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Draft Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program

Esmeralda, Lincoln, Nye, and White Pine Counties, Nevada
EA Number: NV-21-02

Prepared by:

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February 01, 2021

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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

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Draft Site-Specific Environmental Assessment

Rangeland Grasshopper and Mormon Cricket Suppression Program
Esmeralda, Lincoln, Nye, and White Pine Counties, Nevada

I. Need for Proposed Action

A. Purpose and Need Statement

An infestation of grasshoppers or Mormon crickets may occur in Nevada, specifically Esmeralda, Lincoln, Nye, and White Pine counties. The Animal and Plant Health Inspection Service (APHIS) and Nevada Department of Agriculture (NDA) 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 stressing and/or causing the mortality of native and planted range plants or adjacent crops due to the feeding habits of large numbers of grasshoppers. The benefits of treatments including the suppressing of over abundant grasshopper populations to lower adverse impacts to range plants and adjacent crops. Such would decrease the economic impact to local agricultural operations and permit normal range plant utilization by wildlife and livestock. Some populations that may not cause substantial damage to native rangeland may require treatment due to the secondary suppression benefits resulting from the high value of adjacent crops and damage to revegetation programs. 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 March to September in Esmeralda, Lincoln, Nye, and White Pine counties.

This EA is prepared in accordance with the requirements under the National Environmental Policy Act of 1969 (NEPA) (42 United States Code § 4321 *et. seq.*) and the NEPA procedural requirements promulgated by the Council on Environmental Quality, United States Department of Agriculture (USDA), and APHIS. A decision will be made by APHIS based on the analysis presented in this EA, the results of public involvement, and consultation with other agencies and individuals. A selection of one of the program alternatives will be made by APHIS for the 2021 Control Program for Esmeralda, Lincoln, Nye, and White Pine counties.

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B. Background Discussion

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

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

The site-specific data used to make treatment decisions in real time is gathered during spring nymph surveys. The general site-specific data include: grasshopper densities, species complex, dominant species, dominant life stage, grazing allotment terrain, soil types, range conditions, local weather patterns (wind, temp., precipitation), slope and aspect for hatching beds, animal unit months (AUM's) present in grazing allotment, forage damage estimates, number of potential AUM's consumed by grasshopper population, potential AUM's managed for allotment and value of the AUM, estimated cost of replacement feed for livestock, rotational time frame for grazing allotments, number of livestock in grazing allotment. Baseline thresholds for Mormon crickets are two per square yard and grasshoppers are eight per square yard, though neither of those thresholds guarantees justification for treatment alone. These are all factors that are considered when determining the economic infestation level.

APHIS surveys grasshopper populations on rangeland in the Western United States, provides technical assistance on grasshopper management to land owners 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

[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.

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

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

Nevada Revised Statutes 561.245 provides authority to cooperate with and enter into contracts or agreements with the Federal government. Nevada Revised Statutes 555.2605 – 555.470 are laws on the custom application of pesticides and restricted use pesticides. These contain the requirements for a license to apply pesticides and certification to use and sell restricted use pesticides.

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 the suppression of grasshoppers on BLM system lands (Document # 15-8100-0870-MU, October 15, 2015). This MOU clarifies that APHIS would prepare and issue to the public site-specific environmental documents that evaluate potential impacts associated with proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents would be prepared under the APHIS NEPA implementing procedures with cooperation and input from BLM.

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

In September 2016, APHIS and the Bureau of Indian Affairs (BIA) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on the suppression of grasshoppers on BIA system lands. This MOU clarifies that APHIS would prepare and issue to the public site-specific environmental documents that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents would be

prepared under the APHIS NEPA implementation procedures with cooperation and input from the BIA.

The MOU further states that the responsible BIA official would request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on BIA land is necessary The BIA must also prepare 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 prepares and 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 the suppression of grasshoppers on FS system lands (Document # 19-8100-0573-MU, November 06, 2019). This MOU clarifies that APHIS would prepare and issue to the public site-specific environmental documentations that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents would be prepared under the APHIS NEPA implementation procedures with cooperation and input from the FS.

The MOU further states that the responsible FS official would request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on FS land is necessary The FS must also prepare a Pesticide Use Proposal (Form: FS-2100-2) for APHIS to treat infestations. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and FS prepares and approves the Pesticide Use Proposal.

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

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

C. About This Process

The NEPA process for grasshopper management is complicated by the fact that there is very little time between requests for treatment and the need for APHIS to act swiftly with respect to those requests. Surveys help to determine general areas, among the millions of

acres where harmful grasshopper infestations may occur in the spring of the following year. Survey data provides the best estimate of future grasshopper populations, while short-term climate or environmental factors change where the specific treatments will be needed. Therefore, examining specific treatment areas for environmental risk analysis under NEPA is typically not possible. At the same time, the program strives to alert the public in a timely manner to its more concrete treatment plans and avoid or minimize harm to the environment in implementing those plans.

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

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

APHIS uses the scoping process to enlist land managers and the public to identify alternatives and issues to be considered during the development of a grasshopper or Mormon cricket suppression program. Scoping was helpful in the preparation of the draft EAs. The process can occur formally and informally through meetings, conversations, or written comments from individuals and groups.

The current EIS provides a solid analytical foundation; however, it may not be enough to satisfy NEPA completely for actual treatment proposals. The program typically prepares a Draft EA tiered to the current EIS for each of the 17 Western States, or portion of a state, that may receive a request for treatment. The Draft EA analyzes aspects of environmental quality that could be affected by treatments in the area where grasshopper outbreaks are anticipated. The Draft EA will be made available to the public for a 30-day comment period. When the program receives a treatment request and determines that treatment is necessary, the specific site within the state will be evaluated to determine if environmental factors were thoroughly evaluated in the Draft EA. If all environmental issues were accounted for in the Draft EA, the program will prepare a Final EA and FONSI. Once the FONSI has been finalized copies of those documents will be sent to any parties that

submitted comments on the Draft EA, and to other appropriate stakeholders. To allow the program to respond to comments in a timely manner, the Final EA and FONSI will be posted to the APHIS website. The program will also publish a notice of availability in the same manner used to advertise the availability of the Draft EA.

II. Alternatives

To engage in comprehensive NEPA risk analysis APHIS must frame potential agency decisions into distinct alternative actions. These program alternatives are then evaluated to determine the significance of environmental effects. The 2002 EIS presented three alternatives: (A) No Action; (B) Insecticide Applications at Conventional Rates and Complete Area Coverage; and (C) Reduced Agent Area Treatments (RAATs), and their potential impacts were described and analyzed in detail. The 2019 EIS was tiered to and updated the 2002 EIS. Therefore the 2019 EIS considered the environmental background or 'No Action' alternative of maintaining the program that was described in the 2002 EIS and Record of Decision. The 2019 EIS also considered an alternative where APHIS would not fund or participate in grasshopper suppression programs. The preferred alternative of the 2019 EIS allowed APHIS to update the program with new information and technologies that not were analyzed in the 2002 EIS. Copies of the complete 2002 and 2019 EIS documents are available for review at 8775 Technology Way, Reno, NV 89521. These documents are also available at the Rangeland Grasshopper and Mormon Cricket Program web site, http://www.aphis.usda.gov/plant-health/grasshopper.

All insecticides used by APHIS for grasshopper suppression are used in accordance with applicable product label instructions and restrictions. Representative product specimen labels can be accessed at the Crop Data Management Systems, Incorporated web site at www.cdms.net/manuf/manuf.asp. Labels for actual products used in suppression programs will vary, depending on supply issues. All insecticide treatments conducted by APHIS will be implemented in accordance with APHIS' treatment guidelines and operational procedures, included as Appendix 1 to this 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 Esmeralda, Lincoln, Nye, and White Pine counties, and therefore the environmental baseline should describe a no treatment scenario.

A. No Suppression Program Alternative

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

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

Under Alternative B, the Preferred Alternative, APHIS would manage a grasshopper treatment program using techniques and tools discussed hereafter to suppress outbreaks. The insecticides available for use by APHIS include the U.S. Environmental Protection Agency (USEPA) registered chemicals carbaryl, diflubenzuron, and malathion. These chemicals have varied modes of action. Carbaryl and malathion work by inhibiting acetylcholinesterase (enzymes involved in nerve impulses) and diflubenzuron inhibits the formation of chitin by insects. APHIS would make a single application per 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, as a result of treatment delays, then carbaryl or rarely malathion are the remaining control options. Certain species are more susceptible to carbaryl bait, and sometimes that pesticide is the best control option.

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

- 8.0-16.0 fluid ounces (0.25-0.50 pound active ingredient (lb a.i.)) of carbaryl ULV spray per acre;
- 2.0-10.0 pounds (0.04-0.20 lb a.i.) of 2 percent carbaryl bait per acre;
- 2.0-10.0 pounds (0.10-0.50 lb a.i.) of 5 percent carbaryl bait per acre;
- 0.75 or 1.0 fluid ounce (0.012-0.016 lb a.i.) of diflubenzuron per acre; or
- 4.0-8.0 fluid ounces (0.31-0.62 lb a.i.) of malathion per acre.

The width of the area not directly treated (the untreated swath) under the RAATs approach is not standardized. The proportion of land treated in a RAATs approach is a complex function of the rate of grasshopper movement, which is a function of developmental stage, population density, and weather (Narisu et al., 1999, 2000), as well as the properties of the

insecticide (insecticides with longer residuals allow wider spacing between treated swaths). Foster et al. (2000) left 20 to 50% of their study plots untreated, while Lockwood et al. (2000) left 20 to 67% of their treatment areas untreated. Currently the grasshopper program typically leaves 50% of a spray block untreated for ground applications where the swath width is between 20 and 45 feet. For aerial applications, the skipped swath width is typically no more than 20 feet for malathion, 100 feet for carbaryl and 200 feet for diflubenzuron. The selection of insecticide and the use of an associated swath widths is site dependent. Rather than suppress grasshopper populations to the greatest extent possible, the goal of this method is to suppress grasshopper populations to less than the economic infestation level.

Contractors use of Trimble GPS Navigation or equivalent system 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 applicator. All sensitive sites are reviewed in the daily briefing with APHIS personnel including the applicator working on the treatment site.

Typical treatment designs in Nevada have historically used 1.0 fl. oz. of Diflubenzuron per acre with 50% coverage. Dependent on the size of the treatment and the aircraft capabilities, previous treatments had spacing of 150-foot swath widths alternating between treated and untreated swaths.

