Site-Specific Environmental Assessment

Rangeland Grasshopper and Mormon Cricket Suppression Program

OREGON

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

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Table of Contents

Table of Contents

Appendices

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OREGON (OR-19-01)

I. Need for Proposed Action

A. Purpose and Need Statement

Grasshoppers and/or Mormon crickets (hereafter referred to collectively as grasshoppers) have the potential for sudden and explosive population increases. Outbreaks are usually preceded by several years of gradual increases in grasshopper numbers, followed by a year in which conditions favor grasshopper development. Outbreaks are difficult to predict because they depend greatly on climatic variables such as temperature and moisture conditions at the time of hatching and early nymphal development. The intensity of grasshopper outbreaks depends largely on the rate of population increase in previous years and conditions that favor their development in the current year.

To assist in predicting where potential grasshopper outbreaks may occur, the Animal and Plant Health Inspection Service (APHIS) and Oregon Department of Agriculture (ODA) conduct annual surveys of grasshopper populations in Oregon. Adult grasshopper surveys conducted by the APHIS and ODA during the summer of the previous year reveal areas where numbers of grasshoppers may be at economically damaging levels in the current year.

A request for APHIS assistance in suppressing a grasshopper outbreak is voluntary. In response to requests from Federal land managers or Oregon Department of Agriculture, APHIS would determine if an outbreak has reached an economically or environmentally critical level. If so, an appropriate treatment strategy would be developed, taking into account additional site specific information.

Populations of grasshoppers that trigger the need for a suppression program are considered on a case-by-case basis. There is no specific infestation level that triggers APHIS' participation. Participation here is based on the potential damage grasshoppers cause, and the benefits of treatments. When grasshopper numbers become extreme, their feeding on available vegetation can lead to denuded areas, thus eliminating seed production and increasing soil erosion. Forage and habitat for some wildlife species and livestock will also be reduced. Rare plants may be adversely impacted by severe grasshopper feeding. Benefits of controlling grasshopper outbreaks may include increasing the forage available for wildlife and livestock, reduced soil erosion, protecting wildlife habitat, and preventing grasshoppers from becoming migratory and causing further damage to adjacent crops or rangeland. 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 the protection of rangeland revegetation programs.

The goal of the proposed suppression program analyzed in this EA is to reduce grasshopper populations to an acceptable level in order to protect rangeland ecosystems and/or cropland adjacent to rangeland.

This environmental assessment (EA) analyzes potential environmental consequences of the proposed action and its alternatives. This EA applies to proposed suppression programs that could take place from May 1 to July 31 in the Oregon counties of Baker, Crook, Deschutes, Gilliam, Grant, Harney, Jefferson, Klamath, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and Wheeler (see Appendix 1, Map 1). A decision on which treatment strategy to use, if any, will be made by APHIS based on the analysis presented in this EA, the results of public involvement, and consultation with other state and federal agencies. Three alternates are analyzed here. One alternative is the 'no action' alternative. The other two alternatives are chemical control alternatives. If an outbreak suppression request is made and APHIS determines that assistance in suppressing a grasshopper outbreak is necessary, selection of one of the three alternatives will be made by APHIS for suppression programs in eastern Oregon.

This EA is prepared in accordance with the requirements under the National Environmental Policy Act of 1969 (NEPA) (42 United States Code (U.S.C.)§ 4321 *et. seq.*) and the NEPA procedural requirements promulgated by the Council on Environmental Quality, United States Department of Agriculture (USDA), and APHIS.

B. Background Discussion

In rangeland ecosystems in the Western United States, grasshoppers are a natural component of the biota. Different species of grasshoppers forage on different preferred grasses, forbs and shrubs. They perform beneficial functions by recycling nutrients and serving as food for other animal species. They are native to Western rangelands and they have evolved to occupy various niches in the ecosystem. Even though these ecosystems have been impacted by various forms of human activity and invasion by foreign plant and animal species, grasshoppers are usually beneficial with respect to human values.

Additionally, integrated pest management (IPM) systems can help hold grasshopper populations below economically damaging levels. Management tools such as mechanical control, biological control, cultural control, and/or selective use of chemicals can be implemented by farmers, ranchers and land managers to delay or avert economic grasshopper outbreaks. However, grasshopper populations can build up to levels of economic infestation 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 also needed to prevent grasshopper migration to cropland adjacent to rangeland.

APHIS conducts surveys for grasshopper populations on rangeland in the Western United States, provides technical assistance on grasshopper management to land owners/managers, and cooperatively suppresses grasshoppers when direct intervention is requested by a Federal land management agency or a State agriculture department (on behalf of a State agency, a local government, or a private group or individual) and deemed necessary. The need for rapid and effective suppression of grasshoppers 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 (but not eradicate) grasshopper populations and effectively protect rangeland.

In June 2002, APHIS completed an Environmental Impact Statement document "Rangeland Grasshopper and Mormon Cricket Suppression Program, Final Environmental Impact Statement, June 21, 2002" (2002 FEIS) concerning suppression of grasshopper populations in 17 Western States. The 2002 FEIS describes

the actions available to APHIS to reduce the destruction caused by grasshopper populations in the states of Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington and Wyoming.

APHIS' authority for cooperation in this suppression program is based on Section 417 of the Plant Protection Act of 2000 (7 U.S.C. § 7717). In general this statute directs APHIS to control actual or potential economic grasshopper and Mormon cricket outbreaks on Federal, State, or private lands. **APHIS' participation is subject to available funds, and at the request of a State or Federal land manager.** For the discussions in this EA, it is understood that no control measures will be undertaken by APHIS without both of these conditions being met.

In April 2014, APHIS and the Forest Service (FS) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two agencies on suppression of grasshoppers and Mormon crickets on National Forest System Lands (Document #14-8100-0573-MU, April 22, 2014). This MOU clarifies that APHIS will prepare, and issue to the public, site-specific environmental documents that evaluate potential impacts associated with proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents will be prepared under the APHIS NEPA implementing procedures with cooperation and input from the FS.

The MOU further states that the responsible FS official will request in writing the inclusion of appropriate lands in the APHIS grasshopper suppression project when treatment on National Forest System Lands is necessary. FS will provide information on location of T&E species, sensitive sites, and other resource issues. The FS must also approve a Pesticide Use Proposal for APHIS to treat outbreaks. A Pesticide Use Proposal is the tracking mechanism by which pesticide use on federally managed land is reported to the Environmental Protection Agency (EPA). EPA's role is to track use under the Federal Insecticide Fungicide and Rodenticide Act as amended (Public Law (P.L.) 92-516). Responsibility for administering the act is vested in the EPA. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and FS approves the Pesticide Use Proposal.

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

The MOU further states that the responsible BLM official will request, in writing, the inclusion of appropriate lands in the APHIS suppression project when treatment on BLM managed land is necessary. BLM will provide information on location of T&E species, sensitive sites, and other resource issues. 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 approves the Pesticide Use Proposal.

