the timing and location of a planned program treatment does not coincide or conflict with cultural events or observances on Tribal lands.

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

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

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

6. Endangered Species Act

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

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

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

- RAATs are used in all areas adjacent to salmonid habitat
- ULV sprays are used, which are between 50% and 66% of the USEPA recommended rate
- Insecticides are not aerially applied in a 3,500-foot buffer zones for carbaryl or malathion, or applied within a 1,500-foot buffer zones for diflubenzuron along

stream corridors

- Insecticides will not be applied when wind speeds exceed 10 miles per hour. APHIS will attempt to avoid insecticide application if the wind is blowing towards salmonid habitat
- Insecticide applications are avoided when precipitation is likely or during temperature inversions

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

APHIS submitted a programmatic biological assessment for grasshopper suppression in the 17-state program area and requested consultation with USFWS on March 9, 2015. With the incorporation and use of application buffers and other operational procedures APHIS anticipates that any impacts associated with the use and fate of program insecticides will be insignificant and discountable to listed species and their habitats. Based on an assessment of the potential exposure, response, and subsequent risk characterization of program operations, APHIS concludes the proposed action is not likely to adversely affect listed species or critical habitat in the program area. APHIS has requested concurrence from the USFWS on these determinations. Until this programmatic Section 7 consultation with USFWS is completed, APHIS will conduct consultations with USFWS field offices at the local level.

APHIS considers the role of pollinators in any consultations conducted with the FWS to protect federally listed plants. Mitigation measures, such as no treatment buffers are applied with consideration of the protection of pollinators that are important to a listed plant species. Local consultations are being conducted between APHIS and FWS regarding section 7 of the Endangered Species Act.

7. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668–668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. During the breeding season, bald eagles are sensitive to a variety of human activities. Grasshopper management activities could cause disturbance of nesting eagles, depending on the duration, noise levels, extent of the area affected by the activity, prior experiences that eagles have with humans, and tolerance of the individual nesting pair. Also, disruptive activities in or near eagle foraging areas can interfere with bald eagle feeding, reducing chances of survival. USFWS has provided recommendations for avoiding disturbance at foraging areas and communal roost sites that are applicable to grasshopper management programs (USFWS, 2007).

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

8. Additional Species of Concern

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

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

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

9. Fires and Human Health Hazards

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

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

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

10. Cultural and Historical Resources

Federal actions must seek to avoid, minimize, and mitigate potential negative impacts to cultural and historic resources as part of compliance with the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act of 1979, and NEPA. Section

106 of the NHPA requires Federal agencies to provide the Advisory Council on Historic Preservation with an opportunity to comment on their findings.

Consultation with the appropriate landowner, State Historic Preservation Office, National Trail's administrative office, or other appropriate agencies will be conducted when appropriate to ensure minimal impacts to cultural and historical resources in the proposed treatment areas.

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VI. Listing of Agencies and Persons Consulted

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Bureau of Land Management
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Bureau of Land Management
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Bureau of Land Management
James Pease, NRS
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Washington Department of Fish & Wildlife
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US Fish and Wildlife Service
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Colville Confederated Tribes
Danielle Blevins, Soil and Range Conservationist
21st Colville Street
Nespelem, WA 9915

Appendix A: APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program
FY-2022 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 landmanagers 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, 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
      i) solid bait
      ii) ultra-low volume (ULV) spray
   b) Diflubenzuron ULV spray
   c) Malathion 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 can be found in the APHIS Grasshopper Program Guidebook: http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/grasshopper.pdf

SPECIFIC PROCEDURES FOR AERIAL APPLICATIONS

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

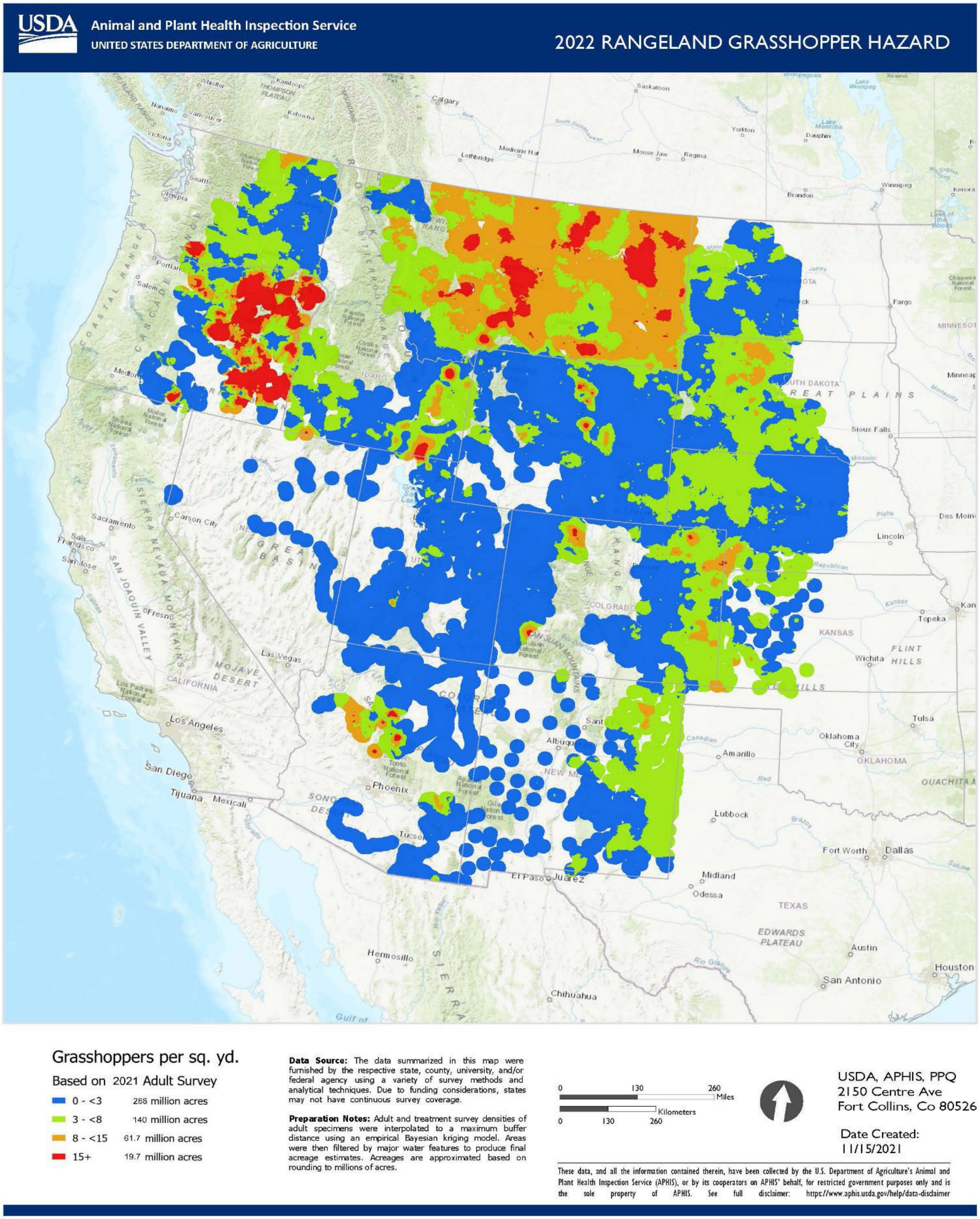
2) Minimize the potential for drift and volatilization by not using ULV sprays when the following conditions exist in the spray area:
   a) Wind velocity exceeds 10 miles per hour (unless state law requires lower wind speed)
   b) Rain is falling or is imminent
   c) Dew is present over large areas within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

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

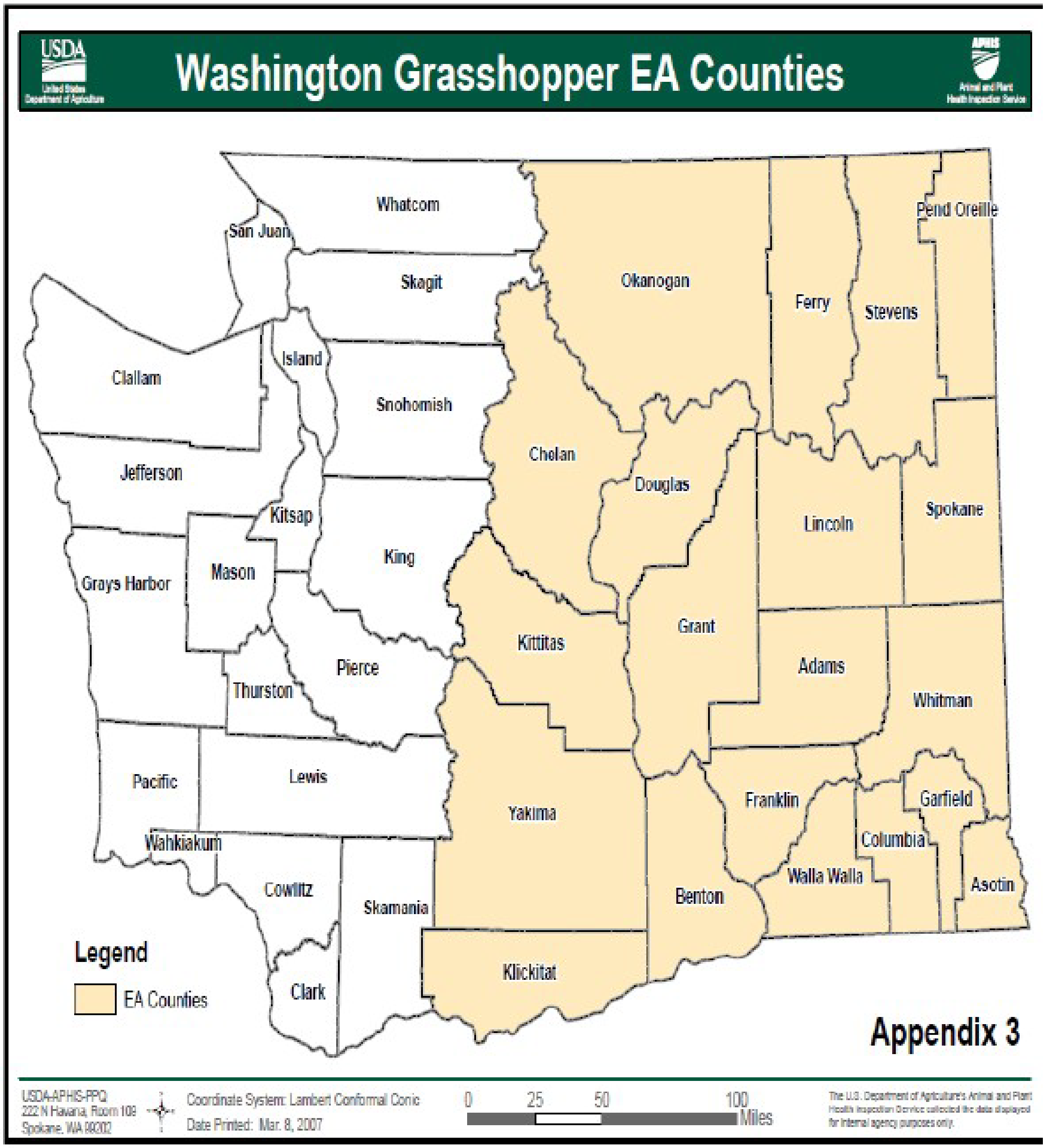
4) Application aircraft will fly at a median altitude of 1 to 1.5 times the wingspan of the aircraft whenever possible or as specified by the COR or the Treatment Manager.