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

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

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

III. Affected Environment

A. Description of Affected Environment

The proposed suppression program area included in the EA encompasses 26,396,800 acres (41,245 sq. mi.) within southern and central Nevada. Approximately 90% of the land area is classified as Federal with the remainder State and private lands. Most of the area is high desert, Mojave Desert, and mountain country. The lowest elevation is approximately 500 feet and 13,000 feet elevation at its highest. A map of the program suppression area is attached hereto as Appendix B. The actual program area that may be treated will be determined by surveys done in early spring.

The area is semi-arid and the majority of precipitation falls from October to June, as a result of Pacific storms. Monsoon storms occur in Lincoln and White Pine counties during mid to late summer. The precipitation varies from 4 inches a year in the valleys to over 20 inches a year in the mountains. Normally, the area is snow free from June to October, but snow can occur at any time. The soils are in climatic groups including desert, semi desert, upland mountain and high mountain with some irrigated soils. Agriculture areas include native and improved rangeland, pasture and cropland. Treatment guidelines in Appendix A would be followed to provide the least effect on soils.

Major waterways include, but are not limited to: White River, Egan Creek, Duck Creek, Spring Valley Creek, Muncy Creek, Bull Creek, Wilson Creek, Cobb Creek, Camp Valley Creek, Snake Creek, Smith Creek, Swan Creek, Illipah Creek, East Creek, Bird Creek, Berry Creek, Steptoe Creek, Reese River, Chiatovich Creek, Indian Garden Creek, Ophir Creek, Jeff Creek, Cherry Creek, Jefferson Creek, Barley Creek, Amargosa River, Hot Creek, Bull Creek, Currant Creek, Cloverdale Creek, Moores Creek, Clear Creek, Barker Creek, Bowman Creek, Peavine Creek, Pine Creek, Savory Creek, Tulle Creek, Sawmill Creek, Willow Creek, Snowball Creek, Mosquito Creek, San Juan Creek, Cottonwood Creek, and Steward Creek.

Recreation activities vary considerably throughout the area. Primary activities include hunting, fishing, off-road vehicle use, hiking, backpacking, rockhounding and horseback riding. Related uses are camping, sightseeing, photography and nature study. Overall, primary use is low except in developed recreation sites and along major reservoirs. Major recreational areas in this Region include: Lunar Crater Volcanic Field, Railroad Valley Wildlife Management Area, Great Basin National Park, Cathedral Gorge State Park, Spring Valley State Park, Cave Lake State Park, Echo Canyon State Park, Ruby Lake National Wildlife Refuge, Ward Charcoal Ovens State Historic Park, Death Valley National Monument, and Boundary Peak. The water resources provide water for wildlife, wild horses/burros, and domestic livestock use as well as habitat for wildlife.

The Railroad Valley, Sunnyside, and Ash Meadows Management areas are within the assessment area. Ruby Lake Wildlife Refuge and Great Basin National Park are within White Pine County. Nellis Airforce Base Bombing and Gunnery Range as well as the Nevada Test Site are within the assessment area. The Humboldt-Toiyabe National Forest is also within the area.

The principle rangeland vegetation in the area is: Bitterbrush, Big Sagebrush, Indian ricegrass, Winterfat, Greasewood, Horsebrush, Rabbitbrush, Paintbrush, Perennial bunchgrasses, and Blue grasses.

B. Site-Specific Considerations

1. Human Health

Population centers within the district include the towns of Goldfield, Coaldale, Dyer, Lida, Beatty, Amargosa Valley, Pahrump, Ruth, Cherry Creek, Pioche, Panaca, Lund, Preston, Ely, McGill, Baker, Currant, Duckwater, Manhattan, Warm Springs, Tonopah, Round Mountain, Sunnyside, and Ione. No ULV aerial applications of malathion, cabaryl, or diflubenzuron would be conducted over these congested areas. The major schools are

located within city limits of these towns. The population of the four counties is approximately 59,870 (U.S. Census Bureau, March 2018).

Four Indian Reservations exist within the boundaries of the assessment area. They are Goshute, Yomba, Duckwater, and Ely Shoshone Indian Reservation.

Potential exposures to the general public from traditional application rates are infrequent and of low magnitude. Program use of carbaryl, malathion and diflubenzuron has occurred routinely in many past programs, and there is a lack of any adverse health effects reported from these projects. Therefore, routine safety precautions as listed on chemical labels would continue to provide adequate protection of worker health. Immunotoxic effects from carbaryl and malathion exposure are generally expected at concentrations much higher than those from grasshopper applications, but individuals with allergic or hypersensitive reactions to the insecticides or other chemicals in the formulated product could be affected. These individuals would be advised to avoid treatment areas at the time of application until the insecticides has time to dry on the treated vegetation.

2. Nontarget Species

Proposed treatment areas have been tentatively identified in Northern Nevada. There are species of concern in some of the treatment blocks. Should other areas warrant treatment, the local land managers will be consulted.

a) Migratory birds

The U.S. Fish and Wildlife Service (USFWS) list of migratory bird species in Nevada is attached (Appendix C – Table 1). Migratory bird species of concern will be addressed through local consultation with land managers and USFWS.

b) Endangered Species

The U.S. Fish and Wildlife Service (USFWS) list of endangered, threatened, candidate and proposed species of concern in Nevada is attached (Appendix C – Table 1).

Species for Federal listing state-listed species, and/or other sensitive species identified by state or federal agencies within the area include but are not limited to: Columbia Spotted frog, Greater sage-grouse, Southwestern Willow Flycatcher, Yellow-Billed Cuckoo, Bald Eagle, Desert dace, Lahontan and Paiute cutthroat trout.

c) Bald and Golden Eagles

Bald and golden eagles are known to occur in the proposed treatment areas. Bald and golden eagle populations and their nesting sites will be identified prior to treatment through local consultation with land managers and USFWS.

d) Additional Species of Concern

Game species known to occur within the general areas proposed for spraying include Bighorn sheep, mule deer, pronghorn antelope, mountain lion, cottontail rabbit mourning dove, sage grouse, chucker, Hungarian partridge and several species of waterfowl. A number of cold and warm water game fish occur in the various lakes, streams and reservoirs in the area. Wild horses and burros are managed by the BLM on numerous herd

management areas throughout the proposed suppression program area. It is anticipated that aerial control programs will not be in areas where populations of wild horses/burros are found.
A diversity of non-game wildlife occurs in the area (birds, reptiles, amphibians, and mammals) including wild horses. The greatest abundance and diversity of most species occurs in riparian and wetland habitat types.

3. Socioeconomic Issues

Recreation use is moderate over most of the affected area. There are several dispersed camping sites. Hunting seasons increase recreation use in the form of dispersed camping and general hunting activity. Hunting season occurs later in the year during a time when grasshopper 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.

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

A substantial threat to the animal productivity of these rangeland areas is the proliferation of grasshopper 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. Rural and social values and lifestyles, in conjunction with the long heritage of ranching and farming continue to this

day, dating back to the earliest pioneers in Nevada, who shaped the communities and enterprises that make up much of Nevada. The rural Western lifestyle also contributes to tourism in the area, presenting to travelers a flavor of the west through tourist-oriented goods and services, photography of sheep bands or cattle in pastoral settings and scheduled events.

Ranchers displaced from public lands due to early loss of forage from 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 years (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.

4. Cultural Resources and Events

Federal and public lands that are part of the Region's visual and cultural resources include the Humboldt-Toiyabe National Forest, Great Basin National Park Desert National Wildlife Refuge, and numerous wilderness study areas administered by the BLM in the proposed suppression program area.

A broad variety and number of activities have occurred, are occurring or would occur throughout the area of concern that affects cultural resources. These activities and any cumulative impacts associated with them would occur regardless of whether or not grasshoppers are treated.

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

With no treatment of grasshoppers on public lands, aerial application of insecticides off public lands would likely increase. However, most if not all of the areas likely to be treated have been heavily disturbed in the past, and any artifacts on them likely impacted.

Consequently, it is unlikely that these aerial treatments would result in additional impacts on cultural properties.

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

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

To ensure that historical or cultural sites, monuments, buildings or artifacts of special concern are not adversely affected by program treatments, APHIS would confer with BLM, Forest Service or other appropriate land management agency or cultural resource specialists on a local level to protect these areas of special concern. APHIS also would confer with the appropriate tribal authority and with the BIA office at a local level to ensure that the timing and location of planned program treatments do not coincide or conflict with cultural events or observances, such as sundances, on tribal lands.

5. Special Considerations for Certain Populations

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

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

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

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

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

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

Treatments used for grasshopper programs are primarily conducted on open rangelands where children would not be expected to be present during treatment or enter during the restricted entry period after treatment. Based on the 2019 review of the three insecticides and their use in programs, the risk assessment concludes that the likelihood of children being exposed to insecticides from a grasshopper program is very slight and that no disproportionate adverse effects to children are anticipated over the negligible effects to the general population.

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 Draft 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, diflubenzuron, or malathion, depending upon the various factors related to the grasshopper outbreak and the site-specific characteristics. The use of an insecticide would typically occur at half the conventional application rates following the RAATs strategy. APHIS would apply a single treatment to affected rangeland areas to suppress grasshopper outbreak populations by a range of 35 to 98 percent, depending upon the insecticide used.

a) Carbaryl

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

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

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

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

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

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

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

Carbaryl can cause cholinesterase inhibition (i.e., overstimulate the nervous system) in humans resulting in nausea, headaches, dizziness, anxiety, and mental confusion, as well as convulsions, coma, and respiratory depression at high levels of exposure (NIH, 2009a;

Beauvais, 2014). USEPA classifies carbaryl as "likely to be carcinogenic to humans" based on vascular tumors in mice (USEPA, 2007, 2015a, 2017a).

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

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

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

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

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b) Diflubenzuron

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

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

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

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

Risk is low for most non-target species based on laboratory toxicity data, USEPA approved use rates and patterns, and additional mitigations such as the use of lower rates and RAATs

that further reduces risk. Risk is greatest for sensitive terrestrial and aquatic invertebrates that may be exposed to diflubenzuron residues.