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

The MOU further states that the responsible BIA and tribal officials will request, in writing, the inclusion of appropriate lands in the APHIS suppression project when treatment on BIA managed land is necessary. BIA will consult with affected tribes to include in any requests information on the location and dates of all tribal ceremonies and/or cultural events that will be in or near the proposed treatment area(s). In addition, requests should include information on the location of any T&E species, the location and nature of any sensitive or "not to be treated" sites, and legal boundary information. The BIA will provide written concurrence with APHIS' suppression plan and identified mitigation measures. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and BIA concurs.

These MOUs are generally valid for five years. In the final year APHIS will begin negotiation with the respective land managing agency to review or revise these MOUs. Until a new MOU is signed program activities will be guided by the previous MOU.

C. About This Process

The EA process for grasshopper management is complicated by the fact that there is very little time between requests for treatment and the need for APHIS to take action with respect to those requests. Late summer and fall surveys help to determine general areas, among the millions of acres that potentially could be affected, where grasshopper infestations may occur the following spring. There is considerable uncertainty, however, in the forecasts, so that framing specific proposals for analysis under NEPA is generally 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. Requests for assistance can come at any time. However, treatments will occur when grasshoppers can be effectively controlled, from shortly after they hatch until the majority has become adults. The exact timing of these events varies based on climate and elevation. In Oregon treatments may occur from mid-May through July.

Environmental review will be an on-going process as long as the APHIS Grasshopper and Mormon Cricket Suppression Program is funded by Congress. Therefore, comments are welcome at any time and will be addressed during the NEPA review process in the year received. Comments received in response to this program will be made available for public inspection at USDA APHIS PPQ 6135 NE 80th Avenue, Suite A-5, Portland, OR 97218, and will be released in their entirety if requested pursuant to the freedom of information act.

APHIS normally engages in a "conventional" environmental assessment process, consistent with regulations implementing NEPA, for almost all of its actions classified as normally requiring the preparation of environmental assessments (EA's). See 7 CFR § 372.5(b) for APHIS' NEPA Implementing Procedures. However, a conventional process does not accommodate the needs of the Grasshopper Management Program. This Program conducts ongoing surveillance activities to ensure detection of and swift response to grasshopper outbreaks. Surveillance activities may cover broad territories, sometimes an entire State, and usually take place where grasshopper outbreaks have occurred earlier or are reasonably anticipated to occur. If grasshopper outbreaks are identified, surveys are quickly performed in an effort to delimit the affected area. As soon as surveys firmly establish the boundaries of the affected area, action to deal with the pest threat usually has to be undertaken immediately. In these situations, there seldom is enough time to engage in a conventional EA process. Thus, a two-stage EA process has been designed to accommodate such situations.

The first stage takes place while surveillance activities covering broad territories are being conducted. In cooperation with State officials, potential environmental effects of standard program operations (all of which integrate environmental safeguards) on all aspects of environmental quality are considered. Options for dealing with critical issues-waste disposal, for example, are explored and developed. To the extent possible, other environmental review and consultation requirements, those mandated by Section 7 of the Endangered Species Act, for example, are satisfied. An environmental assessment (EA) documenting this examination is prepared. As appropriate, a finding of no significant impact (FONSI) is signed by the APHIS decision maker and, together with the underlying EA, made available to the public; a 30-day comment period normally is prescribed. The analysis carried out in this document is part of the first stage of the two-stage EA process.

Following detection of grasshopper outbreaks within the surveillance territory covered under the initial EA and signed FONSI, a second stage of the environmental assessment process is undertaken to re-examine potential program effects on the quality of the human environment. This examination, while conducted swiftly, is more focused because the affected area has been delimited through surveys to a very substantial degree. Still, given the need to take action immediately to deal with the grasshopper outbreak, there generally is insufficient time at this stage to involve the public as it might otherwise be in a more conventional environmental assessment process designed to address and consider potential impacts in the delimited area.

The second stage of the environmental assessment process in these situations is intended mainly to ensure that significant impacts in the delimited area will not be experienced; if a determination to this effect can be made, it is documented and made available to the public, which again would have an opportunity to comment. This supplemental determination would probably be only a page or two in length and would analyze the specific outbreak area. In addition, the determination would include responses to comments received on the EA and FONSI in stage 1. If, at this second stage, the decision maker cannot confirm the previous FONSI, then the "emergency circumstances" provisions of the NEPA implementing regulations could be invoked, as appropriate.

Where emergency circumstances make it necessary to take an action with significant environmental impact without observing the provisions of the Council on Environmental Quality's (CEQ) NEPA implementing regulations, APHIS should consult with CEQ about alternative arrangements to deal with actions necessary to control the immediate impacts of the emergency (40 CFR § 1506.11).

D. Oregon 2018 Grasshopper Survey Summary

The 2018 Oregon grasshopper survey season showed continuing high numbers in grasshopper populations at several locations within the state. Requests for suppression of potentially economically damaging grasshopper outbreaks would most likely come from Harney, Klamath, Malheur, and/or Baker County in 2019.

II. Alternatives

The USDA, APHIS, has prepared the 2002 FEIS to comply with the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. § 4321et seq.), the Council on Environmental Quality (CEQ)

Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations (CFR) §§ 1500–1508), the USDA NEPA regulations (7 CFR Part 1b), and the APHIS NEPA regulations (7 CFR Part 372). This 2002 FEIS analyzed the potential for impacts on the human environment from APHIS' use of any of three insecticides analyzed in this EIS to protect rangeland from economically damaging grasshopper infestations.

The alternatives presented in the 2002 FEIS and considered for the proposed action in this EA are: (A) no action; (B) insecticide applications at conventional rates and complete area coverage, and (C) reduced agent area treatments (RAATS). Each of these alternatives, their control methods, and their potential impacts were described and analyzed in detail in the 2002 FEIS. Copies of the complete 2002 FEIS document are available for review at Animal and Plant Health Inspection Service, Plant Protection and Quarantine, 6135 NE 80th Avenue, Suite A-5, Portland, Oregon 97218-4033, (503) 326-2814. It is also available at the APHIS web site (www.aphis.usda.gov).

All insecticides used by APHIS for grasshopper suppression are used in accordance with all applicable product label instructions and restrictions. Labels for actual products used in suppression programs will vary, depending on supply issues.

All insecticide treatments conducted by APHIS would be implemented in accordance with the most recent *APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program Treatment Guidelines* (Treatment Guidelines). These Treatment Guidelines were developed by APHIS to provide established safety guidelines which will be employed in the 17 Western states where grasshopper suppression programs may occur.

A. No Action Alternative

Under the No Action Alternative, APHIS would not fund or participate in any program to suppress grasshopper infestations. Some Federal land management agencies, State agriculture departments, local governments, or private groups or individuals would likely conduct their own grasshopper treatments, but APHIS would not be involved with any suppression activities. APHIS may assist in making grasshopper management decisions by providing survey information and technical assistance to the land managers.

B. Insecticide Applications at Conventional Rates/ Complete Area Coverage Alternative

Under this alternative (Conventional Rates Alternative), the application of insecticides, typically at the rates described in the Rangeland Grasshopper Cooperative Control Management Program, Final Environmental Impact Statement—1987 and the 2002 FEIS and covering all treatable sites within the infested area (total or blanket coverage), has historically been the most common approach used to reduce grasshopper populations.