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

Appendix B: Grasshopper Hazard Map of the Affected Environment



Appendix C: Map of the Affected Environment



Appendix D: FWS/NMFS Correspondence

Email correspondence with Greg Kurz, Fish & Wildlife Biologist, U.S. Fish and Wildlife Service, Wenatchee Field office to discuss Environmental Conservation Online System (ECOS) and Section 7 consultation as required by the Endangered Species Act of 1973. Discussed potential Mormon cricket/Grasshopper ground treatment locations in southeastern Franklin County and southwesternGrant County. Confirmed through local consultation and ECOS that there would be no threat to non-target species, migratory and local bird species, native bees, pollinators and "no effect" on federally designated threatened or endangered species using carbaryl bait ground treatments withinproposed treatment areas.

Telephone conversation with Kodi Jo Jaspers, Colville Confederated Tribes, Wildlife Biologist todiscuss potential Mormon cricket/Grasshopper treatments on the Colville Reservation. Greater Sage Grouse and Sharp-tailed Grouse locations will be excluded from treatments. Confirmed through local consultation that any treatment applications within proposed treatment areas would have "no effect" on federally designated threatened or endangered species at present time.

Telephone conversation with Dale Bambrick, Eastern Washington Team Leader, NMFS regarding listed anadromous fish species and critical habitat associated with the assessment area. Given the location and nature of the proposed Mormon cricket hatchingbed treatment programs, it was determined that there would be "no effect" on T&E listed species.No federally designated threatened or endangered species occur within the treatment areas at the present time. No treatments will take place within at least a mile of any lakes, rivers, or streams.

From: Kurz, Gregg <gregg_kurz@fws.gov>
Sent: Wednesday, March 16, 2022 11:45 AM
To: Bruno, George A - APHIS <george.a.bruno@usda.gov>
Subject: Re: [EXTERNAL] 2022 Biological Assessment for APHIS Rangeland Grasshopper Program in Washington

Hello George,

Thanks for sending the updated BA for 2022. As we discussed last year, the implementing regulations for section 7 of the Endangered Species Act do not require a Federal action agency to obtain written concurrence from the Service if they determine that their proposed action will not affect listed species or critical habitat, nor do these regulations provide a legal mechanism for the Service to concur with such a determination.

That said, based on the project location and known occurrences of the species addressed in the BA, the Service has no reason to disagree with your no effect determinations. Thank you for coordinating with us again on this project.

Gregg Kurz
Shrub-Steppe Zone Supervisor
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(He, Him, His)

2022 Biological Assessment

For

Washington

Rangeland Grasshopper and Mormon Cricket Suppression Program

03/16/2022

Prepared by
USDA, APHIS, PPQ
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BIOLOGICAL ASSESSMENT (BA) FOR STATEWIDE CONSULTATION AND CONFERENCE FOR 2022 GH/MC PROGRAMS IN WASHINGTON.

1.0 INTRODUCTION

The Animal and Plant Health Inspection Service (APHIS), in conjunction with Federal agencies, State departments of agriculture, Native American tribes, and private individuals is planning to conduct grasshopper/Mormon cricket control programs in Washington in 2022. This document is intended as statewide consultation and conference with the U.S. Fish and Wildlife Service (FWS) regarding the APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program.

Beginning in 1987, APHIS has consulted with the FWS on a national level for the Rangeland Grasshopper Cooperative Management Program. Biological Opinions (BO) were issued annually by FWS from 1987 through 1995 for the national program. A letter dated October 3, 1995 from FWS to APHIS concurred with buffers and other measures agreed to by APHIS for Washington and superseded all previous consultations. Since then, funding constraints and other considerations have drastically reduced grasshopper/Mormon cricket control activities.

APHIS is requesting initiation of informal consultation for the implementation of the 2022 Mormon cricket and grasshopper suppression program on rangeland in the Juniper Dunes Management Area (BLM) in southeastern Franklin County and rangeland in West Saddle Mountains (BLM) in southern Grant County.

Our determinations of effect for listed species are based on the October 3, 1995 FWS letter, the analysis provided in the 2019 Environmental Impact Statement (EIS) for APHIS suppression activities in 17 states, and local discussions with FWS. There is no Critical habitat for the listed species within the proposed project areas.

APHIS has determined that the proposed action **will not affect:** the threatened Yellow-billed Cuckoo, (*Coccyzus americanus*); threatened Bull Trout *(Salvelinus confluentus)*; endangered Columbia Basin Pygmy Rabbit (*Brachylagus idahoensis*) and endangered gray wolf (*Canus lupus*).

With this letter, APHIS is requesting concurrence with our determination for listed species that may occur in Washington within the area of the proposed 2022 grasshopper suppression program.

2.0 PURPOSE

The purpose of the proposed action is to control Mormon cricket and grasshopper outbreaks on Bureau of Land Management (BLM) rangelands within the Juniper Dunes Management Area (JDMA) in southeastern Franklin County and the West Saddle Mountains in southern Grant County. The objective is to suppress economically damaging Mormon cricket infestations on BLM administered/managed rangelands, adjacent to high value privately owned agricultural lands using insecticide carbaryl bait within the identified project areas. No treatments will occur in the Juniper Dunes Wilderness.

All rangeland treatments and border protection programs will be applied utilizing the reduced agent area treatments (RAATs) techniques. RAATs treatments differ from traditional programs by applying fewer agents to fewer acres while maintaining efficacy.

APHIS respectfully requests informal ESA consultation on listed species in Washington. A written response from FWS is requested regarding FWS concurrence with the determinations in this assessment.

3.0 DESCRIPTION OF ACTION

This document incorporates by reference portions of the 1987 APHIS Rangeland Grasshopper Cooperative Management Program, Final Environmental Impact Statement (2019 APHIS FEIS) which discuss the purpose and needs, alternative strategies, affected environments, standard operational procedures, and environmental consequences of the grasshopper program.

An environmental assessment (EA), tiered to the 2019 Rangeland Grasshopper and Mormon Cricket Suppression Program Final Environmental Impact Statement (FEIS), is being prepared in anticipation of treatments in the State of Washington. When specific treatment areas are identified and become imminent, a site-specific addendum to the EA will be prepared. Grasshopper Program decisions are then based on the conclusions reached in the EA and the addendums. Only the program operational procedures and alternatives found in the 2019 FEIS are available to APHIS for use in any site-specific treatment.

Grasshopper populations may build up to levels of damaging infestations despite even the best land management and other efforts to prevent outbreaks. At such time, a rapid and effective response may be requested and needed to reduce the destruction of rangeland vegetation, or in some cases, to also prevent grasshopper migration to private agricultural lands. The 2019 FEIS analyzes the alternatives available to APHIS when a Federal land management agency, Tribe or State agriculture departments (on behalf of a State, a local government, or a private group or individual) requests APHIS to suppress economically damaging grasshopper populations.

The chemical control methods will include the use of carbaryl bait by ground application. Three alternatives are considered: 1) No action, 2) insecticide applications at conventional rates and complete area coverage, 3) Reduced Agent Area Treatments (RAATs).

Conventional rates for these agents are:

- 10 pounds (0.50 lb a.i.) of 5 percent carbaryl bait per treated acre,

Rates utilizing RAATs are:

- 10 pounds (0.20 lb a.i.) of 2-5 percent carbaryl bait per treated acre,

Carbaryl is a broad spectrum contact insecticide used to control a wide variety of insects on agricultural crops, pastures and range grasses. Its mode of action is to inhibit acetyl cholinesterase (AChE) function in the nervous system. Reduced Area/Agent Treatments (RAATs) rates for carbaryl are 8-12 ounces per acre containing 280-420 grams of a.i. in 100-foot treated swaths alternating with 100 foot untreated for air applications. 2 percent carbaryl bait containing .20 lb a.i. in 30–40 foot swaths alternating with 30-40 foot untreated swaths are used for ground applications. An example of modified RAATs by ground application may incorporate 5 percent carbaryl bait containing .50 a.i. in 30–40-foot swaths alternating with 30-40 foot untreated swaths.

4.0 ASSESSMENTS:

4.1 MAMMALS

4.0.1 **Columbia Basin Pygmy Rabbit**, (*Brachylagus idahoensis)*

4.0.1.1 Status:

On March 5, 2003, the USFWS listed the Columbia Basin pygmy rabbit as endangered under the Endangered Species Act (ESA). Because of the extreme risk of extinction, this population was given emergency protection under the ESA on November 30, 2001. WDFW developed the Washington State Recovery Plan for the Pygmy Rabbit in July 1995 (WDFW, 1995). The plan was modified in August 2001 and May 2003 (WDFW, 2003).

4.0.1.2 Habitat and Distribution:

Columbia Basin pygmy rabbits are the smallest rabbit in North America and the only rabbit to dig its own burrows. They are typically located in the deep loamy soils of sagebrush-dominated landscapes. Its distribution is scattered in the sagebrush-dominated shrub steppe areas of the Great Basin. This includes portions of Oregon, California, Nevada, Utah, Idaho, Montana, Wyoming, and Washington states. Washington populations are discontinuous from the rest of the species' range. Pygmy rabbits are typically found in areas that include tall, dense stands of sagebrush (*Artemisia spp.*) which they are highly dependent on to provide both food and shelter throughout the year. Pygmy rabbits in Washington State are part of the Columbia Basin Distinct Population Segment. Pygmy rabbits were thought to be extirpated from Washington by the mid- 20th century, until a single unverified sighting was documented in Benton County in 1979 (USFWS 2012a). Since then, pygmy rabbits have only been found in southern Douglas and northern Grant counties (USFWS 2012a). Current reintroduction efforts are occurring in Douglas and Grant counties from captive-bred individuals as well as captured and translocated individuals from Oregon, Idaho, and Nevada (USFWS 2012a).