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

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

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

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

Diflubenzuron is moderately toxic to spiders and mites (USDA APHIS, 2018c). Deakle and Bradley (1982) measured the effects of four diflubenzuron applications on predators of *Heliothis* spp. at a rate of 0.06 lb a.i./ac and found no effects on several predator groups. This supported earlier studies by Keever et al. (1977) that demonstrated no effects on the arthropod predator community after multiple applications of diflubenzuron in cotton fields. Grasshopper integrated pest management (IPM) field studies have shown diflubenzuron to have a minimal impact on ants, spiders, predatory beetles, and scavenger beetles. There was

no significant reduction in populations of these species from seven to 76 days after treatment. Although ant populations exhibited declines of up to 50 percent, these reductions were temporary, and population recovery was described as immediate (Catangui et al., 1996).

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

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

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

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

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

requirements, program measures designed to reduce exposure to the public, and low toxicity to mammals.

c) Malathion

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

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

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

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

USEPA found malathion moderately toxic to birds on a chronic basis, slightly toxic to mammals through dietary exposure, and acutely toxic to aquatic species (including freshwater as well as estuarine and marine species) (USEPA, 2000b, 2016b). Toxicity to aquatic vertebrates such as fish and larval amphibians, and aquatic invertebrates is variable based on test species and conditions. The data available on impacts to fish from malathion

suggest effects could occur at levels above those expected from program applications. Consumption of contaminated prey is not expected to be a significant pathway of exposure for aquatic species based on expected residues and malathion's BCF (USEPA, 2016a; USDA APHIS, 2018d). Indirect effects to fish from impacts of malathion applications to aquatic plants are not expected (USDA APHIS, 2018d).

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

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

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

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

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

and implementation of preferred program measures such as RAATs (USDA APHIS, 2018d).

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

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

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

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

d) Reduced Area Agent Treatments (RAATs)

The use of RAATS is the most common application method for all program insecticides and would continue to be so, accept in rare pest conditions that warrant full coverage and higher rates. The goal of the RAATs strategy is to suppress grasshopper populations to a desired level, rather than to reduce those populations to the greatest possible extent. This strategy has both economic and environmental benefits. APHIS would apply a single application of insecticide per year, typically using a RAATs strategy that decreases the rate of insecticide applied by either using lower insecticide spray concentrations, or by

alternating one or more treatment swaths. Usually RAATs applications use both lower concentrations and skip treatment swaths. The RAATs strategy suppresses grasshoppers within treated swaths, while conserving grasshopper predators and parasites in swaths that are not treated.

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

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

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

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

B. Other Environmental Considerations

1. Cumulative Impacts

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

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

Potential cumulative impacts associated with the Preferred Alternative are not expected to be significant because the program applies an insecticide application once during a treatment. The program may treat an area with different insecticides but does not overlap the treatments. The program does not mix or combine insecticides. Based on historical outbreaks in the United States, the probability of an outbreak occurring in the same area where treatment occurred in the previous year is unlikely; however, given time, populations eventually will reach economically damaging thresholds and require treatment. The insecticide application reduces the insect population down to levels that cause an acceptable level of economic damage. The duration of treatment activity, which is relatively short since it is a one-time application, and the lack of repeated treatments in the same area in the same year reduce the possibility of significant cumulative impacts.

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

The insecticides proposed for use in the program have a variety of agricultural and non-agricultural uses. There may be an increased use of these insecticides in an area under suppression when private, State, or Federal entities make applications to control other pests. However, 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."

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

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

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

In past grasshopper programs, the U.S. Department of the Interior's (USDI) Bureau of Land Management or Bureau of Indian Affairs have notified the appropriate APHIS State Plant

Health Director when any new or potentially threatening grasshopper infestations is discovered on BLM lands or tribal lands held in trust and administered by BIA. Thus, APHIS has cooperated with BIA when grasshopper programs occur on Indian tribal lands. For local Indian populations, APHIS program managers would work with BIA and local tribal councils to communicate information to tribal organizations and representatives when programs have the potential to impact the environment of their communities, lands or cultural resources. In past grasshopper programs, APHIS has worked cooperatively with American Indian groups and would continue to do so in the future.

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.

The human health risk assessment for the 2019 EIS analyzed the efforts of exposure to children from the three insecticides. Based on review of the insecticides and their use in the grasshopper program, the risk assessment concluded that the likelihood of children being exposed to insecticides is very slight and that no disproportionate adverse effects to children are anticipated over the negligible effects to the general population. Treatments are conducted 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.

Impacts on children would be minimized by the implementation of the Treatment Guidelines:

Aerial Broadcast Applications of Liquid Insecticides

- Notify all residents in treatment areas, or their designated representatives, prior to proposed operations. Advise them of the control method to be used, the proposed method of application, and precautions to be taken (e.g., advise parents to keep children and pets indoors during ULV treatment). Refer to label recommendations related to restricted entry period.

- No treatments would occur over congested urban areas. For all flights over congested areas, the contractor must submit a plan to the appropriate FAA District Office and this office must approve of the plan; a letter of authorization signed by

the city or town authorities must accompany each plan. Whenever possible, plan aerial ferrying and turnaround routes to avoid flights over congested areas, bodies of water, and other sensitive areas that are not to be treated.

Aerial Application of Dry Insecticidal Bait

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

Ultra-Low-Volume Aerial Application of Liquid Insecticides

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

Based on the analysis in the protection measures, we have determined that there would be no significant impact within any potential treatment zone of the area of concern.

4. Tribal Consultation

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

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

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

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

APHIS will support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or reducing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Impacts are minimized as a result of buffers to water, habitat,

nesting areas, riparian areas, and the use of RAATs. For any given treatment, only a portion of the environment will be treated, therefore minimizing potential impacts to migratory bird populations.

6. Endangered Species Act

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

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

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

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

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

APHIS submitted a programmatic biological assessment for grasshopper suppression in the 17-state program area and requested consultation with USFWS on March 9, 2015. With the incorporation and use of application buffers and other operational procedures APHIS anticipates that any impacts associated with the use and fate of program insecticides will be insignificant and discountable to listed species and their habitats. Based on an assessment of

the potential exposure, response, and subsequent risk characterization of program operations, APHIS concludes the proposed action is not likely to adversely affect listed species or critical habitat in the program area. APHIS has requested concurrence from the USFWS on these determinations. Until this programmatic Section 7 consultation with USFWS is completed, APHIS will conduct consultations with USFWS field offices at the local level.

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

APHIS personnel have been conferring with the U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office to discuss section 7 consultations as required by the Endangered Species Act of 1973 annually since 2007. On June 25 2018, USFWS provided a letter of concurrence to APHIS personnel for the 2018, 2019, and 2020 treatment seasons. Included in Appendix C is the U.S. Fish and Wildlife Service listing of Nevada endangered, threatened, proposed, and candidate species (Table 1). As of January 2021, APHIS personnel are working with the local FWS office to seek concurrence prior to the treatment season.

The 1995 biological opinion issued by USFWS lists the mitigations to be followed by APHIS when conducting a suppression program to control grasshoppers with insecticides other than diflubenzuron. This list is included in Appendix C (Table 2). Mitigation measures for use of malathion and carbaryl for new listings (since 1995) of threatened, endangered and proposed species that have not been included in formal Section 7 consultation are also included in Appendix C (Table 3). Mitigation measures as required by USFWS for threatened, endangered, and proposed species incorporating the use of diflubenzuron on grasshopper suppression programs are included in Table 3.

APHIS is not required to develop mitigation buffer zones for candidate or other species of concern. The Columbia spotted frog (Great Basin population) (*Rana luteiventris*) and Greater Sage Grouse are species of concern and located within our proposed treatment areas for 2021. However, species of concern receive no legal protection under the Act, but consideration of these species will be discussed with the local land managers prior to any treatments to assist in conservation efforts. Agreed upon mitigation measures between USFWS, NDOW, NDA, and APHIS will be followed. Yearly local program consultations with the requesting agency would determine if mitigation measures would allow a suppression program to be done.

7. Bald and Golden Eagle Protection Act

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

feeding, reducing chances of survival. USFWS has provided recommendations for avoiding disturbance at foraging areas and communal roost sites that are applicable to grasshopper management programs (USFWS, 2007).

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

8. Additional Species of Concern

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

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

Because grasshopper numbers are so high in an outbreak year, treatments would not likely reduce the number of grasshoppers below levels present in a normal year. 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.

Through an agreement between Nevada Department of Agriculture (NDA), Nevada Department of Wildlife (NDOW), USDA Plant Protection and Quarantine (PPQ), the Bureau of Land Management (BLM), and the United Stated Fish and Wildlife Service (USFWS) all parties agree to limit the use of insecticides within sage-grouse habitat for grasshopper and Mormon cricket control during times that would have the greatest chance of disturbing sage-grouse during critical nesting and brooding periods. For aerial applications of Dimilin, no applications will occur within three miles of active and pending sage grouse leks during the intervals of one hour before sunrise to two hours after sunrise, and from two hours before sunset to one hour after sunset between the months of March and May.

Ground applications will use specially formulated carbaryl baits to mitigate potential impacts to non-target species. No carbaryl bait will be applied within three miles of any active or pending sage grouse lek. Through consultation with NDOW and BLM, areas where crops, roads, or urban areas are to be protected, two track or other categories of roads may be utilized to distribute carbaryl bait within the sage grouse buffer zone, up to one mile from the area to be protected. If a lek is found within one mile from the protected area, further consultation will be had with NDOW and USFWS. Any ground baiting activity approved by NDOW and USFWS within the sage grouse buffer zone using carbaryl bait

would also comply with the time frame constraints consistent with that of the aerial applications of Dimilin.

There are also biocontrol programs established by various land managers as well as county, state, and federal agencies. Nevada Department of Agriculture (NDA) works in conjunction with APHIS personnel through a cooperative agreement. NDA also maintains a healthy biocontrol program. All biocontrol sites are mapped and logged for relocation purposes. If a biocontrol site overlapped with a proposed treatment, APHIS and NDA would agree upon mitigation measures prior to beginning treatment. Biocontrol populations established by other land managers would be the responsibility of the land manager to identify to APHIS personnel during site specific consultation between APHIS and the land manager. If applicable, describe how your program will work with BLM, States, and any other appropriate agencies when grasshopper treatments are proposed in areas where sage grouse are present, or any other species that is known to be of special interest or concern to federal or state agencies or the public.

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

9. Fires and Human Health Hazards

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

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

The safety data sheet for each insecticide identifies these combustion products for each insecticide as well as recommendations for PPE. The PPE is similar to what typically is used in fighting wildfires. Material applied in the field will be at a much lower concentration than what would occur in a fire involving a concentrated formulation.

Therefore, the PPE worn by rangeland firefighters would also be protective of any additional exposure resulting from the burning of residual insecticides.