The insecticides APHIS considers using in Oregon under this alternative are carbaryl and/or diflubenzuron. Carbaryl is an insecticide that has traditionally been used by APHIS. Diflubenzuron, an insect growth regulator, is also included in this alternative. Although diflubenzuron's mode of action is very different than the mode of action for carbaryl, the term "insecticide" used in this document refers to carbaryl and diflubenzuron.

Insecticide applications at conventional rates and complete area coverage has generally been the approach that APHIS has used for many years prior to the 2002 FEIS. See FEIS Appendix A for a summary of grasshopper programs applications (2002 FEIS pp. 101-116). Under the Conventional Rates Alternative, APHIS would cover all treatable sites within the infested area (total or blanket coverage) per label directions. The application rates under this alternative are as follows:

- 16.0 fluid ounces (0.50 pound active ingredient (lb a.i.)) of carbaryl spray per acre,
- 10.0 pounds (0.50 lb a.i.) of 5% carbaryl bait per acre, or
- 1.0 fluid ounce (0.016 lb a.i.) of diflubenzuron per acre

In accordance with EPA regulations, these insecticides may be applied at lower rates than those listed above. Additionally, coverage may be reduced to less than the full area coverage, resulting in lesser effects to non-target organisms.

The potential generalized environmental effects of the application of carbaryl and diflubenzuron, under this alternative are discussed in detail in the 2002 FEIS (Environmental Consequences of Alternative 2: Insecticide Applications at Conventional Rates and Complete Area Coverage, pp. 38-48). A description of anticipated site-specific impacts from this alternative may be found in Part IV of this document.

Treatment Strategies, Treatment Guidelines, Additional Protective Measures, and Monitoring are also incorporated into this alternative. These additional elements of the grasshopper suppression program are described in greater detail under the Reduced Agent Area Treatments Alternative.

C. Reduced Agent Area Treatments (RAATs) Alternative

RAATs, is a grasshopper suppression method in which the rate of insecticide is reduced from conventional levels, and treated swaths are alternated with swaths that are not treated. The RAATs strategy relies on the effects of an insecticide to suppress grasshoppers within treated swaths while conserving grasshopper predators and parasites in swaths not treated. Carbaryl and/or diflubenzuron would be considered under this alternative at the following application rates:

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

The amount of area not treated (the untreated swath) under the RAATs approach is not standardized. In the past, the area infested with grasshoppers that remains untreated has ranged from 20 to 67 percent. The 2002 FEIS analyzed the reduced pesticide application rates associated with the RAATs approach but assumed pesticide coverage on 100 percent of the area as a worst-case assumption. This assumption was made because there is no way to predict how much area would actually be left untreated as a result of the specific action requiring this EA. Rather than suppress grasshopper populations to the greatest extent possible, the goal of this alternative is to suppress grasshopper populations to a desired level.

The amount of area not receiving pesticide may vary based on factors such as choice of chemical, site characteristics, grasshopper life stage, grasshopper density, and value of the resource being protected.

The potential environmental effects of the application of carbaryl and diflubenzuron under this alternative are discussed in detail in the 2002 FEIS (Environmental Consequences of Alternative 3: Reduced Agent

Area Treatments (RAATs), pp. 49–57). A description of anticipated site-specific impacts from this proposed treatment may be found in Part IV of this document.

Treatment Strategies, Treatment Guidelines, Additional Protective Measures, and Monitoring are also incorporated into this alternative. These additional elements of the grasshopper suppression program are described in greater detail below.

1. Treatment Strategies

The insecticides available to APHIS are diflubenzuron, carbaryl (spray and bait), and malathion. APHIS will not be considering the use of malathion in Oregon under this EA. The decision on which insecticide to use, if any, depends on a variety of factors specific to a given site and situation. Each of these insecticides has characteristics that dictate its desirability for a treatment. Detailed information on the insecticides used by APHIS for grasshopper control is found in the 2002 FEIS pp 30-36. Information on surfactants or additives to sprays is found in the 2002 FEIS pp 36-37.

Diflubenzuron is a chitin inhibitor, and only kills grasshoppers or other insects when they are in their immature stages. It will not kill adult grasshoppers. It cannot be used late in the season because the grasshoppers are no longer molting, and thus not susceptible. In Oregon, the efficacy of diflubenzuron is notably decreased by the first week of July because of grasshopper maturity**.** This material would not normally be used after the third week of June, for most species of grasshoppers in Oregon. Insects usually die seven to ten days after treatment. Diflubenzuron is reported to have a residual activity against grasshoppers lasting up to 28 days. Diflubenzuron is less harmful to other insects, including pollinators, than the other chemicals, and is essentially harmless to vertebrates. Diflubenzuron must be applied as a spray mixed with water and crop or vegetable oil. It is normally applied by air for grasshoppers on rangeland, but can also be applied by ground. It is the least costly option per acre treated. The formulation of diflubenzuron approved for use by APHIS is Dimilin 2L ®.

Carbaryl bait acts faster than diflubenzuron. It kills adult and immature grasshoppers and other insects that feed on the bait. It has a broader spectrum of insecticidal activity than diflubenzuron, but the bait must be ingested to be lethal. Therefore it is preferred over carbaryl sprays, in areas where foraging bees are a concern. It is the most costly option. It can be used effectively any time during the grasshopper season. It can be applied by air or ground. Carbaryl bait is applied in greater mass than any of the other treatments (up to 10 lbs. dry material per acre) and creates a greater logistical problem because of the amount of material which must be stored, transported and applied. Carbaryl bait can be applied by air in some situations when and where liquid insecticides cannot. Although no aerial applications of any insecticide can be conducted when wind speeds exceed 10 mph, carbaryl bait can be applied when air temperatures are too high to permit effective applications of sprays. Additionally, when terrain is too rough to maintain flying at the low altitude consistent with effective spray application, bait can be applied by flying at a safe altitude over the ground. Thus, the window of opportunity to apply bait is greater than for sprays. The carbaryl bait formulations approved for use by APHIS include products which impregnate carbaryl into wheat bran, rolled whole wheat, and pellets manufactured from grape and apple pumice.

Carbaryl spray is a broad spectrum contact insecticide that is more effective in cool weather than hot weather. It kills adult and immature grasshoppers and other insects. It has a knock-down effect intermediate between diflubenzuron (delayed) and malathion (immediate) sprays, and it has a residual activity of up to 14 days. It is normally applied by air for grasshoppers on rangeland, but can also be applied by ground. It is intermediate in cost. It carries higher risk for non-target species than diflubenzuron or carbaryl bait. Because of the residual toxicity to bees, it is not likely to be a treatment of

choice in areas where foraging bees are a concern. The carbaryl formulation approved for use by APHIS is Sevin XLR Plus which uses water as the carrier.

Requests for grasshopper suppression programs may come from Federal land managers or Oregon Department of Agriculture, at any time. Complaints and requests for suppression from public land managers, private landowners and other persons who are threatened by grasshopper outbreaks normally come when the outbreak is in progress. When a request for suppression is received, APHIS then determines the need for suppression measures.