4.0.1.3 Assessment:

No pygmy rabbits or their sign were observed in the project area during annual grasshopper surveys conducted by APHIS in May and August 2021. While there is suitable sagebrush habitat in the project area, it is not within the expected historical distribution of the species. Since the most recent observation was unverified and occurred in 1979, it is anticipated that the pygmy rabbit does not occur in the project area. Therefore, the proposed Project would have no effect on pygmy rabbits.

4.0.1.4 Protective measures:

Threats to pygmy rabbit survival are primarily habitat destruction or degradation. For any given grasshopper treatment, only a portion of the environment will be treated one time during the season, therefore minimizing any potential impact to the Columbia Basin pygmy rabbit and its habitat.

4.0.1.5 Determination:

Although Columbia Basin pygmy rabbit habitat occurs in the project area, it is unlikely that the pygmy rabbit occurs on the site. Based on the determined protective measures, habits of the species, characteristics of the insecticide, and application rates, grasshopper treatments occurring on rangeland within this species habitat, the proposed actions **will have no effect** on the Columbia Basin pygmy rabbit.

4.0.2 **Gray wolf**, (*Canus lupus)*

4.0.2.1 Status:

As of February 10, 2022, gray wolves are **federally delisted** in Washington east of Highway 97 from the British Columbia border south to Monse, Highway 17 from Monse south to Mesa, and Highway 395 from Mesa south to the Oregon border (eastern one-third of WA); but are **federally listed** as endangered west of these highways (western two-thirds of WA). (USFWS and WDFW, 2022).

4.0.2.2 Habitat and Distribution:

Gray wolves are habitat generalists and will establish territories anywhere there is a sufficient food source. They were once found in almost all habitat types; prairie, forest, mountains, and wetlands. Presently, their territories usually contain a mixture of forested and open areas, away from human disturbance. Wolves are opportunistic carnivores whose primary prey are deer, elk and moose. When these preys are not available, wolves will eat smaller animals. Typically, only the top-ranking ("alpha") male and female in each pack breed and produce pups. Females and males typically begin breeding as 2-year-olds and may annually produce young until they are over 10 years old. Litters are typically born in April and range from 1 to 11 pups, but average around 5 pups. Pups are reared in the den for the first six weeks. Dens are commonly located on southerly aspects of moderately steep slopes with well drained soils, or rock caves/abandon beaver lodges, usually within 400 yards of water. Most wolf packs are sensitive to human disturbance near den sites. Dens are often over a mile from recreation trails and 1-2 miles from backcountry camp sites. In the summer and fall wolf packs use areas called "rendezvous sites" for resting and gathering. These are usually complexes of meadows adjacent to hillside timber with water nearby. Rendezvous sites vary in size, but are generally small, approximately 1 acre. Wolves can live 13 years, but the average lifespan is less than 4 years. Pup production and survival can increase when wolf density is lower and food availability per wolf increases. Breeding members also can be quickly replaced either from within or outside the pack.

4.0.2.3 Assessment:

No gray wolves or their sign were observed in the project area during annual grasshopper surveys conducted by APHIS in May and August 2021, or previous surveys. While the chemical insecticide carbaryl bait is highly toxic to insects it is relatively nontoxic to mammals. Impacts from a grasshopper suppression program on any prey species of the gray wolf would be negligible. It is also unlikely that gray wolves will be resident in, or traveling through, open rangeland areas where suppression programs will occur. Should a wolf wander into a suppression area there will be no jeopardy to its existence, therefore; Grasshopper Suppression Program activities will have **no effect** on the gray wolf (*Canis lupus*) in Washington.

4.0.2.4 Protective measures:

Threats to the long-term survival of the gray wolf are primarily habitat destruction or degradation. For any given grasshopper treatment, only a small portion of the environment will be treated one time during the season, therefore minimizing any potential impact to the gray wolf and its habitat.

4.0.2.5 Determination:

APHIS determines that grasshopper treatment activities **will have no effect** on the gray wolf, as a result of the proposed insecticide at the proposed rates of application.

4.2 BIRDS

4.2.1 Yellow-billed cuckoo, (*Coccyzus americanus)*

4.2.1.1 Status:

Yellow-billed cuckoo *(Coccyzus americanus)* was federally listed as threatened on October 3, 2014. Critical habitat was proposed for designation on August 15, 2014, but excluded Washington State (USFWS 2015a).

4.2.1.2 Habitat and Distribution:

Yellow-billed cuckoo require large, tree riparian corridors, preferably deciduous, with dense, low, scrubby vegetation greater than 50 acres. Nests are often placed in willows along streams and rivers, with nearby cottonwoods serving as foraging sites. (USFWS 2015a).
The western population has experienced major declines in its breeding range since the 1800s. Very few recent observations of the species have occurred in Washington State, with only about 12 records between 1950 and 2000 (WDFW 2012). The Yellow-billed cuckoo inhabits the canopies of deciduous trees such as cottonwoods and willows along large rivers.

4.2.1.3 Assessment:

Yellow-billed Cuckoo are not known to occur within the project area and are not expected to be present. Given the arid nature of the project areas, the lack of streams, rivers, bodies of water or riparian forests to provide suitable habitat for Yellow-billed Cuckoo, it is unlikely that it would be

present within the proposed action area. The project areas do contain sparsely populated trees, however, no cottonwood trees and willows or riparian areas are present that would be the cuckoo's typical habitat. Due to the riparian nature of the yellow-billed cuckoo and the fact that APHIS suppression activities will not occur in riparian areas, it is believed that grasshopper treatments are not likely to adversely affect the yellow-billed cuckoo. No yellow-billed cuckoos, or suitable nesting habitat were observed within the project areas during APHIS grasshopper surveys conducted in May and August 2021.

4.2.1.4 Protective measures:

In accordance with Executive Order 13186, Migratory Bird Act, 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 minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. APHIS maintains a 500-foot buffer around all water bodies, which would exclude most riparian areas where the Yellow-billed cuckoo is likely to occur. Impacts will be minimized as a result of buffers to water, habitat, nesting areas, subsequently riparian areas, and the use of RAATs. For any given treatment, only a portion of the environment will be treated, therefore minimizing any potential impact to migratory bird populations.

4.2.1.5 Determination:

No riparian areas occur in the boundaries of proposed treatment areas. The common species of trees for nesting are not present in proposed treatment areas. There are no known occurrences of yellow-billed cuckoo near the project and the action area does not contain the extensive canopy/woodlands habitat the species requires; therefore, it is determined the grasshopper treatments **will have no effect** on yellow-billed cuckoo.

4.3.1 **Trout, Bull**, *Salvelinus confluentus*

4.3.1.1 Status:

Bull trout were originally listed as threatened on July 10, 1998. Critical habitat for Bull trout was designated on September 30, 2010. The Upper Columbia River, including the Hanford Reach is listed as part of the Columbia River Distinct Population Segment [75 FR 63898].

4.3.1.2 Habitat and Distribution:

Bull trout are members of the char subgroup of the salmonidae family. They are typically associated with the colder streams in a river system and often spawn near cold-water springs, and areas of groundwater infiltration [64 FR 58911]. Suitable habitat requires clear and stable stream channels, clean spawning gravel, complex and diverse cover, and unblocked migration routes. In Washington, bull trout were historically found in major tributaries to the Columbia River on the eastside of the Cascades. Bull trout are widespread throughout tributaries of the Columbia River basin in Washington, Oregon, and Idaho, including its headwaters in Montana. Bull trout have declined in overall range and numbers of fish. Though still widespread, there have been numerous local extirpations reported throughout the Columbia River basin. Although some strongholds still exist, bull trout generally occur as isolated subpopulations in headwater lakes or tributaries where migratory fish have been lost.

4.3.1.3 Assessment:

The Proposed action will not involve insecticide applications or soil disturbance closer than 1.0 mile from bull trout utilized streams, tributaries of the Columbia River and Snake River where bull trout are known to occur. Further, the proposed action would not have any impacts on spawning and rearing habitat as the project areas are far from the designated critical habitat within the Snake River or Columbia River. Therefore, the proposed action would have no effect on designated critical habitat for bull trout. No critical habitat for bull trout occurs within the project areas.

4.3.1.4 Protective measures:

A 1.0-mile treatment buffer would be implemented from known habitats of the bull trout, and critical habitat will not be treated.

4.3.1.5 Determination:

APHIS determines that grasshopper treatment activities **will have no effect** on bull trout as a result of the protective measures, proposed insecticide, and the proposed rates of application.

6.0 SUMMARY

This BA addresses the effects of grasshopper suppression program activities on species listed since the 1995 BO and additionally provides measures for all earlier species that may be impacted by applications of carbaryl. Information is provided on the biology and ecology of those species and protective measures are suggested when necessary because program activities could potentially affect those species or their habitats.

APHIS has determined that the proposed action will not affect yellow-billed cuckoo, (*Coccyzus americanus*); bull trout, *(Salvelinus confluentus)*; Columbia Basin pygmy rabbit *(Brachylagus idahoensis)* and gray wolf (*Canus lupus*).

Should there be species in the affected areas that become newly listed, newly proposed, or otherwise not mentioned in previous biological opinions, APHIS will adhere to buffers and other protective measures for similar species that have been specified in previous biological opinions. This will ensure that Grasshopper Program activities will not likely jeopardize the continued existence of either listed species or species proposed for listing, or adversely modify critical habitat for listed species. APHIS will continue to incorporate, protection and conservation measures to ensure grasshopper control activities have little impact on the environment.

Works Cited:

(1) Biological Opinions, National Section 7 Consultations: U.S. Department of Interior, Fish and Wildlife Service; June 1, 1987; July 26, 1988; July 17, 1989; August 3, 1990; August 29, 1991; September 24, 1992; September 16, 1993; December 6, 1994; and July 21, 1995.

(2) George, T. Luke, McEwen, Lowell C., and Petersen, Brett E., Effects of Grasshopper Control Programs on Rangeland Breeding Bird Populations, Journal of Range Management, July 1996, Vol. 48(4).

(3) Grasshopper Integrated Pest Management User Handbook, U.S. Department of Agriculture, Animal Plant Health Inspection Service, Plant Protection Quarantine, Technical Bulletin Number 1809.