10. Cultural and Historical Resources

Federal actions must seek to avoid, minimize, and mitigate potential negative impacts to cultural and historic resources as part of compliance with the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act of 1979, and NEPA. Section 106 of the NHPA requires Federal agencies to provide the Advisory Council on Historic Preservation with an opportunity to comment on their findings.

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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**Indicates past consultation*

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Appendix A - APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program

FY-2021 Treatment Guidelines
Version 03/09/2020

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

General Guidelines for Grasshopper / Mormon Cricket Treatments

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

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

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

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

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

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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.

<u>Operational Procedures</u>

GENERAL PROCEDURES FOR ALL AERIAL AND GROUND APPLICATIONS

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

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

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

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C. Malathion ULV spray
D. Chlorantraniliprole

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

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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:

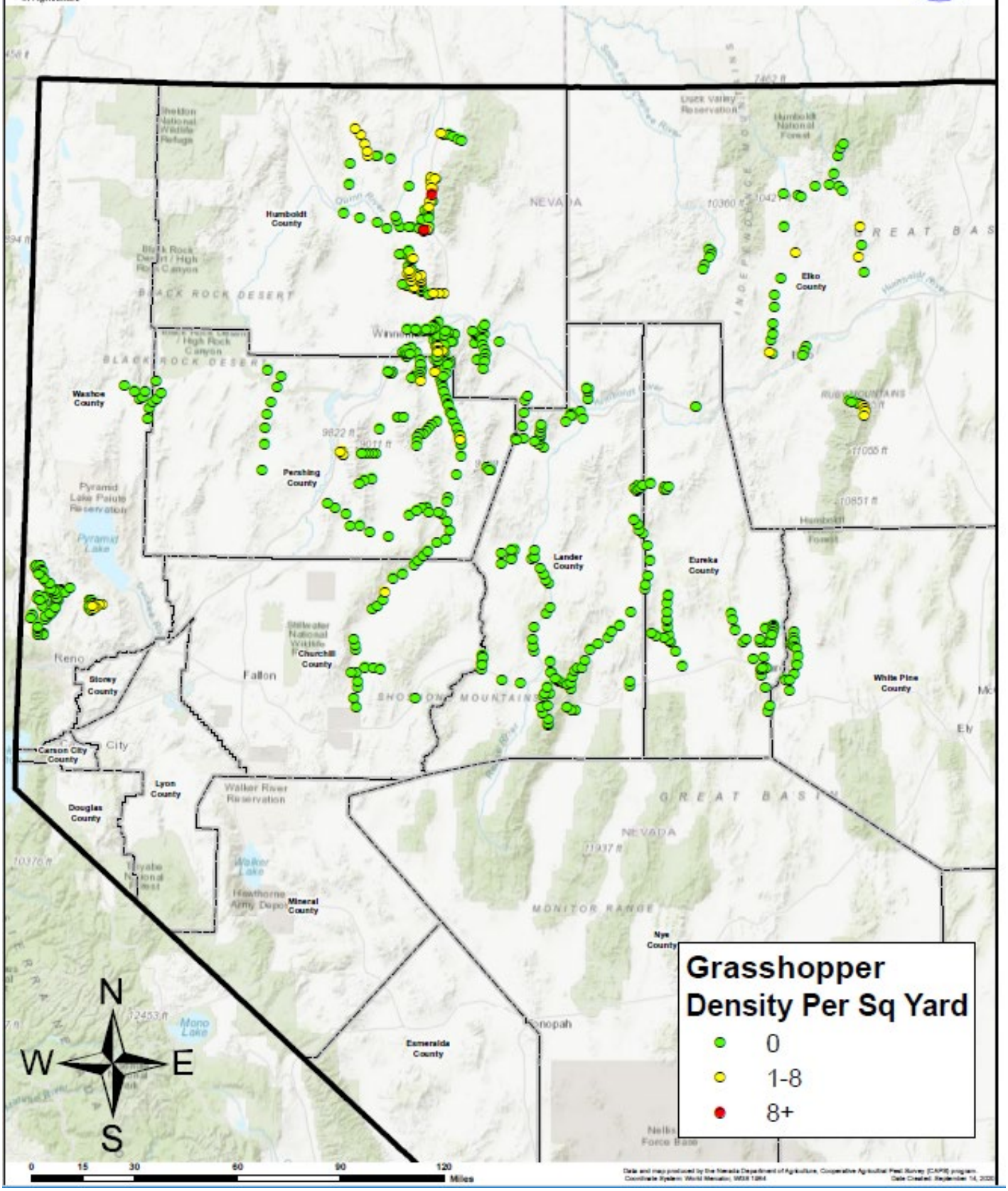
    a. Wind velocity exceeds 10 miles per hour (unless state law requires lower wind speed);
    b. Rain is falling or is imminent;
    c. Dew is present over large areas within the treatment block;
    d. There is air turbulence that could affect the spray deposition;
    e. Temperature inversions (ground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

2020 Grasshopper Survey Cumulative



2020 Mormon Cricket Survey Cumulative

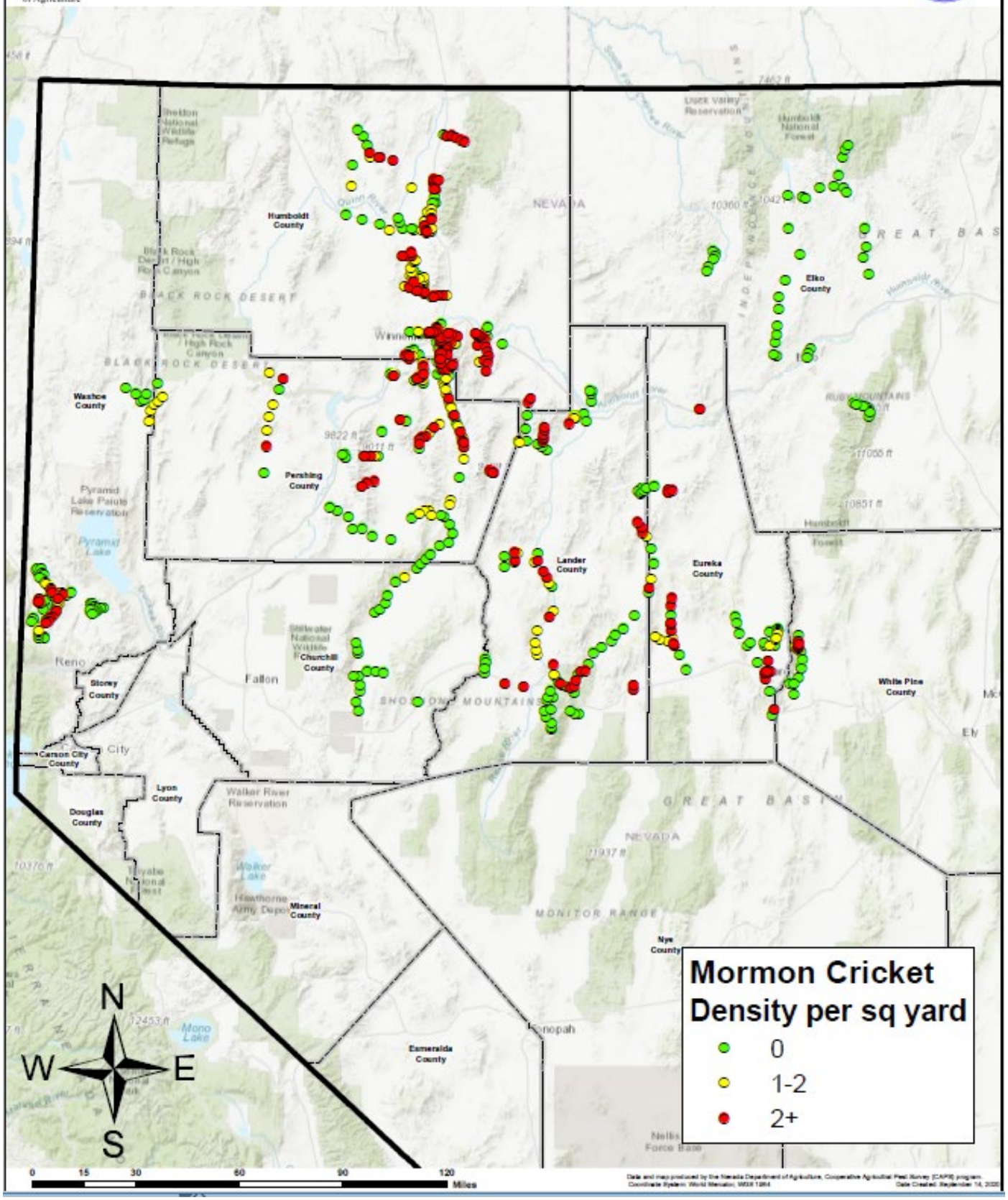


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Table 1

United States Department of the Interior
FISH AND WILDLIFE SERVICE

Southern Nevada Fish And Wildlife Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130-2301
Phone: (702) 515-5230 Fax: (702) 515-5231

Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
Phone: (775) 861-6300 Fax: (775) 861-6301
http://www.fws.gov/nevada/

In Reply Refer To: January 22, 2021

Consultation Code: 08ENVS00-2021-SLI-0061 and 08ENVD00-2021-SLI-0132
Event Code: 08ENVS00-2021-E-00102 and 08ENVD00-2021-E-00390
Project Name: NV-21-02

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

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:

Southern Nevada Fish And Wildlife Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130-2301
Phone: (702) 515-5230 Fax: (702) 515-5231

Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
(775) 861-6300

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Project Summary

Consultation Code: 08ENVS00-2021-SLI-0061 and 08ENVD00-2021-SLI-0132

Event Code: 08ENVS00-2021-E-00102 and 08ENVD00-2021-E-00390

Project Name: NV-21-02

Project Type: Agriculture

Project Description: Site Specific Environmental Assessment for Rangeland Grasshopper and Mormon Cricket Suppression Program in Esmeralda, Lincoln, Nye, and White Pine counties in Nevada.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.066835499999996,-116.1033901956489,14z

Counties: Esmeralda, NV | Lincoln, NV | Nye, NV | White Pine, NV

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Endangered Species Act Species

There is a total of 31 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
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened
Yuma Clapper Rail *Rallus longirostris yumanensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3505	Endangered

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Reptiles

NAME	STATUS
Desert Tortoise *Gopherus agassizii* Population: Wherever found, except AZ south and east of Colorado R., and Mexico There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4481	Threatened