The first level of assessment is the overall grasshopper population density. This is determined through field survey and is expressed in grasshoppers per square yard. In addition to the density of grasshoppers, an assessment of the species composition and life stage will be made. Species without strong migratory habits are less of a concern to nearby croplands than those with strong migratory characteristics. Examples of grasshoppers with strong migratory habits include Mormon crickets (*Anabrus* spp.), *Melanoplus sanguinipes,* and *Camnula pellucida.* Examples of grasshoppers which are not highly migratory include the short-winged form of *Oedaleonotus enigma*, and *Hesperotettix viridis*. Grasshopper populations which are not likely to threaten crops or cause significant damage to rangeland would not be treated.

Next, APHIS will determine, through consultation with US Fish and Wildlife Service (FWS) and Federal land managers what protective measures, if any, will be necessary to protect sensitive species and/or sites. Sensitive species and/or sites could include threatened & endangered, candidate, and species of concern (threatened & endangered, candidate, and species of concern will be collectively referred to as T&E species), critical habitats, organic crops, special sites, or other areas needing protection from program chemicals. The implementation of buffers may have an adverse impact on the efficacy of a potential program. APHIS may decide not to undertake a program if it is determined that protective measures will prevent effectively reducing grasshopper numbers to a desired level.

Following a decision to conduct a treatment, the pesticide would be chosen according to site specific conditions. This involves many factors including type and density of vegetation, acceptance of bait by the grasshopper species involved, terrain, climatic conditions, proximity to pollinators, life stage of the grasshopper, importance of rapid reduction of grasshopper density, need for residual control, costs, and logistics.

Because of their different modes of action, and suitability under different climatic conditions, the two pesticides can be sorted as follows:

Grasshopper Life Stage	Weather Conditions	Pesticide
Nymphs	Cool and wet	Diflubenzuron, Carbaryl
Nymphs	Hot and dry	Diflubenzuron
Adults	Cool and wet	Carbaryl
Adults	Hot and dry	Carbaryl

The insecticides would be applied in swaths which have a width determined for each treatment device (aircraft, truck-mounted spreader, or ATV-mounted spreader) and insecticide. For instance, an Ayres Turbine Thrush aircraft can deliver a 100 foot swath with spray, and an ATV-mounted bait spreader can deliver a 15 foot swath with bait.

Insecticide Applications at Conventional Rates and Complete Area Coverage Alternative utilizes the approach of spacing the centerline of adjacent swaths one swath-width apart. RAATS utilizes variable spacing of the swaths. The distance between treated swaths may be varied by the program manager based on factors such as vegetation density, grasshopper population pressure and value of the resource being protected. For carbaryl and diflubenzuron, which have longer residual activity, the percent of the area left untreated can be greater (swaths can be up to 100 feet) than other insecticides. In some situations, such as when grasshopper densities are extreme, late instars are present, or vegetation is dense it may be determined to reduce the size of the untreated swaths to increase effectiveness.

2. Treatment Guidelines

The objectives of the APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program are to 1) conduct surveys in 17 Western States; 2) provide technical assistance to land managers; 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. (APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program FY-2016 Treatment Guidelines Version 2/11/2016)

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 or the agriculture department of an affected State, APHIS, to protect rangeland, shall immediately treat Federal, State, or private lands that are infested with grasshoppers or Mormon crickets at levels of economic infestation, unless 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% charged to any funds received by APHIS for federal involvement with suppression treatments.

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

7. There are situations where APHIS may be requested to treat rangeland that also includes 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 that crop as well as rangeland.

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. giving technical guidance.

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

Operational Procedures

GENERAL PROCEDURES FOR ALL AERIAL AND GROUND APPLICATIONS

1. Follow all applicable Federal, State, Tribal 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 spray

b) Diflubenzuron ultra low volume spay

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 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 Repersentative (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 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 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 assure that any environmentally sensitive sites were protected.

9. APHIS reporting requirements associated with grasshopper / Mormon cricket suppression treatments can be found in the APHIS Grasshopper Program Guidebook:
http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/grasshopper.pdf

SPECIFIC PROCEDURES FOR AERIAL APPLICATIONS

1. APHIS Aerial treatment contracts will adhere to the current Statement of Work.

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 effected.

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 aircraft's wingspan.

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.

3. Additional Protective Measures

- APHIS will perform on-site examination of proposed suppression spray areas to determine the presence of water.

- Biological control release sites will be considered on an individual basis in consultation with the land manager to determine which insecticides might be used and/or how much buffer space should be allowed.

- APHIS will obtain a listing of certified organic growers and determine buffers needed to protect organic farm operations on an individual basis.

- Prior to making a final decision on whether to treat and which method to use, APHIS will request the land manager to provide information on the existence and location of any sensitive areas or species of concern. US Fish and Wildlife Service (FWS) and NOAA Fisheries will be contacted to determine the location of any listed or proposed T&E species. The appropriate mitigation measures will be applied. When treating state, Federal, or Trust land, APHIS will adhere to protective measures required by the requesting land manager with respect to candidate species, non-listed species of concern, critical habitats, and other areas of concern. When requested to treat private land APHIS will consider protective measures for state listed species, candidate species, critical habitats and other areas of concern so long as they do not compromise the effectiveness of the suppression program.

4. Monitoring

APHIS has developed an Environmental Monitoring Plan (EMP) for the Rangeland Grasshopper and Mormon Cricket Suppression Program. Monitoring involves the evaluation of various aspects of the grasshopper suppression programs. There are three aspects of the programs that may be monitored. The first is the efficacy of the treatment. APHIS will determine how effective the application of an insecticide has been in suppressing the grasshopper population within a treatment area and will report the results in a Work Achievement Report to the Western Region and the land manager.

The second area included in monitoring is safety. This includes ensuring the safety of the program personnel through medical monitoring conducted specifically to determine risks of a hazardous material. (APHIS Safety and Health Manual (USDA, APHIS, 2004).

The third area of monitoring is environmental monitoring. APHIS Directive 5640.1 commits APHIS to a policy of monitoring the effects of Federal programs on the environment. Environmental monitoring includes such activities as checking to make sure the insecticides are applied in accordance with the labels, and that sensitive sites and organisms are protected. The environmental monitoring recommended for grasshopper suppression programs involves monitoring sensitive sites such as bodies of water used for human consumption or recreation, or which have wildlife value, habitats of T&E species, habitats of other sensitive wildlife species, edible crops, and any sites for which the public has expressed concern or where humans might congregate (e.g., schools, parks, hospitals).

The need for specific environmental monitoring on any suppression programs in Oregon will be based upon APHIS current policy (EMP), consultation with land managers, and consideration of sensitive areas for T&E or other species of concern.

5. Experimental Treatments

APHIS continues to refine its methods of grasshopper control in order to make the program more economically feasible and environmentally acceptable. These refinements can include reduced rates of currently used pesticides, improved formulations, development of more target specific baits and development of biological pesticide suppression alternatives or improvements to aerial and ground application equipment. A division of APHIS, the Center for Plant Health Science and Technology (CPHST) located in Phoenix, AZ conducts methods development and evaluations for our agency.