(4) Rangeland Grasshopper Cooperative Management Program, Final Environmental Impact Statement – 1987

(5) Rangeland Grasshopper and Mormon Cricket Suppression Program, Final Environmental Impact Statement--2002 and 2019

(6) Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection on power lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission, Washington, DC and Sacramento, CA. 207 pp.

(7) Avian Power Line Interaction Committee (APLIC). 1995. Mitigating bird collisions with power lines: the state of the art in 1994. Edison Electric Inst., Washington, DC. 103 pp.

USDA APHIS – See U.S. Department of Agriculture, Animal and Plant Health Service

(8) Weiland, R.T., Judge, F.D., Pels, T., and Grosscurt, A.C., 2002. A literature review and new observations on the use of diflubenzuron for control of locusts and grasshoppers throughout the world. J. Orthoptera Res. 11(1):43-54.

(9) Smith, D.I., Lockwood, J.A., Latchininsky, A.V., and Legg, D.E., 2006. Changes in non-target populations following applications of liquid bait formulations of insecticides for control of rangeland grasshoppers. Internat. J. Pest Mgt. 52(2):125-139.

(10) Coccyzus americanus. In Nature Serve Explorer. Retrieved February 5, 2015, from http://explorer.natureserve.org/servlet/NatureServe?searchName=Coccyzus+americanus

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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In Reply Refer To: February 28, 2022
Project Code: 2022-0013651
Project Name: 2022 Rangeland Grasshopper Suppression Program

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

Project Summary

Project Code: 2022-0013651
Event Code: None
Project Name: 2022 Rangeland Grasshopper Suppression Program
Project Type: Integrated Pest Management Plan
Project Description: BLM - Juniper Dunes Management Area (500 Acres)
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@46.3702316,-118.81427138971509,14z

Counties: Franklin County, Washington

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bull Trout *Salvelinus confluentus* Population: U.S.A., conterminous, lower 48 states There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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http://www.fws.gov/wafwo/

In Reply Refer To: February 28, 2022
Project Code: 2022-0013694
Project Name: 2022 Rangeland Grasshopper Suppression Program

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

Project Summary

Project Code: 2022-0013694
Event Code: None
Project Name: 2022 Rangeland Grasshopper Suppression Program
Project Type: Integrated Pest Management Plan
Project Description: BLM - Western Saddle Mountains (500 Acres)
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@46.7940595,-119.91206090698047,14z

Counties: Grant County, Washington

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Columbia Basin Pygmy Rabbit *Brachylagus idahoensis* Population: Columbia Basin DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1126	Endangered
Gray Wolf *Canis lupus* Population: U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico. There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4488	Endangered

Birds

NAME	STATUS
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bull Trout *Salvelinus confluentus* Population: U.S.A., conterminous, lower 48 states There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Appendix E: APHIS response to public comments on Washington's draft EA (EA Number: WA-22-01).

USDA APHIS received two public responses to the publication of the 2022 Draft Environmental Assessment (EA) (EA Number: WA-22-01). Public comments were received from the Xerces Society and from the Center for Biological Diversity ("Center"). Comments similar in nature were grouped under one response. Comments that were editorial in nature or requested additional citations are not addressed in the appendix but will be incorporated into the final EA, where appropriate. No APHIS PPQ grasshopper suppression programs occurred in Washington in 2021.

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.

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 the likely method of treatment and chemical to be used -- in the Draft EA and certainly by the Final EA. We find it hard to imagine a good reason for not disclosing more specific treatment maps, together with acreage estimates and proposed method and chemical – as soon as such information is available, certainly by the Final EA or as an Addendum to the Final EA.

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

APHIS' lack of transparency about proposed and historical treatment areas, particularly on public lands, is a disservice to the public and prevents citizens from reviewing sufficient information to be able to gauge the justification for and the risks involved in the suppression effort. Furthermore, as a result of the lack of specificity in the EA, it is impossible to determine whether effects would actually be significant or not.

Obviously, final treatment decisions should hinge on a firm understanding of species-specific nymphal densities as well as other conditions related to the economic threshold, as described by APHIS, and it could be that APHIS would decide not to treat an area that was included in a budget request. Nonetheless, in order to adequately inform the public, describe the affected environment, and ascertain impacts to critical ecological and social resources, APHIS should provide the treatment request areas with the EA, even if actual treatments end up less than these.

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

As soon as available, we request to receive a copy of maps and acreages of all final treatment areas for 2022, whether or not a supplemental determination is published. Should a supplemental determination be published, please send a copy to us.

If APHIS chooses to finalize its 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.

Treatment requests are received before the survey season begins, but they are very dynamic and can change week-to-week. In Washington, requests for treatment from BLM are normally received from February through April. Arbitrarily publishing requested treatment locations in the draft EA would not accurately reflect future treatment actions. Treatment locations on public land cannot be described accurately in the EA because the exact location is only known after nymphal surveys are conducted, which depending on weather conditions can occur April through June in Washington. Grasshopper nymphal stages generally develop every 5-12 days depending on environmental temperature. If draft EAs are published after nymphal surveys dictate treatment locations, the grasshopper life stage would advance to the point that treatments could no longer take place. See the APHIS responses to comments 1, 2, 3, 4 ,5, 6, 8, 54, 92 and 93 in the 2020 EA and response to comment #1 of the 2021 EA.

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 EA:

The emergency response aspect is why site-specific treatment details cannot be known, analyzed, and published in advance.

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

Also see Oregon's EA, which provides a map of similar historic information.

Even armed with this information, APHIS did not bother to take a closer look at the areas 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.

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.

APHIS described the purpose and need for grasshopper suppression treatments, potential treatment options, the affected environment within the state, and an analysis of the potential environmental consequences in the Draft EA that was made available for public comment. The emergency response aspect is why site-specific treatment details cannot be known, analyzed, and published in advance. APHIS relies on its emergency provisions within its NEPA Implementing regulations (7 CFR 372.10) to address these situations. APHIS does not know the location of actual treatment areas while preparing the Draft EA, because it is unknown at that time where economically damaging grasshopper populations may occur in the state of Washington. Although grasshopper outbreak history is one means of predicting where treatments may occur, treatments are in no way limited to these historical hotspot areas and can take place in rangeland anywhere throughout eastern Washington, in any given year.

APHIS regularly engages with the public about areas experiencing outbreak grasshopper and Mormon cricket populations. Previous year adult surveys can be used to predict areas of high populations, but one year's survey data does not always directly correlate to current populations. High variability of abiotic factors at a local level can significantly impact developing nymphal populations. Furthermore, Mormon cricket populations are mobile and can migrate into areas that were not forecasted to have outbreak populations. In these types of situations, it is impossible to know exactly where treatments will occur in advance. The need for rapid response is akin to an emergency for rural communities who are significantly impacted by the economic damage caused by these pests. APHIS uses the EAs to capture the variability in these rural locations and can then work with local governments, conservation districts, state, and federal partners to rapidly respond to the public needs for treatments. Areas which meet the criteria, express a desire for treatments and collaborate with APHIS have the potential to receive rapid response emergency treatments when funds are available.

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

APHIS claims in its EA 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 two potential insecticides in its Preferred Alternative B: carbaryl and diflubenzuron.

It is common knowledge that carbaryl is a broad-spectrum chemical 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. An accurate assessment regarding the impacts of these non-selective chemicals must also be included.

For more than 25 years, Washington APHIS has only been involved in small scale ground treatments using carbaryl bait which poses a reduced risk to native bees and pollinators compared to liquid carbaryl and diflubenzuron applications. Furthermore, APHIS Washington has used RAATs to treat approximately 99% of the acres historically treated by the Program. When using the RAATs method APHIS applies pesticides below the labeled rates further reducing the amount of insecticide used by the program. APHIS also emphasizes the use of carbaryl bait, where applicable, to suppress pest populations while protecting native bees and pollinators. Grasshopper suppression treatments typically occur in the early morning when pollinators are less active. These methods of applications have been shown to mitigate harm to nontarget invertebrates. Therefore, the risk of significant impacts to pollinators and arthropods as a group within the area covered by this EA are negligible.

APHIS recognizes that there may be exposure and risk to some pollinators at certain times of the application season from liquid insecticide applications used to control grasshopper and Mormon cricket populations. APHIS reduces the exposure and risk to pollinators by using rates well below those labeled for use by EPA. Current labeling for grasshopper treatments also allows multiple applications per season. APHIS uses one application per treatment season, further reducing the risk to pollinators when compared to the current number of applications that can be made to rangeland in a year. When used at rates below those recommended on the label and by alternating treated and untreated swaths, risks and impacts from exposure to non-targets are reduced when compared to full label rates at conventional 100% coverage.

As stated by the commentor, diflubenzuron is the most commonly used insecticide under APHIS's grasshopper suppression, although we have never used diflubenzuron for grasshopper suppression in Washington.

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

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

The Plant Protection Act of 2000 does not give authority to APHIS to purchase replacement feed for ranchers, but rather only provides funding when available to suppress outbreak populations of grasshoppers to save forage.

The commenter is correct that APHIS believes the use of RAATs mitigates the risk to non-target insects including pollinators. However, APHIS does not solely rely on the reduced deposition of pesticides in the untreated swaths to determine the potential harmful effects of grasshopper treatments will not cause significant impacts. The environmental consequences risk analysis of carbaryl and diflubenzuron treatments using conventional methods (total area coverage and higher application rates) is provided on pages 26-32 of the 2022 EA. Additional descriptions of APHIS' analysis methods and discussion of the toxicology can be found in the 2019 EIS.

This is a similar comment from the 2021 EA. See response to comment # 2 of the 2021 EA.

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 and do not provide an accurate scientific assessment.

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

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

This is a similar comment from the 2021 EA. See response to comment # 3 of the 2021 EA.

6. APHIS ignores the significance of Washington 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 500-1000 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 Washington home are already considered at-risk. See lists of at risk pollinators found in Washington in our comment letter submitted in 2020 (Attachments 1 and 2). We ask you to incorporate those attachments by reference.

Pollinators, including bumble bee species that occur in Washington and are within the range of historic and possibly future treatments, are facing significant declines (National Research Council 2007; Cameron et al. 2011).

Bumble bees as a group, and several bumble bee species endemic to western states are perhaps the best known examples of pollinators in serious decline. Bumble bees are known to be important pollinators on many rangeland plants, including listed plant species located in Washington such as Ute Ladies' Tresses. Scientists recognize serious information gaps about the relative and interacting effects of stressors to bumble bee populations, especially the effects of pathogens, pesticides, climate change and habitat loss (see Graves et al. 2021).