Fishes

NAME	STATUS
Ash Meadows Amargosa Pupfish *Cyprinodon nevadensis mionectes* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/529	Endangered
Ash Meadows Speckled Dace *Rhinichthys osculus nevadensis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3415	Endangered
Big Spring Spinedace *Lepidomeda mollispinis pratensis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5397	Threatened
Devils Hole Pupfish *Cyprinodon diabolis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7409	Endangered
Hiko White River Springfish *Crenichthys baileyi grandis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7004	Endangered
Lahontan Cutthroat Trout *Oncorhynchus clarkia henshawi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3964	Threatened
Moapa Dace *Moapa coriacea* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1771	Endangered
Pahranagat Roundtail Chub *Gila robusta jordani* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/782	Endangered

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NAME	STATUS
Pahrump Poolfish *Empetrichthys latos* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7281	Endangered
Paiute Cutthroat Trout *Oncorhynchus clarkia seleniris* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7281	Threatened
Railroad Valley Springfish *Crenichthys nevadae* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/302	Threatened
Razorback Sucker *Xyrauchen texanus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/530	Endangered
Virgin River Chub *Gila seminuda (=robusta)* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1772	Endangered
Warm Springs Pupfish *Cyprinodon nevadensis pectoralis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4823	Endangered
White River Spinedace *Lepidomeda albivallis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6900	Endangered
White River Springfish *Crenichthys baileyi baileyi* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5633	Endangered
Woundfin *Plagopterus argentissimus* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/49	Endangered

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Insects

NAME	STATUS
Ash Meadows Naucorid *Ambrysus amargosus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2564	Threatened

Flowering Plants

NAME	STATUS
Amargosa Niterwort *Nitrophilia mohavensis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4072	Endangered
Ash Meadows Blazingstar *Mentzelia leucophylla* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4582	Threatened
Ash Meadows Gumplant *Grindella fraxinipratensis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8580	Threatened
Ash Meadows Ivesia *Ivesia kingie var. eremica* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2411	Threatened
Ash Meadows Milk-vetch *Astragalus phoenix* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4271	Threatened
Ash Meadows Sunray *Enceliopsis nudicaulis var. corrugata* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5707	Threatened
Spring-loving Centaury *Centaurium namophilum* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5559	Threatened

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NAME	STATUS
Ute Ladies'-tresses *Spiranthes diluvialis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2159	Threatened

Conifers and Cycads

NAME	STATUS
Whitebark Pine *Pinus albicaulis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1748	Proposed Threatened

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Critical habitats

There are 14 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Ash Meadows Amargosa Pupfish *Cyprinodon nevadensis mionectes* https://ecos.fws.gov/ecp/species/529#crithab	Final
Ash Meadows Blazingstar *Mentzelia leucophylla* https://ecos.fws.gov/ecp/species/4582#crithab	Final
Ash Meadows Gumplant *Grindelia fraxinipratensis* https://ecos.fws.gov/ecp/species/8580#crithab	Final
Ash Meadows Ivesia *Ivesia kingii var. eremica* https://ecos.fws.gov/ecp/species/2411#crithab	Final
Ash Meadows Milk-vetch *Astragalus phoenix* https://ecos.fws.gov/ecp/species/4271#crithab	Final
Ash Meadows Naucorid *Ambrysus amargosus* https://ecos.fws.gov/ecp/species/2564#crithab	Final
Ash Meadows Speckled Dace *Rhinichthys osculus nevadensis* https://ecos.fws.gov/ecp/species/3415#crithab	Final
Ash Meadows Sunray *Enceliopsis nudicaulis var. corrugata* https://ecos.fws.gov/ecp/species/5707#crithab	Final
Big Spring Spinedace *Lepidomeda mollispinis pratensis* https://ecos.fws.gov/ecp/species/5397#crithab	Final
Desert Tortoise *Gopherus agassizii* https://ecos.fws.gov/ecp/species/4481#crithab	Final
Hiko White River Springfish *Crenichthys* https://ecos.fws.gov/ecp/species/7004#crithab	Final
Railroad Valley Springfish *Crenichthys nevadae* https://ecos.fws.gov/ecp/species/302#crithab	Final

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NAME	STATUS
Southwestern Willow Flycatcher *Empidonax traillii extimus* https://ecos.fws.gov/ecp/species/6749#crithab	Final
Spring-loving Centaury *Centaurium namophilum* https://ecos.fws.gov/ecp/species/5559#crithab	Final
White River Spinedace *Lepidomeda albivallis* https://ecos.fws.gov/ecp/species/302#crithab	Final
White River Springfish *Crenichthys baileyi baileyi* https://ecos.fws.gov/ecp/species/5633#crithab	Final

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USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

The following FWS National Wildlife Refuge Lands and Fish Hatcheries lie fully or partially within your project area:

FACILITY NAME	ACRES
Ash Meadows National WildlifeRefuge	24,300
Ash Meadows National Wildlife Refuge Hcr 70, Box 610z Amargosa Valley, NV 89020-0115 (775) 372-5435 https://www.fws.gov/refuges/profiles/index.cfm?id=84554	
Desert National Wildlife Range	1,620,000
Desert National Wildlife Range Desert Nwr Hcr 38, Box 700 Las Vegas, NV 89124-8402 (702) 879-6110 https://www.fws.gov/refuges/profiles/index.cfm?id=84555	
Pahranagat National Wildlife Refuge	4,650
Pahranagat National Wildlife Refuge P.O. Box 510 Alamo, NV 89001-0510 (775) 725-3417 https://www.fws.gov/refuges/profiles/index.cfm?id=84551	
Ruby Lake National Wildlife Refuge	41,100
Ruby Lake National Wildlife Refuge Hc 60 Box 860 Ruby Valley, NV 89833-9802 (775) 779-2237 https://www.fws.gov/refuges/profiles/index.cfm?id=84570	

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Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Bendire's Thrasher *Toxostoma bendirei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9435	Breeds Mar 15 to Jul 31

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NAME	BREEDING SEASON
Black Rail *Laterallus jamaicensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/7717	Breeds Mar 1 to Sep 15
Black Rosy-finch *Leucosticte atrata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9460	Breeds Jun 15 to Aug 31
Black-chinned Sparrow *Spizella atrogularis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9447	Breeds Apr 15 to Jul 31
Brewer's Sparrow *Spizella breweri* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9291	Breeds May 15 to Aug 10
Burrowing Owl *Athene cunicularia* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9737	Breeds Mar 15 to Aug 31
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jan 1 to Dec 31
Costa's Hummingbird *Calypte costae* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10
Golden Eagle *Aquila chrysaetos* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/1680	Breeds Dec 1 to Aug 31
Gray Vireo *Vireo vicinior* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8680	Breeds May 10 to Aug 20

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NAME	BREEDING SEASON
Green-tailed Towhee *Pipilo chlorurus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9444	Breeds May 1 to Aug 10
Lawrence's Goldfinch *Carduelis lawrencei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Le Conte's Thrasher *toxostoma lecontei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8969	Breeds Feb 15 to Jun 20
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Lewis's Woodpecker *Melanerpes lewis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Long-billed Curlew *Numenius americanus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5511	Breeds Apr 1 to Jul 31
Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Pinyon Jay *Gymnorhinus cyanocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15

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NAME	BREEDING SEASON
Rufous Hummingbird *selasphorus rufus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Sage Thrasher *Oreoscoptes montanus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9433	Breeds Apr 15 to Aug 10
Sagebrush Sparrow *Artemisiospiza nevadensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Jul 31
Virginia's Warbler *Vermivora virginiae* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9441	Breeds May 1 to Jul 31
Whimbrel *Numenius phaeopus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9483	Breeds elsewhere
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5
Williamson's Sapsucker *Sphyrapicus thyroideus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8832	Breeds May 1 to Jul 31
Willow Flycatcher *Empidonax traillii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31

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Table 2

Part I
Grasshopper and Mormon Cricket Control Program Protection Measures Agreed to by APHIS to Protect Threatened, Endangered, or Proposed Species

Mammals

Common Name	Scientific Name	Listing Status	States
A. Black-footed ferret	*Mustela nigripes*	E, EXPN	CO, KS, MT, ND, NE, SD, UT, WY
Program personnel will consult with applicable Federal and/or State agencies in regard to the presence of black-footed ferrets prior to beginning any control programs. Each documented and verified occurrence of interest to the program will be considered and plans for adequate protection adopted in consultation with the local Fish and Wildlife Service (Service) field offices.			
B. Utah prairie dog	*Cynomys parvidens*	T	UT
Malathion and acephate will not be used within ¼ mile of any Utah prairie dog town.			
C. Hualapai Mexican vole	*Microtus mexicanus hualpaiensis*	E	AZ
One-quarter mile no malathion or acephate treatment buffer around occupied areas. Contact the local Service office prior to program operations in Mohave County.			
D. Mexican long-nosed bat	*Leptonycteris nivalis*	E	NM, TX
Sanborn's long-nosed bat	*Leptonycteris sanborni*	No Data	No Data. AZ, NM ????
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	E	AZ, NM
No jeopardy foreseen because of low risk from pesticides to be used and prey base not expected to be significantly effected. Unquantifiable anticipated incidental take as a result of off-road vehicles use for surveys and application of carbaryl bait. Reasonable and prudent measures and terms and conditions provided to reduce take of the species.			

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Table 2

Birds			
Common Name	Scientific Name	Listing Status	States
A. Whooping crane	*Grus americana*	E, EXPN	CO, ID, KS, MT, ND, NE, NM, OK, SD, TX, UT,WY
APHIS shall ensure that no whooping cranes have wandered into a proposed spray treatment or bait treatment area.			
B. Bald eagle	*Haliaeetus leucocephalus*	T	All 17 western States
Maintain a 1-mile radius treatment-free zone (including Nosema) around active bald eagle eyries found on rivers or lakes with no flyovers of this area by contract pilots. A 2.5 mile no-aerial ULV spray zone will be maintained upstream and downstream from the nest site as a forage area. This will include a 0.25 mile buffer along each side of the rivers. Lakes will be protected by a 0.25 no-aerial ULV spray buffer if they are considered foraging areas of the bald eagle.			
C. Peregrine falcon	*Falco peregrinus anatum*	DM	All 17 western States
This species has been delisted but is being monitored for the first 5 years.			
D. Northern aplomado falcon	*Falco femoralis septentrionalis*	E	TX
APHIS will contact the local Service office at least 5 days prior to grasshopper program activities to determine if nesting sites are known and coordinate necessary measures to protect nests and foraging areas.			