To accomplish this work, experimental plots are used to refine equipment and methods or develop formulations that will possibly be used in future rangeland grasshopper programs. The experimental plot investigations are typically located throughout the western United States, including Oregon.

During the local informal field level consultation with the appropriate agencies, locations of experimental trials will be made available in order to ensure these activities are not conducted near sensitive species or habitats. Due to the small size of experimental plots, location of plots away from sites with endangered species conflicts, EPA approval and informal field level consultations, no adverse effects to the environment or its components are expected from these research activities.

Stressor tests, mixtures of native pathogen isolates combined with low doses of insecticides, will be conducted on native species of grasshoppers in a series of field cage exposures. Each test will consist of a series of mini-plots to be treated with Field Aerial Application Spray Simulation Tower Technique (FAASSTT). The treated plots, ten for each treatment, will be 14 inches in diameter. Grasshoppers confined in field cages on these areas will be followed to determine if the combination enhances field mortality of grasshoppers. Likely insecticides are diflubenzuron, Neem oil and chlorantraniliprole.

A series of experiments using ATV application equipment to apply labeled materials using RAATs and blanket applications to determine expected mortalities associated with barrier or crop protection and hot spot treatments. This may include baits or liquid applications.

A Study to Look at CP® Nozzle and Tip Configuration

The objective would be to look at tips that would be equivalent to the 8004 TeeJet® tip recommended in the statement of work (SOW). The test would be conducted on grasshopper populations that are present, expansive and warrant control applications at a chosen location.

The study will consist of four replicated plots of 40 acres each to be treated to determine the effect of CP nozzles oriented 90 degrees to the slip stream of the aircraft (CP_{down}) as well with the airflow (CP_{down}), a common practice in commercial application industry to be compared with the standard nozzle and tip orientation as specified in the current SOW. This would allow direct comparison of the effect of CP nozzle design and orientation with the treatments consisting of Dimilin and Prevathon applied as a RAATs application.

Dimilin would be applied at 1.0 fl. oz., 10 fl. oz. crop oil concentrate and 20 fl. oz. water applied in a RAATs application. The Prevathon would be applied at 2 fl. oz. with 0.32 fl. oz. methylated seed oil and water up to a total volume of 32 fl. oz. per acre applied as a RAATs application. These treatments would be applied and monitored by USDA personnel.

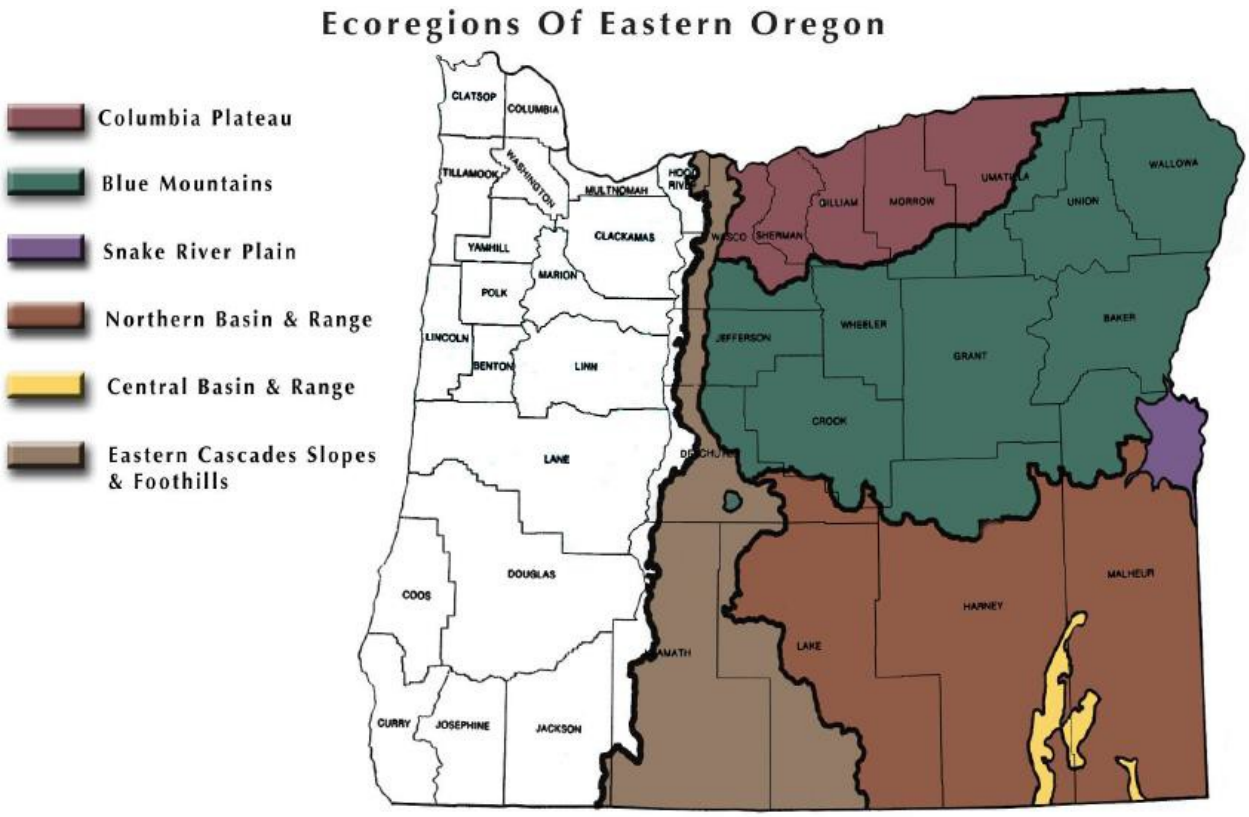
III. Affected Environment

A. Description of Affected Environment

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

Generally, it is not possible to predict the precise locations where grasshopper outbreaks will occur in any given year. However, ODA has compiled historical annual survey data from 1953-2012. The result is a map showing areas where grasshoppers have historically been an economic problem in Oregon (see Appendix 1, Map 2). The areas of economic outbreaks are very consistent. This extensive historical data allows APHIS to make the assumption that it is unlikely that economic outbreaks will occur in areas other than those with historical infestations. Although this assessment covers all the rangeland in the 17 counties, APHIS's attention to the affected environment will concentrate on the areas of historical grasshopper outbreaks.

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



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

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

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

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

Central Basin and Range – This ecoregion is composed of north-south trending fault block ranges and intervening drier basins. In the higher mountains, woodland, mountain brush and scattered open forest are found. Lower elevation basins, slopes and alluvial fans are shrub and grass covered, shrub-covered, or

barren. The potential natural vegetation is, in order of decreasing elevation and ruggedness: scattered western spruce-fir forest, juniper woodland, sagebrush and salt brush-greasewood. The region is internally drained by ephemeral streams. In general, this region is warmer and drier than the Northern Basin and Range and has more shrub land and less grassland than the Snake River Plain. The land is primarily used for cattle grazing.

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

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

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

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

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

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

Grassland, shrub land, and woodlands are present across the general area. Grasshopper treatments would occur only in rangelands (grass and shrub lands, not in forests). Some of the rangelands are utilized for

livestock grazing, but rangelands also provide habitat for native and introduced game and non-game animal species.