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

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 these 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 Washington designates any invertebrates as species of greatest conservation need.

Specific risks to bees from the insecticides diflubenzuron and carbaryl, 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 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 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 larger buffers around all water sources, including intermittent and ephemeral streams, wetlands, and permanent streams and rivers, as well as threatened and endangered species habitat, honey bee hives, and any human-inhabited area. Buffers should be sufficient to reduce potential drift deposition to insignificant levels. For example, Tepedino (2000) recommends a three-mile buffer around rare plant populations, as many of these are pollinated by solitary bees that are susceptible to grasshopper control chemicals.

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

The commenter has stated that pollinator populations are suffering significant declines, which APHIS does not dispute. However, the agency does not agree the proposed grasshopper treatments will significantly contribute to those declines.

This is a similar comment from the 2021 EA. See responses to comments #6, 9, and 13 of the 2021 EA.

7. APHIS has not demonstrated that treatments in Washington 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 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 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. 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 costsas$9.39per 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.

Information from a summary of treatments conducted across Western states in2017,2018, and 2019 shows treatment costs for treatment costs for treated acres ranging from $4.43-$35.00 (2107); $9.34-$45.44 (2018), and $2.70-$35.60 (2019).

In determining whether a treatment is economically justified, one must ask what is the revenue expected to be received for the product? CARMA, the model used by APHIS to determine if a treatment should occur, does not contain data for Eastern Washington that conveys the number of acres of rangeland to support one animal unit-month (AUM), however Oregon does. Relatively productive sites in NE Oregon have a grazing capacity of around4 acres/AUM. Currently, on federal BLM and Forest Service lands, the US taxpayer receives $1.35 per AUM. As a rough estimation, taking NE Oregon as a proxy and estimating carrying capacityas4 acres per AUM) and calculating the value of the forage per acre as paid to the American taxpayer, the US taxpayer receives an estimated $0.34 per acre for the forage value on BLM or USFS federal rangelands in2021 in Washington.

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

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

APHIS claims that treatments can reduce the likelihood of future outbreaks, but this claim is not supported by evidence. Treatments are unreliable at thwarting outbreaks in subsequent years (Blickenstaff et al.1974; Smith et al.2006; Cigliano et al. 1995). At best, insecticide treatments may stem damage to forage and crops in the current year.

The EA did not include APHIS' protocol for delineation surveys which occur in spring and summer to identify treatment areas. We know that APHIS encourages landowners to "signup" for treatments, in an effort, it appears, to attract contract bids for the aerial effort, and perhaps to lower the per acre cost.

[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.

Without inclusion of information about how APHIS selects nymphal survey points, how it determines which nymphal survey points are at an "economic" threshold, and how APHIS delineates treatment blocks and accounts for areas between survey points, we have legitimate concern that unjustified treatment may be occurring, with repercussions for sensitive ecological systems.

Recommendation: Available data suggest that APHIS does not have adequate support to demonstrate that it treats only after lands reach an "economic infestation" according to its own definition. In addition, there appears to be insufficient support to demonstrate that APHIS will meet an economic threshold before treating. APHIS must disclose its procedures for determining when a spray block has been identified as meeting the level of economic infestation according to its definition, and APHIS must demonstrate in its 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.

This comment questions the worth of grasshopper suppression on rangeland and it is difficult to parse out which of the demands it places on APHIS are possibly grounded in actual law. The commenter makes a primarily fiscal argument against social or political decisions APHIS is not empowered to make. NEPA requires environmental risk analysis and it is not clear that APHIS must demonstrate economic analysis in an Environmental Assessment. This political argument and could certainly proceed in other venues, however in the interest of explaining the purpose and need for grasshopper suppression APHIS will provide the following clarification.

Precipitation is a critical variable in determining range plant production; hence, forage production varies significantly from year to year and from place to place and cannot be predicted prior to the growing season. Only after grasshopper species and population levels are determined and forage *value assigned, can any treatment decision be determined. Any and all APHIS treatments that would be considered must meet the economic infestation level at minimum. In most circumstances, APHIS is not able to accurately predict specific treatment areas and the best treatment strategies months or even weeks before grasshopper populations build up to economic infestation levels.*

The value of the forage is not based only on the grazing fees assessed by BLM or FS. There are a range of additional costs associated with replacement feed, the cost of hay, the cost to ship the hay, the cost and labor to move the hay to the rangeland, the cost of moving the cattle from the grazing allotments, the cost to provide or build a hay barn to store the hay, etc. Therefore, replacement feed costs in Washington would greatly outweigh any treatment costs accrued by the agency. The Plant Protection Act of 2000 does not give authority to APHIS to purchase replacement feed for ranchers, it only provides funding when available to suppress outbreak populations of grasshoppers to save forage. The costs of treatments must not only be compared to the protected forage for livestock but for wildlife as well. The IPM User Handbook prepared by USDA discusses the cost benefit analysis for grasshopper suppression programs.

In Washington, there are no overhead or administrative costs associated with small-scale ground treatment costs provided by APHIS. Administrative costs would be associated if contractors were provided for aerial treatments.

This is a similar comment from the 2021 EA. See response to comment # 4 of the 2021 EA.

8. The EA understates 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.

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 all but acknowledges the risk to managed bees in the 2022 EA by indicating it will notify beekeepers of proposed treatments [presumably so they can move their bees]. However, APHIS then provides a contradictory and misleading statement that diflubenzuron is expected to have "minimal risk" to pollinators.

APHIS misrepresented important studies examining pollinator impacts, including an important study of diflubenzuron on bumble bees (Mommaerts et al. 2006). The Mommaerts study found drastic reproductive failure at concentrations that would be expected from program rates.

Other studies that have examined diflubenzuron impacts to pollinators are also left out or not adequately treated in the EAs. For example, Camp et al. (2020) found that *Bombus terrestris* microcolonies fed with diflubenzuron resulted inhibited of drone production. Litsey et al. (2021) examined the impact to honey bee workers that had been exposed as larvae to chronic sublethal doses of insect growth disruptors. Bees developmentally exposed to diflubenzuron had lower adult survival relative to controls.

APHIS also does not mention 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 non-ant Hymenoptera (this group includes bees) at two of the three treated sites compared to untreated areas (not higher as APHIS stated in the EA). 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.

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

The commenter asserts the EA does not provide information on the possible effects of diflubenzuron and carbaryl sprays on bees and pollinators. That information is provided on pages 21-22 and 24-29. The Draft EA is 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.

This is a similar comment from the 2021 EA. See response to comment # 6 of the 2021 EA.

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).*

● Washington 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 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. 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 the APHIS AgDISP analysis, we believe it—and the EIS and EAs that appear to rely on it—likely underestimates drift, and the resulting risk to non-targets within skipped swaths, as a result of several factors:

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

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

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

• APHIS Program operational guidelines (included as an appendix in the 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.

The APHIS grasshopper program in Washington has not been involved in aerial grasshopper treatments for nearly 30 years. The commenter is correct that APHIS believes the use of RAATs mitigates the risk to non-target insects including pollinators. The environmental consequences risk analysis of carbaryl and diflubenzuron treatments using conventional methods (total area coverage and higher application rates) is provided on pages 26-32 of the 2021 EA. Additional descriptions of APHIS' analysis methods and discussion of the toxicology can be found in the 2019 EIS. For Washington treatments the skip swath width is described on pages 7-9 of the 2022 EA. The swath width skipped is at least the same swath width of the treated swath which can be expected to preserve pollinators and beneficial insects.

Furthermore, the ground treatment equipment used in carbaryl bait application is approximately 4 feet off the ground, the bait pellets are not capable of drift due to the size and weight of each pellet at that distance from the ground. For the safety of the applicator and to eliminate drift potential, it is a practice in Washington not to treat when the wind is blowing greater than 10MPH.

This is a similar comment from the 2021 EA. See response to comment # 5 of the 2021 EA.

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

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

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

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

Given the lack of disclosure and the unacceptably high acute risk quotients reached with these deposition rates, carbaryl spray is an unacceptable option.

A study by Abivardi et al. (1999) looked at the effect of carbaryl contact toxicity to recently emerged adult codling moths (*Cydia pomonella*), finding that at 187.5 ng/cm2 (which is equivalent to 0.016 lb/ac—the same as the highest application rate under the grasshopper program), more than 70% of exposed male moths died within 24 hours, while these rates killed 30% of the females within 24 hours.

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

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

Coleoptera (beetles) are important for a variety of ecological roles - food for sage-grouse and other species, as well as dung burial and recycling, and some are also predators on other insects.

Peterson (1970) identifies Coleoptera, Orthoptera (grasshoppers), Hymenoptera (primarily ants), and a variety of unidentified and immature insects as the most frequent components of sage-grouse chick diets based on crop analysis in Montana.

Thus impacts to beetles and grasshoppers from carbaryl baits raise important concerns for effects to declining sage-grouse.

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

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

In Washington, APHIS conducts barrier treatments on rangeland immediately adjacent to agriculture lands to prevent Mormon crickets and grasshoppers from moving into crops. APHIS avoids blanket application of insecticides on rangeland and works in cooperation with Federal and State land managing agencies to protect sensitive resources managed on their lands. APHIS strictly adheres to pesticide labels which clearly state where their use is allowed or prohibited. 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. APHIS also emphasizes the use of carbaryl bait, where applicable, to suppress pest populations while protecting native bees and pollinators. These methods of applications have been shown to be protective of non-target invertebrates. These studies are referenced and summarized in the EIS.

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, sage grouse and other non-target species. These measures may include reduced insecticide applications associated with RAATS, avoidance measures and use of carbaryl bait, where applicable.

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 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.

APHIS use of carbaryl is even smaller compared to all uses of carbaryl. Carbaryl is presently approved by the EPA and registered in Washington. It should be noted that the current labeled uses for carbaryl grasshopper treatments are at much higher rates and can be applied with more frequency than what APHIS is proposing for use in Washington.

This is a similar comment from the 2021 EA. See response to comment # 12 of the 2021 EA.

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

Greater Sage-Grouse has seen its range cut in half and its population decreased 93 percent from historic numbers. Its breeding range in Washington state has been drastically reduced. An agreement is in place to prevent ESA listing through implementation of state-based conservation strategies.

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

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

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The 2022 EA contains minimal analysis of the impacts of the grasshopper suppression program to this species. There is no indication that leks in Washington will be protected from aerial application of insecticides, even though these and surrounding areas are where most of the chicks are produced and where it is especially important that food sources include the insects that sage grouse chicks most need (grasshoppers, beetles, Lepidoptera, ants, and other insect species).