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E. Piping plover	*Charadrius melodus*	T	CO, KS, MT, ND, NE, OK, SD, TX
No aerial ULV pesticides will be used within 0.25 mile of water bodies where piping plovers are known to nest. Where carbaryl bran bait or Nosema is used, a 500-foot no-treatment zone around nesting areas of piping plovers should be maintained. Piping plover habitat will be determined in consultation with local Service field offices.			
F. Western snowy plover	*Charadrius alexandrinus nivosus*	T	CA, WA, OR
No aerial ULV pesticides should be applied within 0.25 mile of the edges of known snowy plover nesting areas. Carbaryl bran bait or Nosema may be used to within 500 feet of these areas. Within the 500 foot buffer, no treatments will be made.			
G. Interior least tern	*Sterna antillarum*	E	CO, KS, MT, ND, NE, NM, OK, SD, TX
No aerial ULV application should be applied 2.5 miles up and down river to prevent abandonment of nesting least tern colonies due to aircraft flyovers and a possible decrease of the fishery forage base due to accidental aquatic applications. A 0.25 mile no aerial ULV application buffer on each side of the river and around other bodies of water containing least tern colonies also should be observed. A 500 foot no treatment zone around nesting colonies also should be observed. Interior least tern habitat will be determined in consultation with the local Service field offices.			
H. Yuma clapper rail	*Rallus longirostris yumanensis*	E	AZ, CA
Maintain a 0.25 mile no aerial ULV application buffer and a 500 foot no application buffer for carbaryl bran bait and Nosema around nesting and foraging areas.			

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I. Black-capped vireo	*Vireo atricapillus*	E	KS, OK, TX
Before APHIS control programs are initiated in Oklahoma, a concerted effort should be made to identify nesting areas of this species. The Service recommends that APHIS personnel contact our Service field office in Tulsa, which can assist in identifying specific nesting habitat. The Department of Biology, Central State University, Edmond, OK also can provide further assistancein this effort. Contact the Austin, TX field office for actions near black-capped vireo habitat in Callahan and Taylor Counties, TX. Exclusion of aerial ULV spray application in habitat normally used for foraging and nesting by this species as identified above.			
J. California brown pelican	*Pelecanus occidentalis californicus*	E	CA, OR, TX, WA
Maintain a 0.25 mile no aerial application buffer around established nests or roost sites. A 500 foot buffer will apply for carbaryl bran bait or Nosema.			
K. Southwestern willow flycatcher	*Empidonax traillii extimus*	E	AZ, CA, CO, NM, TX, UT
No ULV application of insecticides should occur within 0.25 mile of the edge of occupied habitat. A buffer of 500 feet should be maintained where no application of carbaryl bran bait or Nosema is applied.			
L. Mexican spotted owl	*Strix occidentalis lucida*	T	AZ, CO, NM, TX, UT
APHIS will confer with the local Service office at least 5 days prior to grasshopper control activities in any of the counties known to contain Mexican spotted owls in northeastern Arizona, southwestern Colorado, and Utah to determine if protective measures are needed.			
M. Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	E	AZ
APHIS will confer with the local Service office at least 5 days prior to any grasshopper program activities to determine if protective measures are needed. APHIS adopt the preprogram conference procedures. If it is determined during site specific conferences that the grasshopper control program may jeopardize the continued existence of this species or result in the adverse modification of the species' proposed critical habitat, the Service will offer advisory recommendations to avoid or minimize any adverse effects.			

Appendix C
Table 2

Fish			
Group A			
Common Name	Scientific Name	Listing Status	States
Bonytail chub	*Gila elegans*	E	AZ, CA, CO, NV, UT
Colorado pikeminnow (=squawfish)	*Ptychocheilus lucius*	E, EXPN	E = AZ, CA, CO, UT, WY. EXPN = AZ
Cui-ui	*Chasmistes cujus*	E	NV
Gila trout	*Oncorhynchus gilae*	E	AZ, NM
Greenback cutthroat trout	*Oncorhynchus stomias*	T	CO
Humpback chub	*Gila cypha*	E	AZ, CO, UT
Lahontan cutthroat trout	*Oncorhynchus clarkii henshawi*	T	CA, NV, OR, UT
Pallid sturgeon	*Scaphirhynchus albus*	E	KS, MT, ND, SD
Only carbaryl bran bait or Nosema (no aerial application of ULV pesticide) will be used within 0.25 mile of occupied habitats.			
Group B			
Apache trout	*Oncorhynchus apache*	T	AZ
Big Spring spinedace	*Lepidomeda mollispinis pratensis*	T	NV
Borax Lake-chub	*Gila boraxobius*	E	OR
Chihuahua chub	*Gila nigrescens*	T	NM
Desert dace	*Eremichthys acros*	T	NV
Foskett speckled dace	*Rhinichthys osculus ssp.*	T	OR
Gila topminnow (now includes Yaqui)	*Poeciliopsis occidentalis*	E	AZ, NM
Hiko White River springfish	*Crenichthys baileyi grandis*	E	NV
Hutton tui chub	*Gila bicolor spp.*	T	OR
June sucker	*Chasmistes liorus*	E	UT
Kendall Warm Springs dace	*Rhinichthys osculus thermalis*	T	WY
Little Colorado spinedace	*Lepidomeda vittata*	T	AZ
Modoc sucker	*Catostomus microps*	E	CA
Pahrump killifish (poolfish)	*Empetrichthys latos*	E	NV

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Pahranagat roundtail chub	*Gila robusta jordani*	E	NV
Pecos bluntnose shiner	*Notropis simus pecosensis*	T	NM
Pecos gambusia	*Gambusia nobilis*	E	NM, TX
Spikedace	*Meda fulgida*	T	AZ, NM
Virgin River chub	*Gila robusta seminuda*	E	AZ, NV, UT
Virgin spinedace ? Also listed under C?	*Lepidomeda mollispinis pratensis*	T	NV
Warner sucker	*Catostomus warnerensis*	T	OR
White River springfish	*Crenichthys baileyi balleyi*	E	NV
Woundfin	*Plagopterus argentissimus*	E, EXPN	E = AZ, NM, NV, UT EXPN = AZ, NM
No aerial ULV application of malathion should be applied within 1 mile of occupied habitat. A 0.25 no-aerial ULV application of carbaryl and acephate also should be adhered to.			
Group C			
Arkansas River shiner	*Notropis girardi*	T	KS, NM, OK, TX
Ash Meadows Amargosa pupfish	*Cyprinodon nevadensis mionectes*	E	NV
Ash Meadows speckled dace	*Rhinichthys osculus nevadensis*	E	NV
Clover Valley speckled dace	*Rhinichthys osculus oligoporus*	E	NV
Delta smelt	*Hypomesus transpacificus*	T	CA
Desert pupfish	*Cyprinodon macularius*	E	AZ, CA
Devil's Hole pupfish	*Cyprinodon diabolis*	E	NV
Independence Valley speckled dace	*Rhinichthys osculus lethorporus*	E	NV
Leopard darter	*Percina pantherina* .	T	OK
Loach minnow	*Tiaroga cobitis*	T	AZ, NM
Lost River sucker	*Deltistes luxatus*	E	CA, OR
Railroad Valley springfish	*Crenichthys nevadae*	T	NV
Rio Grande silvery minnow	*Hybognathus amarus*	E	NM, TX
Shortnose sucker	*Chasmiste brevirostris*	E	CA, OR
Virgin spinedace ? Also listed under B?	*lepidomeda mollispinis pratensis*	T	NV

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Table 2

Warm Springs pupfish	*Cyprinodon nevadensis pectoralis*	E	NV
White sturgeon	*Acipenser transmontanus*	E	ID, MT
Yaqui topminnow (Now included with Gila topminnow)	*Poeciliopsis occidentalis sonoriensis*	E	AZ, NM
Buffers around areas of occurrence of 0.5 mile for the use of malathion and 0.25 mile for the use an aerially applied carbaryl and acephate. Within the buffers, only carbaryl bait or Nosema will be used.			
Group D			
Yaqui chub	*Gila purpurea*	E	AZ
Neosho madtom	*Noturus placidus*	T	KS, OK
Moapa dace	*Moapa coriacea*	E	NV
No aerial ULV application of malathion should be applied within 0.5 mile of the habitat. A 0.25 mile buffer should be applied for the use of acephate and carbaryl, and a 500 foot no-treatmentzone should be used for carbaryl bran bait.			
Group E			
Razorback sucker	*Xyrauchen texanus*	E	AZ, CA, CO, NM, NV, UT, WY
Maintain a 0.25 mile no-aerial application buffer around known habitats. Within buffer, carbaryl bran bait or Nosema may be used within 500 feet of the water.			
Group F			
Sacramento splittail	*Pogonichthys*	T	CA
No aerial applications of malathion within 0.5 mile, or aerial applications of acephate or carbaryl within 0.25 mile of Suisun Bay and the San Francisco Bay-Sacramento-San Joaquin River estuary in Sacramento and San Joaquin Counties. Within this buffer, carbaryl bran bait or Nosema may be used within 500 feet of the water.			

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Table 2

Reptiles			
Common Name	Scientific Name	Listing Status	States
A. Desert tortoise	*Gopherus agassizii*	T, SAT	AZ, CA, NV, UT
Malathion and acephate should not be applied in the Beaver Dam Slope of Washington County, Utah (both inside and outside of the designated critical habitat).			
B. Flat-tailed horned lizard	*Phrynosoma mcallii*	No Data	No Data
APHIS will maintain a 0.25 mile buffer for ULV aerial applications and a 500 foot buffer for carbaryl bran bait around known habitats.			
C. New Mexican ridge-nosed rattlesnake	*Crotalus willardi obscurus*	T	NM
If required to treat for grasshoppers above 6,000 foot elevation, local consultation with the Service will be conducted at least 5 days prior to grasshopper program activities to determine protection measures and specific areas that should be protected.			
Amphibians			
Common Name	Scientific Name	Listing Status	States
A. Wyoming toad	*Bufo hemiophrys baxteri*	E	WY
A 0.25 mile no-aerial ULV application buffer shall be maintained on each side of the Little Laramie River in Albany county, Wyoming. To determine specific boundaries of the area, APHIS should contact the Helena, MT Endangered Species Field Office, as well as the Wyoming Game and Fish, prior to any control program within the historic range of the Wyoming toad.			