Elevation and topography within the overall area vary considerably, from below 500 feet along the Columbia River to mountains over 9000 feet. Treatments would occur primarily on flatlands, foothills, and areas adjacent to cropland. Some treatments may occur on areas of rangeland where critical forage or revegetation projects are threatened. The rangeland of the Columbia Plateau is mostly between 1000-2000 feet elevation, while the rangeland of the Northern Basin and Range averages 3500-4500 feet. Most suppression treatments would occur at elevations below 6000 feet.

Up to 100 species of grasshoppers may occur within the proposed suppression area. Of these, no more than ten species have been known to reach outbreak status and threaten crops and/or valuable range resources in Oregon during the past five decades. The widespread grasshopper outbreaks of the mid-1980s were comprised primarily of the *Melanopli* group. Localized outbreaks in the 1990s and 2000s have included mainly *Camnula pellucida.* The widespread outbreak that occurred in 2010-11, mainly in Baker, Malheur, Umatilla and Harney Counties was a mix of species, primarily the *Melanopli* group.

B. Site-Specific Considerations

1. Human Health

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

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

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

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

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

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.

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

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

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

Recognition of the increased scientific knowledge about the environmental health risks and safety risks associated with hazardous substance exposures to children 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 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).

2. Non-target Species

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

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

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

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

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

A diverse complement of terrestrial plants occurs within the proposed suppression area. Many such as Canada thistle, Scotch thistle, puncturevine, purple loosestrife, spotted and diffuse knapweed, yellow starthistle, and leafy spurge are considered as non-native, invasive weeds. Native plants such as sagebrushes, bitterbrush, and various grasses provide forage and shelter for animal species and help stabilize the soil against erosion.

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

a) Federally listed species

The proposed action has the potential to cause changes that may affect the behavior or physiological processes of some federally listed Threatened, Endangered, Proposed, or Candidate species. Candidate species have no protection under the ESA, but their conservation status is of special concern to USFWS since they are candidates for listing as threatened or endangered.

Table 1 in section IV.B.7 of this EA shows the federally listed species found in the potential treatment area, and indicates in which counties they are found, including if any critical habitat (CH) is assigned or proposed (PCH). Critical habitat is a specific geographic area essential to the conservation of a T&E species which may require special protection. Although APHIS is not required to consult with USFWS on candidate species under ESA, USFWS has requested that APHIS consider impacts to candidate species that could occur in rangeland habitat and thus be affected by a grasshopper suppression program.

In 2015 the U.S. Fish and Wildlife Service (FWS) determined that the Greater sage-grouse (Centrocercus urophasianus) did not warrant listing under the Endangered Species Act. The decision by the FWS relied on the collaborative conservation efforts among federal, state and private landowners among the eleven states where the Greater sage-grouse occur. The Greater sage-grouse is an upland bird that occurs primarily in sagebrush habitat which is also habitat where grasshopper and Mormon cricket suppression programs may be warranted. USDA APHIS currently works with federal, state and private landowners in monitoring these types of habitats for grasshopper and Mormon cricket populations, and in some cases may make pesticide treatments to protect these habitats. USDA APHIS recognizes that Greater sage-grouse conservation plans by federal entities such as the Bureau of Land Management and Forest Service, as well as state plans, are critical in protecting their habitat. USDA APHIS will continue to work with its federal and state partners, as well as private landowners, to implement protection measures, where appropriate, to protect Greater sage-grouse and their habitat.

Many other species are accorded special status by Federal land managers or by the State of Oregon. Data about these species are available from the respective land managers or at Oregon Department of Fish & Wildlife website, http://www.dfw.state.or.us/wildlife/diversity/

b) Bald and Golden Eagle Protection Act

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

normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

3. Socioeconomic Issues

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

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

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

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

Much of the land in the potential suppression area is publicly owned. The area contains parts of six National Forests; Deschutes, Malheur, Umatilla, Wallowa-Whitman, Fremont-Winema, Ochoco; Crooked River National Grasslands; and Hell's Canyon National Recreation Area administered by USDA Forest Service. USDI Fish and Wildlife Service administers the Hart Mountain National Antelope Refuge, Klamath Marsh, Bear Valley, Lower and Upper Klamath National Wildlife Refuges, Malheur NWR, McKay Creek NWR, Cold Springs NWR, Umatilla NWR, and Deer Flats NWR. The USDI Bureau of Land Management administers much of the public rangeland and is the major landowner in the southeast and south-central part of Oregon. More than half the public forest and rangeland is leased for grazing (Meacham *et. al.* 2001). The remainder is either not farmable or set aside as protected areas.
This area also contains many parks, wilderness areas, public forests, and wilderness studies area administered by state or local governments. The Department of Interior, National Park Service administers John Day Fossil Beds National Monument. There may also be areas of rangeland habitat considered as "sensitive areas" for the survival of non-listed species of concern.

The general public uses rangelands in the proposed suppression area for a variety of recreational purposes including hiking; camping; wildlife, bird, and insect collecting and watching; hunting; falconry; shooting; plant collecting; rock and fossil collecting; artifact collecting; sightseeing; and dumping. Members of the general public traverse rangelands in or near the proposed suppression area by various means including

on foot, horseback, all-terrain vehicles, bicycles, motorcycles, four-wheel drive vehicles, snowmobiles, and aircraft.

Artificial surfaces in or near the proposed suppression area include the walls and roofs of buildings, painted finishes on automobiles, trailers, recreational vehicles, and road signs. See 2002 FEIS pp 71-72. The land most likely to be involved in a grasshopper suppression program would include active or idle rangeland, Conservation Reserve Program (CRP) land, and some cropland.

4. Cultural Resources and Events

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

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

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

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

IV. Environmental Consequences

A. Environmental Consequences of the Alternatives

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 FEIS. The specific impacts

of the alternatives are highly dependent upon the particular action and location of infestation. The principal concerns associated with the alternatives that include insecticide application are: (1) the potential effects of the three pesticide options on human health (including subpopulations that might be at increased risk); and (2) impacts of pesticides on non-target organisms (including threatened and endangered species). Assessments of the relative risk of each pesticide option are discussed in detail in the 2002 FEIS document. Site-specific environmental consequences of the alternatives are discussed in this section.

1. No Action Alternative

Under the No Action Alternative, APHIS would not fund or participate in any program to suppress grasshopper infestations. Some Federal land management agencies, State agriculture departments, local governments, or private groups or individuals would likely conduct their own grasshopper treatments, but APHIS would not be involved with any suppression activities. APHIS may assist in making grasshopper management decisions by providing survey information and technical assistance to the land managers.

Human health

There would be no exposure to the public or workers from chemicals used in APHIS grasshopper suppression activities under this alternative. If APHIS does not participate in any grasshopper suppression programs, it is possible that some Federal land management agencies, State agriculture departments, local governments, or private groups or individuals may attempt to conduct widespread grasshopper programs. Without the technical assistance and program coordination that APHIS can provide to grasshopper programs, it is possible that a large amount of insecticides, including those APHIS considers too environmentally harsh but labeled for rangeland use, could be applied, reapplied, and perhaps misapplied in an effort to suppress or even locally eradicate grasshopper populations. If APHIS assists in making grasshopper management decisions by providing survey information and technical assistance to the land managers, the possibility of misapplications may be reduced. 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 somewhat unknown.