APHIS does not disclose that studies do suggest effects to sage-grouse from grasshopper treatments. Johnson (1987) found that insect reduction as a result of rangeland grasshopper control reduced brood sizes in a wild sage-grouse population

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

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

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

Recommendation*:* APHIS should address the deficiencies in its EA, and implement stronger protections for sage-grouse. Since most chick rearing happens within a certain distance of leks, APHIS should implement firm no-treatment 4-mile buffers around leks (or wider to protect against drift) that prohibit the use of any insecticide. There is too much risk from the use of diflubenzuron to allow its use within chick-rearing areas. And the risks from carbaryl bait are outlined above.

See APHIS' response to comment # 10 above. Under ESA Section 7 there is no requirement to consult on sensitive species. However, in Washington when there is concern by land management agencies (federal, state, etc.) for certain species, APHIS implements protective measures for those species of concern when warranted.

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 treated areas. Of these, only two untreated areas grew in size in their 2nd year, and most winked out by the 2nd year, not reappearing by the 3rd year. This is powerful evidence that not treating is a viable decision, or that treating is not warranted in the first year, at least for small infestations, and at least if the goal is to minimize the chance that an outbreak/hotspot would result in something worse in the following year.

APHIS often stretches science to the point beyond where it is credible. For example, APHIS cites a study by Catangui et al. (1996-2000) which investigated the effects of Dimilin on non-target arthropods at concentrations similar to those used in the rangeland grasshopper suppression program. In APHIS' characterization, the study showed that treatment with Dimilin should be of no concern since applications resulted in "minimal impact on ants, spiders, predatory and scavanger beetles." However, APHIS does not disclose that the plots studied by Catangui measured only 40 acres. This is a far cry from the ground treatments normally measuring thousands of acres or the aerial treatments measuring a minimum of ten thousand acres that are seen in the actual grasshopper suppression program. Small treated plots of 40 acres can be quickly recolonized from the edges. Large treated plots are quite a different story.

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

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

The commenter states that "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." APHIS agrees with the assertion. In fact, that "competition with other grasshoppers" is caused by the destruction of their food sources by over-foraging due to overpopulation of the grasshoppers themselves. In this day and age of range management and conservation to benefit wildlife, sensitive species and livestock, APHIS consults with range managers to determine if grasshopper/Mormon cricket suppression is necessary to preserve range plant continuity. That way, overabundant orthopteran populations can be reduced without the danger of losing the range forage which is necessary to feed other species. Such is the very reason that Congress mandated that APHIS help range managers and landowners suppress "competing" grasshoppers in order to preserve range plant resources.

The commenter asserts that "grasshoppers were regulated primarily by natural processes, including natural enemies such as birds." Comment #13 (with which APHIS does not necessarily agree) contends that rangeland birds are declining. All the more reason to intervene with safe chemical suppression to help save valuable forage and cover for birds and other wildlife species, especially sensitive ones

Another assertion states 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)."

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.*

Another fundamental mischaracterization of the commenter, is the assumption that the proposals in this EA result in widespread treatments in New Mexico, 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.

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

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. APHIS does not typically control grasshopper *infestations on mid-productivity rangeland, 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 Washington, where high productivity meets grasshopper population booms and natural enemies do not respond in scale, regardless of land management decisions or treatment history.

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 author's 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):*

This is a similar comment from the 2021 EA. See response to comment # 7 of the 2021 EA.

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

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

McAtee (1953) examined 40,000 bird stomachs and reported that >200 spp prey on grasshoppers. Such avian predators of grasshoppers include species often seen in Western areas, such as kestrel, and meadowlark. Avian predators of grasshoppers also include grassland birds in decline, that merit special consideration, including sage-grouse, Swainson's hawk, Sprague's pipit, Baird's sparrow, chestnut-collared longspur, long-billed curlew, sage thrasher, and others.

According to McEwen (1987), grasshoppers are especially important for the raising of young by the majority of bird species. McEwen et al. (1996) cites a number of resources in stating that bird predation commonly reduces grasshopper densities on rangeland by 30-50 percent.

Despite the strong linkage between grasshoppers and the health of rangeland bird communities,

APHIS claims an adequate prey base would remain for these declining bird species, even though the EA simultaneously states that RAATS only reduces grasshopper mortality slightly compared to conventional application.

Based on the drift information we have seen and presented elsewhere in this comment letter, and the likelihood of at least short-term effects to the prey base that is documented in a variety of studies, we question the conclusion that RAATs treatments with diflubenzuron within sage grouse areas would not be likely to have a significant impact.

For example Sample et al. (1986) examined the effects of diflubenzuron exposure to nine species of songbirds. The data showed that while diflubenzuron is not directly toxic to vertebrates, birds were affected indirectly through reduced availability of Lepidoptera larvae. Birds possessed differing capabilities to compensate for these diflubenzuron-induced food reductions. Most birds adjusted by switching prey, while others consumed less food.

A recent study estimated a net loss of nearly 3 billion birds since 1970, or 29% of 1970 abundance in North America (Rosenberg et al. 2019). It is critical to recognize that grassland birds—an important group of species that extends well beyond the iconic sage grouse—have suffered the largest decline (53%) among habitat-based groups since 1970, while populations of six species of grassland birds (Baird's sparrow, Cassin's sparrow, Chestnut-collared longspur, lark bunting, Sprague's pipit, and McCown's longspur) have declined by 65-94%. This is never disclosed in the 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, looking closely at how the scale of treatments may impact populations, and considering the cumulative impact of insecticide exposure to prey in combination with existing stressors already impacting these imperiled birds.

This is a similar comment from the 2021 EA. See response to comment # 8 of the 2021 EA.

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." The Sevin XLR Plus label instructs applicators: "Do not apply this product to target crops or weeds in bloom." However, if treated habitat is flowering and bees are active (as would be anticipated during any of the proposed treatment months), it is not clear how applications for grasshopper/Mormon cricket control can minimize exposure to bees.

Except for reduced rates and/or untreated swath widths, the 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.

This is a similar comment from the 2021 EA. See response to comment # 9 of the 2021 EA.

15. Consultation Appears to Have Been Completed on only a Very Small Portion of the Total Area that May Receive Treatment.

The EA includes Appendix D, which includes the Biological Assessment submitted to the U.S. Fish and Wildlife Service, and an Official Species List from FWS which reflects a project map centered on the Juniper Dunes Management Area in Franklin County and the Western Saddle Mountains Area in Grant County. We appreciate the inclusion of this information in the Washington EA (many other states did not include such information and it is important that the public be aware of such determinations and the reasoning behind them).

However, the consultation appears to have been completed for only these two small areas, not for the entirety of the 20-county area specified on the title page.

As such the consultation is not yet complete for the remainder of Eastern Washington.

Recommendation: APHIS must complete consultation for the entire area of the state that may be subject to grasshopper treatments in 2022. The current consultation is incomplete.

Presently, these are the only two areas where APHIS treatments may occur in 2022.

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

APHIS' determinations are, for the most part based on incomplete and scant reasoning. For example, APHIS states for the pygmy rabbit: "No pygmy rabbits or their sign were observed in the project area during annual grasshopper surveys conducted by APHIS in May and August 2021….It is anticipated that the pygmy rabbit does not occur in the area. Therefore the proposed Project would have no effect on pygmy rabbits. " APHIS makes similar statements about lack of observations when it discusses the gray wolf and yellow-billed cuckoo. Were APHIS surveyors (presumably in the area to count grasshoppers) trained in identification, survey protocols, and sign for these listed species? Have experts weighed in to agree that the habitat is not suitable therefore the pygmy rabbit does not occur in the area?

Similarly, for the gray wolf, APHIS states: “Should a wolf wander into a suppression area there will be no jeopardy to its existence, therefore; Grasshopper Suppression Program activities will have no effect on the gray wolf (*Canis lupus*) in Washington.” APHIS staff writing this document clearly do not understand what jeopardy means in an Endangered Species context, and how that differs from a no effect determination.

For Yellow-billed Cuckoo, APHIS bases its no effect call on the assumption that its standard buffer will protect its riparian habitat. APHIS’ standard buffers are only applied around water and the distance varies depending on the chemical and the formulation (500 feet is maximum, 50 feet is minimum). Based on information in APHIS’ own drift analysis that we obtained through FOIA, we do not believe even a 500-ft buffer is adequate (see (1) below) for protecting listed and proposed species when they rely on arthropods for prey or pollination. Therefore, we urge APHIS to adopt stronger buffers.

The BA lacks analysis of direct and indirect impacts to the species, so the determinations are not well justified. APHIS must provide better scientific data justifying their determinations, including an assessment of drift potential through the buffer area based on quantitative models or statistically sound monitoring

Tingle (1996) examined the impacts of diflubenzuron on arthropods. The Tingle study discloses the following:

• analysis of effects was only done on most common taxa at family or order level and that in many cases invertebrates occurred in numbers too small to evaluate statistically.

• Tingle reported evidence of possible effects on spiders and heteropteran bugs within barriers, lasting over 3 mo and that the relative abundance of both caterpillars [Lepidoptera] and non-target grasshoppers [Acrididae] declined within spray barriers following treatment and remained low for several months. Data from 1994 showed a severe negative impact on lepidopteran larvae within barriers lasting > 3 months.

• The author concluded that adverse impacts on spiders [Araneae] (particularly Salticidae), crickets [Orthoptera; Gryllidae] and bugs [Heteroptera] could not be discounted.

For Yellow-billed Cuckoo a variety of insect orders may be prey items. Please note that a wide variety of insects, including from these same orders, were significantly affected by diflubenzuron grasshopper sprays as noted by Graham et al. (2008).

Listed species’ protected locations must be mapped out for ground and aerial applicators, including all buffer widths listed in the protective measures it plans to implement to avoid impacts to listed species.

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

Recommendation: APHIS should reexamine its reasoning and ensure that all determinations are supported by thorough analysis especially if a letter of concurrence is not yet available. In the Final EA, the letters of concurrence must be attached. APHIS should clarify its protective measures in the Final EA. If USFWS was not aware of modeled or empirical drift calculations, APHIS must provide its information to USFWS in a revised request for consultation. All determinations must be supported by thorough, complete analysis and accurate disclosure of the scientific studies underlying their reasoning. Under the ESA there must be disclosure of potential impacts under the treatments, an analysis of whether the project would jeopardize the continued existence or modify or destroy the critical habitat for each adversely affected listed species, according to any active ingredients that may be selected. Determinations must include an analysis of direct and indirect effects to the listed species. Pesticide specific conservation measures for each listed species (actions to benefit or promote the recovery of listed species that are included by the Federal agency as an integral part of the proposed action), where appropriate, should be explicitly addressed and adopted.