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B. Sonora tiger salamander	*Ambystoma tigrinum stebbinsi*	E	AZ
APHIS should not make aerial applications of malathion within 0.5 mile of occupied habitat of the salamander. Buffers of 0.25 mile for acephate and carbaryl aerial applications also should be maintained, and within the buffers only carbaryl bran bait or Nosema should be used.			
C. California red-legged frog	*Rana aurora draytonii*	T	CA
No pesticides (acephate, carbaryl, carbaryl bran bait, or malathion) or Nosema should be applied within 1 mile of occupied habitat of the species.			
Crustaceans			
Common Name	Scientific Name	Listing Status	States
Shasta crayfish	*Pacifastacus fortis*	E	CA
Socorro isopod	*Thermosphaeroma thermosphilus*	E	NM
Vernal pool fairy shrimp	*Branchinecta lynchi*	T	CA, OR
No aerial ULV application of malathion or carbaryl should be applied within 1 mile ofthe habitat. A 0.25 mile buffer should be applied for the use of acephate, and a 500 foot no-treatment zone should be used where carbaryl bran bait is used inside the no-spray buffer areas.			

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Table 2

Snails			
Common Name	Scientific Name	Listing Status	States
A. Bruneau Hot Springs snail	*Pyrgulopsis bruneauensis*	E	ID
No pesticide should be broadcast aerially within 0.25 mile of Hot Creek in Owyhee County, Idaho. This is located at T. 8 S., R. 6 E, sections 2, 3, and 4; and T. 7 S., R. 6 E., sections, 33, 34, and 35.			
B. Socorro springsnail	*Pyrgulopsis neomexicana*	E	NM
Alamosa springsnail	*Tryonia alamosae*	E	NM
No pesticide shou1d be applied aerially within 0.25 mile of the habitat. A 500 foot buffer would apply to carbaryl bran bait and Nosema.			
C. Ouachita rock pocketbook	*Arkansia wheeleri*	E	OK
No aerial application of malathion or carbaryl within 0.25 mile of habitat or within 500 feet of water for aerial application of acephate.			
D. Banbury Springs limpet or lanx	*Lanx sp.*	E	ID
Bliss Rapids snail	*Taylorconcha serpenticola*	T	ID
Idaho springsnail	*Fontelicella idahoensis*	E	ID
Kanab ambersnail	*Oxyloma haydeni ssp. kanabensis*	E	AZ, UT
Snake River physa snail	*Physa natricina*	E	ID
Utah valvata	*Valvata utahensis*	IE	ID
Malathion should not be used within 0.5 mile of populations. A 0.25 mile buffer should be used for carbaryl and acephate, and a 500 foot buffer should be maintained for the use of carbaryl bran bait or Nosema.			

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Table 2

Insects			
Common Name	Scientific Name	Listing Status	States
A. Pawnee montane skipper	*Hesperia leonardus montana*	T	CO
No aerial application of pesticides within 0.25 mile of habitat.			
B. American burying beetle	*Nicrophorus americanus*	E	NE, SD
Contact local office of the Service at least 5 days prior to program activities to determine specific habitat locations and develop adequate protection measures and treatment methods.			
C. Ash Meadows naucorid	*Ambrysus amargosus*	T	NV
No application within 0.25 mile of critical habitat.			

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Table 2

Plants			
Common Name	Scientific Name	Listing Status	States
Group A			
Arizona hedgehog cactus	*Echinocereus triglochidiatus var. arizonicus*	E	AZ
Aerial ULV application of pesticides will not be used within 0.25 of the occupied habitat.			
Group B			
Applegate's milk-vetch	*Astragalus applegatei*	E	OR
Arizona agave	*Agave arizonica*	E	AZ
Arizona cliffrose	*Purshia subintegra*	E	AZ
Arizona willow	*Salix arizonica*	No Data	No Data
Ash Meadows blazing-star	*Mentzelia leucophylla*	T	NV
Ash Meadows gumplant	*Grindelia fraxinopratensis*	T	CA, NV
Ash Meadows ivesia	*Ivesia kingii var. eremica*	T	NV
Ash Meadows milk-vetch	*Astragalus phoenix*	T	NV
Autumn buttercup	*Ranunculus acrifornis var.*	E	UT
Barneby reed-mustard	*Schoenocrambe barnebyi*	E	UT
Blowout penstemon	*Penstemon haydenii*	E	NE, WY
Brady pincushion cactus	*Pediocactus bradyi*	E	AZ
Clay-loving wild	*Eriogonum pelinophilum*	E	CO
Clay phacelia	*Phacelia argillacea*	T	UT
Clay reed-mustard	*Schoenocrambe argillacea*	T	UT
Cochise pincushion cactus	*Coryphantha robbinsorum*	T	AZ
Dudley Bluffs bladderpod	*Lesquerella congesta*	T	CO

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Dudley Bluffs twinpod	*Physaria obcordata*	T	CO
Dwarf bear-poppy	*Arctomecon humilis*	E	UT
Gypsum wild-buckwheat	*Eriogonum gypsophilum*	T	NM
Heliotrope milk-vetch	*Astragalus montii*	T	UT
Holy Ghost ipomopsis	*ipomopsis sancti-spiritus*	E	NM
Jones cycladenia	*Cycladenia humilis var. jonesii*	T	AZ, UT
Knowlton cactus	*Pediocactus knowltonii*	E	CO, NM
Kodachrome bladderpod	*Lesquerella tumulosa*	E	UT
Kuenzler hedgehog cactus	*Echinocereus fendleri var. kuenzleri*	E	NM
Last Chance townsendia	*Townsendia aprica*	T	UT
Lee pincushion cactus	*Coryphantha sneedii var. leei*	T	NM
Lloyd's hedgehog cactus	*Echinocereus lloydii*	DR (Delisted)	NM, TX
Maguire daisy	*Erigeron maguirei (var. maguirei)??*	T	UT
Malheur wire-lettuce	*Stephanomeria malheurensis*	E	OR
Mancos milk-vetch	*Astragalus humillimus*	E	CO, NM
Mead's milkweed	*Asclepias meadii*	T	KS
Mesa Verde cactus	*Sclerocactus mesa-verdae*	T	CO, NM
North Park phacelia	*Phacelia formosula*	E	CO
Oserhout milk-vetch	*Astragalus osterhoutii*	E	CO
Parish's alkali grass	*Puccinellia parishii*	No Data	No Data. CA, NM ?????
Peebles Navajo cactus	*Pediocactus peeblesianus var. peeblesianus*	E	AZ
Penland alpine fen mustard	*Eutrema penlandii*	T	CO
Penland beardtongue	*Penstemon penlandii*	T	CO
Rhizome (Zuni) fleabane	*Erigeron rhizomatus*	T	NM
Sacramento Mountains thistle	Cirsium vinaceum	T	NM
Sacramento prickly-poppy	*Argemone pleiacantha var. pinnatisecta*	E	NM

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San Rafael cactus	*Pediocactus despainii*	E	UT
Siler pincushion cactus	*Pediocactus (=Echinocactus = Utahia) sileri*	T	AZ, UT
Slender orcutt grass	*Orcuttia tenuis*	T	CA
Sneed pincushion cactus	*Coryphantha sneedii var. sneedii*	E	NM, TX
Sodaville milk-vetch	*Astragalus lentiginosus var. sesquimetralis*	No Data	No Data. NV ????
Spring-loving/centaury	*Centaurium namophilum*	T	CA, NV
Steamboat buckwheat	*Eriogonum ovalifolium*	E	NV
Toad-flax cress	*Glaucocarpum suffrutescens*	No Data	No Data. UT ????
Uinta basin hookless cactus	*Sclerocactus glaucus*	T	CO, UT
Ute ladies'-tresses	*Spiranthes diluvialis*	T	CO, ID, MT, NE, UT, WA, WY
Water howellia	*Howellia aquatilis*	T	CA, ID, MT, OR, WA
Welsh's milkweed	*Asclepias welshii*	T	AZ, UT
Western prairie fringed orchid	*Platanthera praeclara*	T	KS, ND, NE, OK
Winkler cactus	*Pediocactus winkleri*	T	UT
Wright's fishhook cactus	*Sclerocactus wrightae*	E	UT
Aerial application of pesticides will not be used within 3 miles of these species occupied habitats. Within the 3 mile buffer, only carbaryl bran bait or Nosema will be used.			
Group C			
Navajo sedge	*Carex specuicola*	T	AZ, UT
No applications of carbaryl bran bait within 200 feet of springs and no aerial application of ULV pesticides within 500 feet of springs of occupied habitat.			
Group D			
Amargosa niterwort	*Nitrophila mohavensis*	E	CA, NV
Ash Meadows sunray	*Enceliopsis nudicaulis var. corrugata*	T	NV
No applications of ULV insecticides will be made within 3 miles designated critical habitat. Within the 3 mile buffer, only carbaryl bran bait or Nosema will be used.			

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Group E			
Canelo Hills ladies'-tresses	*Spiranthes delitescens*	E	AZ
Huachuca water umbel	*Lilaeopsis schaffneriana*	E	AZ
No applications of ULV insecticides will be made within 3 miles of known populations. Within the 3 mile buffer, only carbaryl bran bait or Nosema will he used. Carbaryl bran bait will not be used within 20 yards of known populations of these species.			