Non-target species

An abundant supply of grasshoppers and other insects would be available as a food source for insectivorous animals. This includes birds and other animals which have been accorded sensitive species status by land managers and others.

Grasshoppers in unsuppressed outbreaks may consume agricultural and nonagricultural plants. The damage caused by grasshopper outbreaks could also pose a risk to rare, threatened, or endangered plants that often have a low number of individuals and limited distribution, but this is somewhat unlikely as these plants have coexisted with grasshoppers for thousands of years. Plants can be killed or weakened by grasshopper feeding. Some grasshoppers feed on seeds, so future generations of plants could be threatened.

Loss of plant cover would occur due to consumption by grasshoppers. Nesting and cover habitat may be degraded for birds and other wildlife. The herbaceous under story is important to nesting success by sage grouse (Connelly, *et. al*. 1994).

Rangeland which has been severely grazed by grasshoppers may be more susceptible to invasion by nonnative plant species. The plant root systems which hold the soil in place may be weakened, leading to increased rates of erosion. Continued livestock grazing on grasshopper impacted lands will compound the effects to vegetation, soils, and water quality negatively impacting non-target species.

If APHIS does not participate in any grasshopper suppression programs, local governments, or private groups or individuals may attempt to conduct widespread grasshopper programs. Without the technical assistance and program coordination that APHIS can provide to grasshopper programs, it is possible that a large amount of insecticides, including those APHIS considers more environmentally harsh than the insecticides proposed for use as part of the APHIS grasshopper suppression program, could be applied, reapplied, and perhaps misapplied in an effort to suppress or even locally eradicate grasshopper populations. If APHIS assists in making grasshopper management decisions by providing survey information and technical assistance to the land managers, the possibility of misapplications may be reduced. It is not possible to accurately predict the environmental consequences of the No Action alternative to non-target organisms because the type and amount of insecticides that could be used in this scenario are somewhat unknown.

Rangeland fires may also be set by persons who desire suppression of the grasshoppers. Action of this type has not been documented, but individuals have allegedly threatened to set fires to destroy grasshopper outbreaks that are not controlled.

Socioeconomic issues

Under the No Action alternative, forage for grazing livestock could be reduced by a grasshopper infestation. Under this scenario, individual livestock owners may have to lease rangeland in another area and relocate their livestock, find other means to feed them (such as purchasing hay or grain), or sell their livestock early. Individual livestock owners could incur economic losses from personal attempts to control grasshopper damage, leasing alternate grazing rangeland and relocating livestock, or purchasing alternate sources of feed (such as hay) for livestock. However, many outbreaks occur during droughts when other land leases are unavailable and alternate feed is more expensive. Local communities where losses occur would incur an adverse economic impact under this alternative.

Economic infestations of grasshopper may invade adjacent croplands and cause damage to crops. Since organic farmers have less alternatives when combating grasshopper infestations, organic farmers may suffer significant losses if grasshopper outbreaks are not controlled on public rangeland and migrate to adjacent organic cropland. Organic farmers in other states have reportedly been forced to abandon their organic farming enterprise due to invasion of grasshoppers from rangeland into organic fields.

It has been suggested that rather than treat grasshopper outbreaks, the federal government should compensate farmers for losses they incur. In cases where grasshoppers migrate from rangeland onto high value cropland, USDA Risk Management Agency (RMA) has offered multi-peril crop insurance (Sec. 501 7 USC 1501) which may compensate for losses due to insects if the policy holder utilizes appropriate pest control measures, but those measures fail. Forage is not a covered crop under this program. Normally, this payment is based on the failure of pest control spray practices due to untimely rainfall or some other natural event.

USDA Farm Service Agency (FSA) has offered the Noninsured Crop Disaster Assistance Program (NAP) (7 CFR 1437.4) which provides financial assistance to eligible producers affected by natural disasters. Forage is considered a noninsured crop. To be eligible a natural disaster must result from a condition related to damaging weather or adverse natural occurrence, such as excessive heat, disease, or insect

infestation. Normally grasshopper damage would not qualify for this program. However, the local FSA Office may make a determination that a grasshopper outbreak is a direct result of drought conditions that exist at the time. This program requires pre-enrollment, annual production reporting, and meeting a loss threshold. Skold and Davis (1995) proposed a rangeland grasshopper insurance program. No authority currently exists for such a program. APHIS has no control over these programs.

Cultural resources

Grasshoppers were a significant source of protein for indigenous North American people. They are no longer used as a human food source except as a novelty or recreational experience. No Action alternative may affect traditional gathers and practitioners that gather foods and medicines from traditional natural areas due to grasshopper consumption of gathered medicinal and traditional use plants.

2. Insecticide Applications at Conventional Rates and Complete Area Coverage Alternative

Under Alternative 2, APHIS would participate in grasshopper programs with the option of using the insecticides carbaryl and/or diflubenzuron, depending upon the various factors related to the grasshopper outbreak and the site-specific characteristics. The use of an insecticide would occur at the conventional rates. With only rare exceptions, APHIS would apply a single treatment in an outbreak year that would blanket affected rangeland areas in an attempt to suppress grasshopper outbreak populations by a range of 35 to 98 percent, depending upon the insecticide used. See 2002 EIS pp. 38-48 for general consequences.

Carbaryl

Carbaryl is of moderate acute oral toxicity to humans. The mode of toxic action of carbaryl occurs through inhibition of acetylcholinesterase (AChE) function in the nervous system. This inhibition is reversible over time if exposure to carbaryl ceases. The Environmental Protection Agency (EPA) has classified carbaryl as a possible human carcinogen (EPA, 1993). However, it is not considered to pose any mutagenic or genotoxic risk.

Potential exposures to the general public from conventional application rates are infrequent and of low magnitude. These low exposures to the public pose no risk of direct toxicity, carcinogenicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. The potential for adverse effects to workers are negligible if proper safety procedures are followed, including wearing the required protective clothing. Carbaryl has been used routinely in other programs with no reports of adverse health effects. Therefore, routine safety precautions are expected to provide adequate worker health protection.

Carbaryl is of moderate acute oral toxicity to mammals (McEwen *et al*., 1996a). Carbaryl applied at Alternative 2 rates is unlikely to be directly toxic to upland birds, mammals, or reptiles. Field studies have shown that carbaryl applied as either ultra-low-volume (ULV) spray or bait at Alternative 2 rates posed little risk to killdeer (McEwen *et al*., 1996a), vesper sparrows (McEwen *et al*., 1996a; Adam *et al*., 1994), or golden eagles (McEwen *et al*., 1996b) in the treatment areas. AChE inhibition at 40 to 60 percent can affect coordination, behavior, and foraging ability in vertebrates. Multi-year studies conducted at several grasshopper treatment areas have shown AChE inhibition at levels of no more that 40 percent with most at less than 20 percent (McEwen *et al*., 1996a). Carbaryl is not subject to significant bioaccumulation due to its low water solubility and low octanol-water partition coefficient (Dobroski *et al*., 1985).
Carbaryl will most likely affect non-target insects that are exposed to ULV carbaryl spray or that consume carbaryl bait within the grasshopper treatment area. Field studies have shown that affected insect

populations can recover rapidly and generally have suffered no long-term effects, including some insects that are particularly sensitive to carbaryl, such as bees (Catangui *et al*., 1996). The use of carbaryl in bait form generally has considerable environmental advantages over liquid insecticide applications: bait is easier than liquid spray applications to direct toward the target area, bait is more specific to grasshoppers, and bait affects fewer non-target organisms than sprays (Quinn, 1996).