APHIS should institute buffers around predicted suitable habitat for any listed species for which such modeling is available. APHIS should include buffers even for ground applications. APHIS should also consider upstream and watershed effects for aquatic species, and institute protections to guard against flushes of pesticide into their habitats.

For each species to be protected within the project area, APHIS must provide to applicators a set of clear directions outlining protective measures for the listed and proposed species found within this project area. In addition to these measures, APHIS should adopt the following operational guideline across all site-specific EAs: *"Use Global Positioning System (GPS) coordinates for pilot guidance on the parameters of the spray block. Ground flagging or markers should accompany GPS coordinates in delineating the project area as well as areas to omit from treatment (e.g., boundaries and buffers for bodies of water, habitats of protected species, etc.)."*

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

APHIS appreciates the commenter's careful review of the protected species lists provided in the Draft EA. APHIS has provided the most current ESA consultation documents in Appendix D in the EA. Section 7 consultations were completed, and concurrence was received from FWS regarding T&E species (see Appendix D of the 2022 EA).

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

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

In 2016 and 2017, the U.S. Department of Agriculture National Resources Conservation Service's (NRCS) developed regional Monarch Butterfly Wildlife Habitat Evaluation Guides, and discouraged placement of monarch breeding habitat within 38 m (125 ft.) of crop fields treated with herbicides or insecticides (NRCS 2016).

The risk of carbaryl applications may be unacceptably high for Lepidoptera, including the monarch, based on data from Abivardi et al. (1999) as explained earlier in this comment letter. Any of the liquid insecticides poses a concern to caterpillars of these species if exposed.

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

Recommendation: We urge you to provide strong conservation measures for monarch butterfly. On monarch, buffering out known or potential milkweed areas would be an important conservation recommendation. Known and modeled habitat maps are available from at least three sources:

• Waterbury et al. 2019 (excellent Washington specific information)

• Dilts et al. 2019

• Western Monarch Milkweed Mapper

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

This is a similar comment from the 2021 EA. See response to comment # 11 of the 2021 EA.

18. 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 does not mention a recent nationwide consultation effort on carbaryl's effect to listed species.

EPA released a final BE for carbaryl in March 2021. This BE made determinations of Likely to Adversely Affect (LAA) for 1,640 species and 736 species' critical habitats. The BE includes a documentation of a variety of effects to birds, mammals, insects, bees, fish, aquatic inverts, and plants. While the consultation has yet to be fully completed, these determinations are an indicator of widespread impact from use of this chemical.

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

Recommendation: The listed species determinations for carbaryl should be disclosed in the 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.

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.

This is a similar comment from the 2021 EA. See response to comment # 12 of the 2021 EA.

19. 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.

All bodies of water, including stock tanks and stock ponds are buffered for applications in Washington.

This is a similar comment from the 2020 EA. See response to comments # 40, 41 of the 2020 EA.

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

The Dimilin label indicates that the product is toxic to mollusks. The Sevin XLR Plus label indicates that the product is extremely toxic to aquatic invertebrates.

Nationally, more than 90 mussel species are federally listed as endangered and threatened, and more than 70% are thought to be in decline. About 32 species are thought to have already gone extinct. In the western U.S., populations of western pearlshell, California floater, and western ridged mussel are all in decline, especially in Arizona, California, Montana, and Utah.

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

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

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

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

This is a similar comment from the 2021 EA. See response to comment # 14 of the 2021 EA.

21. 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.

Stock tanks are given the same buffer as any other surface water. See response to comment # 15 of the 2021 EA.

22. 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. An NPDES permit may be required. Even if an NPDES isn't required for certain activities, APHIS still has a duty to comply with state water quality standards under the Clean Water Act. Further, an NPDES permit does not absolve the agency of its duty to disclose impacts to water quality under NEPA.

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

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

APHIS Washington complies with the Clean Water Act as administered by the WA Department of Ecology. An NPDES permit is not applicable for our grasshopper treatment program in Washington because any treatment ground applications would be terrestrial, occurring far from water sources. This is a similar comment from the 2021 EA. See response to comment # 16 of the 2021 EA.

23. Special status lands

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

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

APHIS does not make treatments on lands of special status without a request from that agency and an evaluation of whether treatments are necessary. Additional protection measures for these types of lands are established by the agency requesting treatment and are followed by APHIS. This is a similar comment from the 2021 EA. See response to comment # 17 of the 2021 EA.

24. Avoidance of Lands Where Organic or Transitioning Production Occurs

The general treatment guidelines for 2022 state: *"In areas considered for treatment, State-registered beekeepers and organic producers shall be notified in advance of proposed treatments. If necessary, non-treated buffer zones can be established."*

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

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

The general guidelines, crafted for the program as a whole, and included in each state's EA, leave a number of questions about notification and avoidance of impacts to organic or transitioning producers, including:

• It is unclear if each state maintains a complete registry of organic and transitioning producers, and if that registry is spatially referenced. Many producers farm land in disparate locations. There are a number of certifying organizations across the west, not just the states. It is unclear if these different organizations share information, and if APHIS would be accessing a complete list in any locality.

• It is unclear what the notification process to organic and transitioning producers is. A public meeting is likely to not be sufficient. Given the short time frames between final treatment decisions and the fact that treatments usually occur in the early, critical part of the growing season, it also seems likely that some organic producers could completely miss a notification.

• APHIS appears to make the establishment of buffers optional. Given the issues we've outlined with notification, optional buffers are not a sufficient protection.

Recommendation: APHIS should explain its notification process in the EA. We are concerned that some organic, and especially transitioning, parcels could be missed if APHIS does not cast a wide net to identify all locations where organic or transitioning farms exist. The identification and notification process should include multiple sources beyond any state list, even if redundant, to ensure that any and other spatial locators should be used to the full extent of their availability.

Organic or transitioning producer is accounted for in the spatial footprint of the spray. APHIS should not just notify but also confirm notification for each organic and transitioning producer, to ensure that its communication has reached its recipient. Given the large drift potential and its previous protocol for native managed bees, APHIS should not leave buffers open-ended but should institute a minimum 4-mile buffer around each identified organic or transitioning parcel. Sites such as driftwatch.org and other spatial locators should be used to the full extent of their availability.

APHIS prepares maps of the treatment area that exclude sensitive sites, such as organic crops from the treatment area. The Program also notifies residents within treatment areas, or their designated representatives prior to proposed treatments. They are advised of the control method to be used, proposed method of application, and precautions to be taken. If necessary, non-treated buffer zones are established to protect these resources. A buffer zone is a distance or space around a sensitive area that will not be treated to minimize harm and disturbance of that area.

The APHIS grasshopper program in Washington would notify all crop producers, including organic, in advance of proposed treatments occurring near their properties. APHIS would request organic agriculture certifiers and producers to provide grasshopper program managers maps and locations for any organic crops or transitioning properties located in the area covered by this EA. This is a similar comment from the 2021 EA. See response to comment # 18 of the 2021 EA.

25. 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. We are also concerned about impacts to resources and species that overlap with private lands and the scope of APHIS's program, which is not supposed to be geared toward private lands. For example, determining occupied habitat occupied by listed or candidate species on private land may be difficult or tricky.

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

This is a similar comment from the 2021 EA. See response to comment # 19 of the 2021 EA.

26. Cumulative effects analysis

There is insufficient analysis of cumulative impacts in the EAs. For example, the EA does not adequately disclose the locations where spraying has occurred in the past, nor did the APHIS2019EIS.

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

Based on our independent review, evidence is slim to support APHIS’s statement that the probability of an outbreak occurring in the same area as a previous outbreak is low. Shell and Lockwood (1997) examined decades-long patterns of outbreaks in Wyoming and were also able to map higher-probability outbreak areas. Cigliano et al.(1995)did the same for Montana. Oregon includes a map in its EA showing that a few areas of the state appear far more likely to experience outbreaks than others. Washington should ground its analysis in a spatially explicit description of where treatments and outbreaks have occurred in the past.

APHIS also places emphasis on the fact that its policy dictates that only one treatment a year is conducted, but does not address nearby impacts on private or state lands where more than one treatment may be conducted, which could contribute to cumulative impacts. In addition, ecological impacts can be severe even if a repeat treatment is unlikely if treatment results in adverse effects to a species confined to a small range, already in decline, or both.

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

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

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

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

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

This is a similar comment from the 2021 EA. See response to comment # 20 of the 2021 EA.

27. 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 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 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.

Public land managers have their own rangeland biologists to determine any potential impact on *species of concern and limitations on special status lands. This information is conveyed to APHIS by means of a pesticide use proposal. The comments comparing rotational grazing to season long grazing are valid concerns. APHIS supports such management practices. However, the rotational grazing practices in Washington by the ranchers are not under the control of APHIS grasshopper program. Ranchers practice rotational grazing in Washington, APHIS only responds to the large outbreaks associated with the rangeland forage damage. Grazing practices are not under the control of APHIS. The research the commenter referenced concerning fire management, biological control, and other nonchemical methods are not presently valid control practices. Fire Management of rangeland is not controlled by APHIS. This method would have to be implemented by the land management agencies. This is a similar comment from the 2021 EA. See response to comment # 21 of the 2021 EA.*

28. 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.

The commenter made the same comment in the 2020 EA. Please refer to APHIS responses to comments 1, 2, 3, 51 and 55 of the 2020 EA.

29. Discrepancies in comment deadlines.

Finally, we'd like to point out that the due date for comments listed in the Draft EA does not match the due date listed at the APHIS website. The first specifies April 29, 2022, while the second specifies April 30, 2022.

There was a one-day delay in posting the draft EA to the APHIS website. The 30-day public comment period began on April 30, 2022. Thank you for pointing this out.

Center for Biological Diversity comments and responses

1) **The 2022 EA has the same/similar deficiencies as the previous EAs so comments by CBD and Xerces Society for Invertebrate Conservation comments for the 2020 and 2021 EAs are still applicable.**

The commenter submitted similar comments for the 2021 EA. See response to comment #23 of the 2021 EA. The responses for comments 1 through 157 are found in the 2020 EA. These responses are equally applicable for the 2021 EA.

2) **The EA assumes recreation is not a significant use of potentially treated areas.**

Recreational uses of rangelands have dramatically increased, including in areas where recreation was not previously a significant use.