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Table 2

Part II Species with "No Effect" or "No Jeopardy" Determinations Without Buffers or Other Measures			
Mammals			
Common Name	Scientific Name	Listing Status	States
Gray wolf	*Canis lupus*	E	CO, ID, MT, ND, SD, WA, WY
Grizzly bear	*Ursus arctos horribilis*	T	CO, ID, MT, WA, WY
Mount Graham red squirrel	*Tamiasciurus hudsonicus grahamensis*	E	AZ
Woodland caribou	*Rangifer tarandus caribou*	E	ID, WA
Birds			
Aleutian Canada goose	*Branta canadensis leucopareia*	DM (Delisted)	CA, OR, WA
California condor	*Gymnogyps califonianus*	E, EXPN	E = CA EXPN = AZ, UT
Marbled murrelet	*Brachyramphus marmoratus marmoratus*	T	CA, OR, WA
Northern spotted owl	*Strix occidentalis caurina*	T	CA, OR, WA
Red-cockaded woodpecker	*Picoides (=Dendrocopos) borealis*	E	OK, TX

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Table 2

Fish			
Common Name	Scientific Name	Listing Status	States
Beautiful shiner	*Cyprinella formosa*	T	AZ, NM
Yaqui catfish	*Ictalurus pricei*	T	AZ
Insects			
Uncompahgre fritillary	*Boloria acrocnema*	E	CO
Plants			
MacFarlane's four-o'clock	*Mirabilis macfarlanei*	T	ID, OR
Maguire primrose	*Primula maguirei*	T	UT
Marsh sandwort	*Arenaria paludicola*	E	CA, OR, WA
San Francisco Peaks groundsel	*Senecio franciscanus*	T	AZ
Sentry milk-vetch	*Astragalus cremnophylax var. cremnophylax*	E	AZ
Todsen's pennyroyal	*Hedeoma todsenii*	E	NM

Appendix C
Table 3

Local Mitigation Measures Agreed to by USFWS
and APHIS PPQ in 2004

Table 2. General Direct md Indirect Effects of Proposed Insecticides and Proposed Avoidance/mitigation Measures for Non-target Listed Animal and Plant Species							
Non-Target Listed Species and Species Groups	Status	Toxicity Levels Direct Effects			Indirect Effects	Avoidance or Mitigation Measures	Counties[2]
		Malathion	Carbaryl	Dimilin			
BIRDS							
Southwestern willow flycatcher	E	N/A[3]	N/A[3]	Low	A,B,C	3,10	Clark, Lincoln, Nye
Bald Eagle	T	N/A[3]	N/A[3]	Low	No Indirect Effects	5	Carson City, Churchill, Clark, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, Washoe, White Pine
Yuma clapper rail[1]	E	Low	Low	Low	A,B,C	7	Clark
REPTILE							
Desert tortoise	T,CH	N/A[3]	N/A[3]	Slight	A,B,C	1	Clark, Esmeralda, Lincoln, Nye
FISH							
Warner sucker[1]	T, CH	Moderate to High	Moderate to High	Slight	A,B,C	2	Washoe
Cui-ui	E	N/A[3]	N/A[3]	Slight	A.B,C,F	8	Storey, Washoe
White River springfish	E, CH	N/A[3]	N/A[3]	Slight	A,B,C,F	8	Lincoln
Hiko White River springfish	E, CH	N/A[3]	N/A[3]	Slight	A.B,C,F	8	Lincoln, Mineral
Railroad Valley springfish	T, CH	N/A[3]	N/A[3]	Slight	A,B,C	8	Mineral, Nye
Devils Hole pupfish	E	N/A[3]	N/A[3]	Slight	A,B,C	8	Clark, Nye
Ash Meadows Amargosa pupfish	E, CH	N/A[3]	N/A[3]	Slight	A,B,C	8	Nye
Warm Springs pupfish	E	N/A[3]	N/A[3]	Slight	A,B,C	8	Nye
Pahrump poolfish	E	N/A[3]	N/A[3]	Slight	A,B,C	8	Clark, White Pine
Desert dace	T, CH	N/A[3]	N/A[3]	Slight	A,B,C,F	8	Humboldt
Humpback chub	E	N/A[3]	N/A[3]	Slight	A,B,C	8	Clark
Bonytail chub	E, CH	N/A[3]	N/A[3]	Slight	A,B,C	8	Clark
Pahranagat roundtail chub	E	N/A[3]	N/A[3]	Slight	A,B,C,F	8	Lincoln
Virgin River chub	E, CH	N/A[3]	N/A[3]	Slight	A,B,C,F	8	Clark
White River spinedace[1]	E, CH	Moderate to High	Very High	Slight	A,B,C	2	Nye, White Pine
Big Spring spinedace	T, CH	N/A[3]	N/A[3]	Slight	A,B,C,F	8	Lincoln
Moapa dace	E	N/A[3]	N/A[3]	Slight	A,B,C	8	Clark

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Table 3

Local Mitigation Measures Agreed to by USFWS and APHIS PPQ In 2004

Table 2. General Direct and Indirect Effects of Proposed Insecticides and Proposed Avoidance/mitigation Measures for Non-target Listed Animal and Plant Species							
Non-Target Listed Species and Species Groups	Status	Toxicity Levels Direct Effects			Indirect Effects	Avoidance or Mitigation Measures	Counties[2]
		Malathion	Carbaryl	Dimilin			
Lahontan cutthroat	T	N/A[3]	N/A[3]	Slight	A,B,C	8	Carson City, Churchill, Clark, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Nye, Storey, Washoe
Woundfin	E, CH	N/A[3]	N/A[3]	Slight	A,B,C,F	8	Clark
Colorado pikeminnow	E	N/A[3]	N/A[3]	Slight	A,B,C	8	Clark
Independence Valley speckled dace	E	N/A[3]	N/A[3]	Slight	A,B,C,F	8	Elko
Ash Meadows speckled dace	E, CH	N/A[3]	N/A[3]	Slight	A,B,C	8	Nye
Clover Valley speckled dace	E	N/A[3]	N/A[3]	Slight	A,B,C,E	8	Elko
Bull trout[1]	T	Moderate to High	Very High	Slight	A,B,C	2	Elko
Razorback sucker	E, CH	N/A[3]	N/A[3]	Slight	A,B,C	8	Clark
INVERTEBRATES							
Ash Meadows	T, CH	N/A[3]	N/A[3]	Very high larval stages	B,C	4	Nye
Carson wandering skipper[1]	E	Very High	Very High	Very high larval stages	B,C	2	Carson City, Washoe
PLANTS							
Ash Meadows milkvetch	T, CH	N/A[3]	N/A[3]	Moderate to Low	D,E	6	Nye
Spring-loving centaury	T, CH	N/A[3]	N/A[3]	Moderate to Low	D,E	6	Nye
Ash Meadows sunray	T, CH	N/A[3]	N/A[3]	Moderate to Low	D,E	6	Nye
Steamboat buckwheat	E	N/A[3]	N/A[3]	Moderate to Low	D,E	6	Washoe
Ash Meadows gumplant	T, CH	N/A[3]	N/A[3]	Moderate to Low	D,E	6	Nye
Ash Meadows ivesia	T, CH	N/A[3]	N/A[3]	Moderate to Low	D,E	6	Nye
Ash Meadows blazing star	T, CH	N/A[3]	N/A[3]	Moderate to Low	D,E	6	Nye
Amargosa niterwort	E, CH	N/A[3]	N/A[3]	Moderate to Low	D,E	6	Nye
Ute lady's tresses[1]	T	Very High	Very High	Moderate	D,E	9	Lincoln

Local Mitigation measures Agreed to by USFWS and APHIS PPQ in 2004

Table 2. General Direct and Indirect Effects of Proposed Insecticides and Proposed Avoidance/mitigation Measures for Non-target Listed Animal and Plant Species

Non-Target Listed Species and Species Groups	Status	Toxicity Levels Direct Effects			Indirect Effects	Avoidance or Mitigation	Counties[2]
		Malathion	Carbaryl	Dimilin			

[1]Other listed/proposed species that occur in Nevada, but were not previously addressed in the 1987 BO for USDA-APHIS-PPQ's 1987 Rangeland Grasshopper Cooperative Management Program or its amendments.
[2]County(ies) where animal or plant species may be present.
[3]N/A = Not Applicable; applies to insecticides that were covered under the 1987 National programmatic BO or its amendments.
E = Endangered; T = Threatened; PT = Proposed Threatened; CH = Critical Habitat

Indirect Effects

A. General loss of prey.
B. Limited Mobility of young to move out of treated area during nesting season.
C. Ingestion of chemicals from vegetation and insects could affect survival or reproductive fitness.
D. Loss of important pollinators.
E. Loss of seed dispersal agents.
F. Exposure to chemicals from offsite transport via snow-melt or irrigation drainage.

Avoidance/Mitigation Measures

1. No aerial application of Dimilin®, malathion, or carbaryl within 1 mile of desert tortoise occupied habitat. In accordance with 1987 National programmatic BO for USDA-APHIS-PPQ's 1987 Rangeland Grasshopper Cooperative Management Program and its 1990 amendment, the USFWS's Southern Nevada Field Office will be given a 5 day notice prior to conducting aerial applications of insecticides in occupied desert tortoise habitat.
2. No aerial application of Dimilin®, within 1 mile or malathion or carbaryl within 0.25 mile of occupied habitat.
3. A buffer of 500 feet should be maintained where no application of carbaryl bran bait is applied.
4. No aerial application of Dimilin® within 1 mile of occupied habitat.
5. Maintain a 1 mile radius treatment-free zone around active bald eagle eyries found on rivers or lakes with no flyovers of this area by contact pilots. A 2.5 mile no-aerial spray zone will be maintained upstream and downstream from the nest site as a forage area. This will include a 0.25 mile buffer along each side of the rivers. Lakes will be protected by a 0.25 mile no aerial spray buffer if they are considered foraging areas of the bald eagle.
6. Aerial application of Dimilin® will not be used within 3 miles of species occupied habitat.
7. No aerial application of Dimilin® within 1 mile or malathion or carbaryl within 0.25 mile of the edge of nesting and foraging habitat.
8. No aerial application of Dimilin® within 1 mile of occupied habitat.
9. No aerial application of insecticides within 3 miles of the species occupied habitat. Within the 3 mile buffer only carbaryl bran bait will be used.
10. No aerial application of Dimilin® within 1 mile or malathion or carbaryl within 0.25 mile of the edges of occupied habitat.

PROPOSED MONITORING PLAN

Our environmental monitoring team has developed a draft environmental monitoring plan for the proposed rangeland grasshopper/cricket suppression program. USDA-APHIS-PPQ Directives 5640 .1 dated April 19, 2002, directs the agency to fulfill the mandates of NEPA, ESA, the Federal Insecticide, Fungicide and Rodenticide Act, and other statutes that require monitoring the effects of their actions on the environment.

Environmental monitoring is an integral component of the avoidance/mitigation measures outline in the *PROPOSED AVOIDANCE/MITIAGAION MEASURES* section. The primary goal of this environmental monitoring plan is to provide data which can be used to evaluate the effectiveness of the avoidance/mitigation measures proposed to protect the listed species outlined in the *LISTED SPECIES* section.

The monitoring methods proposed for the rangeland grasshopper/cricket suppression program include monitoring aerial applications of the liquid and bait forms of the insecticides used and for drift at selected sensitive sites primarily by collecting dye card, water and vegetation samples.

Amendment 1:
All mitigation measures agreed upon through local Sec 7 consultation shall apply, including but not limited to the 2018 Biological Assessment and subsequent concurrence.