The commenter wrongly assumes APHIS does not consider recreation to be a significant use of rangelands in Washington. APHIS talks about recreational use of rangelands on pages 22-23 of the EA under the "Socioeconomic Issues" section of the "Site-Specific Considerations". As described by the local populations and governments within the impacted areas, the presence of high densities of Mormon crickets significantly deter from recreational activities on rangelands. Recreation takes place in established areas that already have had significant disturbance by recreational activities (i.e. ATVs, vehicles, mountain bikes, camping equipment). In the presence of high densities of Mormon crickets and grasshoppers, campers and recreationalists may migrate into areas that were not previously used for recreation and cause increased impacts to areas with less historical disturbances.

APHIS does not treat directly onto campsites where recreationists are occupying. APHIS monitors the treatment areas and makes a concerted effort to notify potential recreationists directly and by posting notification of treatments at centralized points of entry. APHIS also consults with the land *managing agency to identify areas of significant recreational use where individuals may be impacted and notify those individuals of treatment plans and work to restrict access into the treatment areas. APHIS would not conduct a treatment of rangeland if people were present.*

3) **The EA does not consider impacts to recreation and recreationists, specifically treatment impacts on adults, children, horses, and dogs. Places that could be sprayed include popular places for people enamored with the landscapes and the many species it supports.**

See APHIS' response to comment #2 above. The cumulative impacts on people, adults and children were addressed on pages 26-38 of the Washington EA. The risk of Program pesticide use was also evaluated in the EIS that this EA tiers to and is incorporated by reference.

APHIS would not conduct a treatment of rangeland if people or their pets were present. APHIS provides analysis of the potential effects of program applied insecticides on humans and animals in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. APHIS does not believe the program treatment will affect unseen bystanders or reduce recreational opportunities. Lastly, if a party was intending to recreate on the vast rangeland, they would be free to conduct those recreational activities anywhere else outside of the comparatively small grasshopper control areas. APHIS does not believe this minor inconvenience would cause significant impacts to the human environment.

4) **The EA does not consider impacts to species recreationists and birders are traveling to see, including birds, butterflies, and bees. Treatment areas are hugely important for hundreds of species of birds, invertebrates, and rare plants.**

APHIS provides analysis of the potential effects of program applied insecticides on humans and animals in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. APHIS does not believe the program treatment will have significant impacts on the rangeland populations of birds, bees or butterflies, or reduce recreational opportunities to see these animals. If parties wish to observe wildlife on the vast rangeland, they would be free to conduct those recreational activities anywhere else outside of the comparatively small grasshopper control areas. APHIS does not believe this minor inconvenience would cause significant impacts to the human environment.

5) **The EA fails to fully account for impacts of this program on native bees. Washington is home to many native bee species.**

APHIS disagrees with the commenter's opinion concerning the robustness of our risk analysis for native bees. APHIS provides analysis of the potential effects of program applied insecticides on pollinators including bumble bees in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. The *commenter has expressed these concerns repeatedly, and APHIS has addressed them previously. See our responses to comments #3, 6, 8, 9, and 14 in the 2022 EA; comments # 6, 9, 13 in the 2021 EA; and comments #10, 12, 14, 19, 20, 21, 22, 24, 25, 28, and 36 of the 2020 EAs.*

APHIS does not believe grasshopper treatments will cause significant impacts to these pollinator populations.

6) **The EA failed to consider how treatments would affect bumble bee species. These species and many other species exist in these areas likely because there is so much protected land around them. Spraying is occurring in and around areas where native bee species are reported. CBD is concerned that treatment could impact increasingly rare bumblebee species. There are also solidary bees that are hard to identify by citizen scientists (thus fewer records exist) but they are equally concerned about them.**

   APHIS provides analysis of the potential effects of program applied insecticides on pollinators including bumble bees in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. The commenter has expressed these concerns repeatedly, and APHIS has addressed them previously. See our responses to comments #3, 6, 8, 9, and 14 in the 2022 EA; comments # 6, 9, 13 in the 2021 EA; and comments #10, 12, 14, 19, 20, 21, 22, 24, 25, 28, and 36 of the 2020 EA.

   APHIS does not believe grasshopper treatments will cause significant impacts to these pollinator populations.

7) **Treatments in and around protected lands reduce the value of lands to wildlife (including bumble bees).**

   APHIS would like the commenter to explain in greater detail how the value of rangeland to wildlife is reduced after a destructive grasshopper outbreak is controlled. This unfounded assertion is so outlandish, the commenter must not understand the reality of grasshopper herbivory.

8) **The EA fails to fully account for impacts of this program on butterflies in the area. intermountain sulfur, *Coalias occidentalis pseudochristina* (listed as S1-critically imperiled in WA), among others APHIS has failed to adequately consider.**

   APHIS disagrees with the commenter's opinion concerning the robustness of our risk analysis for butterflies. APHIS provides analysis of the potential effects of program applied insecticides on non-target insects in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. The commenter has expressed these concerns repeatedly, and APHIS has addressed them previously. APHIS does not believe grasshopper treatments will cause significant impacts to the butterfly *populations named by the commenter.*

See our responses to comments #3, 6, 8, 9, and 17 in the 2022 EA; comments #5, 6, 9, 11, 13 in the 2021 EA; and comments #10, 12, 14, 19, 20, 21, 23, 24, 25, 28, 38, and 41 of the 2020 EA.

9) The EA fails to consider impacts to species that depend on other (potentially) directly affected species for various parts of their life cycles. People who want to view potentially (directly and indirectly) affected species may not be able to due to treatment activities.

APHIS provides analysis of the potential effects of program applied insecticides on humans and animals in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. APHIS does not believe the program treatment will have significant impacts on the rangeland populations of birds, bees or butterflies, or reduce recreational opportunities to see these animals. If parties wish to observe wildlife on the vast rangeland, they would be free to conduct those recreational activities anywhere else outside of the comparatively small grasshopper control areas. APHIS does not believe this minor inconvenience would cause significant impacts to the human environment.

10) The EA fails to fully account for impacts of this program on greater sage grouse, as treatments have occurred in and around greater sage grouse habitat. Impacts like having food sources eliminated and causing disturbances from treatment activities, like aerial spraying. Greater sage grouse is in steep decline.

Sage grouse are buffered as required by existing best management practices, including the plan listed in the comment, as well as additional memoranda and expert opinions noted in the EA. APHIS consults with and follows the latest best practices numerated in USF&W consultation (and summarized in the EA), and any further requests from local management agencies requesting treatments, such as the BLM. In Washington, there is an MOU (Pesticide Use Proposal) between APHIS and BLM that discusses protective measures to mitigate impacts to bird species which have been identified as species of concern within a BLM project area.

11) The EA fails to fully account for impacts of this program on listed and non-listed insect species.

APHIS disagrees with the commenter's opinion concerning the robustness of our risk analysis for insect species. APHIS provides analysis of the potential effects of program applied insecticides on non-target insects in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. The commenter has expressed these concerns repeatedly, and APHIS has addressed them previously. APHIS does not believe grasshopper treatments will cause significant impacts to the specific insect populations named by the commenter.

See our responses to comments #3, 6, 8, 9, and 17 above; comments #5, 6, 9, 11, and 13 in the 2021 EA; and comments # 12, 14, 17, 19, 20, 21, 23, 24, 25, 28, 33, 34, 35, 36, 37, and 41 of the

2020 EA.

12) **The EA does not address how treatments impact the environment when combined with other pesticide treatment activities conducted by private, local, state, and other federal programs.**

Millions of acres of federal public land are treated with pesticides for various reasons each year. Further analysis is needed; APHIS should look at cumulative effects of treatments on impacts to non-target species. Likely all these treatments combined greatly exacerbate impacts to non-target species.

APHIS discussed the potential of overlapping chemical treatments in the areas where outbreaks of grasshoppers have occurred or could occur in the future in the cumulative impacts section of the final EIS, from page 79 to 84 and in the draft EA on pages 33 and 34. It is unlikely there would be significant overlap between other APHIS pest programs and the grasshopper program. Current label restrictions and operational mitigations minimize significant exposure of soil, water and air to Program insecticides. Grasshopper chemical treatments are not expected to persist or bioaccumulate in the environment and there is a lack of significant routes of exposure.

We are unaware of any retreatment that would occur in an area that we have done a treatment. Generally, the land we treat is a hybrid of BLM rangeland and absentee landowners leasing land for grazing. Private landowners do not actively manage that land and, therefore, are not expected to be making any other types of chemical treatments. Although APHIS is unaware of any, BLM could potentially do herbicide treatments in areas we conduct ground bait treatments, but they would not treat for Grasshopper or Mormon cricket.

13) **The EA does not incorporate new knowledge about pesticides (carbaryl, malathion).**

Carbaryl 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 – EPA. FWS biological opinion of malathion references the many types of harms this chemical poses to listed species, including those in the project area.

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

14) **APHIS should be communicating to EPA and FWS about its use of pesticides in this program so these agencies can incorporate this information into their endangered species analyses.**

The use of chemicals used in Washington is detailed in the Biological Assessment submitted to FWS and concurred to APHIS by FWS. The USFWS Field and State Offices are all clearly aware of the pesticides used in Washington. The pesticides used in Washington are approved for use by US EPA and the Washington Department of Agriculture. The pesticide labels are strictly adhered too as well other Program measures designed to reduce risk to nontarget organisms, including listed species.

15) The EAs lack of specific information on treatments and their impacts, and fails to comply with NEPA, ESA, and other statues.

APHIS disagrees with the commenter's opinion concerning the robustness of our risk analysis in the EAs. APHIS provides analysis of the potential effects of program applied insecticides on the human environment in the Environmental Consequences section of the EAs, the Potential Environmental Impacts section of the Programmatic EIS (2019) and the human health and ecological risk assessments prepared for insecticides used by the grasshopper program. APHIS wishes to remind the Center that the NEPA standard of risk evaluation is "Significant Impacts". We believe based on our risk analysis those effects will not be long lasting or severe enough to cause significant impacts. Our operational procedures prevent or reduce the severity of these effects.

This is a similar comment from the 2020 and 2021 EA's. See response to comment #1 of the 2021 EA. A similar comment from the 2020 EA. Please see the APHIS responses to comments 1, 2, 3, 4, 5, 6, 8, 54, 91, 92, 93, 94, and 99 in the 2020 EA. APHIS explained the reason why treatment maps cannot be provided in the draft Environmental Assessments in the 2020 and 2021 EA's.