Should carbaryl enter water, there is the potential to affect the aquatic invertebrate assemblage, especially amphipods. However, operational procedures are in place to prevent carbaryl from entering water.

Diflubenzuron

The acute oral toxicity of diflubenzuron formulations to humans ranges from very slight to slight. The most sensitive indicator of exposure and effects of diflubenzuron in humans is the formation of methemoglobin from hemoglobin (a compound in blood responsible for the transport of oxygen) in blood. Potential exposures to the general public from Alternative 2 application rates are infrequent and of low magnitude. These low exposures to the public pose no risk of methemoglobinemia (a condition where the heme iron in blood is chemically oxidized and lacks the ability to properly transport oxygen), direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Potential worker exposures are higher than the general public but are not expected to pose any risk of adverse health effects.

Because diflubenzuron is a chitin inhibitor that disrupts insects from forming their exoskeleton, organisms without a chitinous exoskeleton, such as mammals, fish, and plants are largely unaffected by diflubenzuron. In addition, adult insects, including wild and cultivated bees, would be mostly unaffected by diflubenzuron applications (Schroeder *et al*., 1980; Emmett and Archer, 1980). Among birds, nestling growth rates, behavior data, and survival of wild American kestrels in diflubenzuron treated areas showed no significant differences among kestrels in treated areas and untreated areas (McEwen *et al*., 1996b). The acute oral toxicity of diflubenzuron to mammals ranges from very slight to slight. Little, if any, bioaccumulation of diflubenzuron would be expected (Opdycke *et al*., 1982).

Diflubenzuron is most likely to affect immature terrestrial insects. While this would reduce the prey base within the treatment area for organisms that feed on insects, adult insects, including grasshoppers, would remain available as prey items. The implementation of pesticide label instructions and restrictions and the APHIS treatment guidelines will reduce potential impacts from the program use of insecticides (see Treatment Guidelines).

Human health

Human exposure to program insecticides could occur. Exposures and effects are discussed in the 2002 FEIS pp. 39-40, 43, and 46-47. Personnel working on the suppression program would be exposed during handling, loading and application of the insecticides. Potential exposure of the general public would be infrequent and of low magnitude. Implementation of the operational procedures outlined in the Treatment Guidelines would minimize public exposure and protect workers from harmful exposure. Individuals with hypersensitivity to the insecticides, carriers, and adjuvants might be affected. APHIS will seek lists of hypersensitive individuals from state and county health departments and would contact persons who reside near proposed treatment areas prior to treatment. Hypersensitive individuals would be advised to avoid treatment areas and the areas surrounding them.

Many individuals are opposed to any treatments on public rangelands because they believe treatments would disrupt ecosystems. The anxiety levels of these stakeholders may be increased. Conversely, the

anxiety level of individuals whose livelihoods are being protected by treatments of grasshoppers, typically originating from public lands, would decrease.

Pesticide spills could expose individuals to excessive levels of insecticide. APHIS maintains spill kits and insures that program personnel are familiar with procedures to mitigate effects associated with a spill.

Non-target species

Non-target exposure to program insecticides could occur. Exposures and effects on representative species in each non-target group are discussed in the 2002 FEIS Appendix B and part V. C. pp. 39-48.

Under this alternative grasshopper feeding damage would be reduced to rangeland plants, including desirable and undesirable plants, and to crops adjacent to rangeland. Reduction of the grasshopper feeding damage may be viewed as having both negative and positive impacts. Population densities of some non-target insects and other arthropods would be reduced. Food sources for some insectivorous animal species would be reduced. Non-target plant and animal species would be exposed to insecticides.

Non-target insect species which would be put at risk by treatments under this alternative include non-native biological control agents and pollinators. Any chemical applied to control grasshoppers has the potential to cause adverse impacts to biological control agents that been released by government agencies or private individuals to control noxious weeds or arthropod pests. APHIS will consult with land managers to determine the location and status of biological control agent populations and would select treatment options (including buffering areas) which minimize negative impacts on the populations.

Managed pollinators include native leafcutter and alkali bees, and non-native honeybee. Honeybees are found throughout and near the proposed suppression area. Carbaryl sprays are very toxic to bees. Leafcutter and alkali bees may be found in the proposed treatment area, but are usually encountered in crop areas adjacent to the rangeland. APHIS will conduct surveys and consult with landowners to determine if managed pollinators are in or near proposed treatment areas. Because of the residual toxicity to bees, Carbaryl sprays are not likely to be a treatment of choice in areas where foraging bees are a concern.

Unmanaged native pollinators include a vast array of insects and other animals. In general, the insect fauna within this group is more susceptible to carbaryl sprays than to the other treatment options. To maximize the protection of these organisms, APHIS would select diflubenzuron spray or carbaryl bait whenever they would be efficacious to control grasshopper outbreaks.

This alternative may result in the reduction of insects as a food source for rangeland insectivores, such as sage grouse and sharptail grouse chicks. The use of the insecticides (diflubenzuron and carbaryl bait) which are more selective for grasshoppers than for most other species leaves alternative insect fauna for foraging insectivores (Paige and Ritter 1999). Because APHIS would only treat significant outbreak populations, numbers of grasshoppers surviving the treatment can provide ample nourishment for the insectivores. Additionally, Martin *et. al.* (2000) and Howe, *et. al.* (2000) found that grassland and shrub steppe bird species were able to make adaptive changes when insecticidal spray reduced the numbers and changed the composition of insect prey species.

There would be a temporary decrease in insect biodiversity within treatment areas. Diflubenzuron spray and carbaryl bait treatments are preferred since Carbaryl sprays would decrease the biodiversity more than diflubenzuron spray and carbaryl bait treatments.

The program chemicals have no phytotoxicity to most plants when applied at label rates. The chemicals act quickly to reduce grasshopper infestations, thus minimizing damage to vegetation from grasshopper foraging. Chemical controls have the potential for indirect effects on plants that depend on certain insects (bees and ants), for pollination and seed dispersal. These insects' numbers may be depressed by chemical control. The effect on plants by a control program will be less than the loss of growth and seed production caused by the total elimination of most vegetation by grasshoppers during an outbreak.

Impacts to non-target species from livestock grazing is unlikely to be affected by this alternative.

Pesticide spills could expose wildlife to excessive levels of insecticide. APHIS maintains spill kits and insures that program personnel are familiar with procedures to mitigate effects associated with a spill.

Negative impacts to non-target organisms would be minimized by the implementation of the Treatment Guidelines.

Socioeconomic issues

A discussion of the socioeconomic impacts of grasshopper treatments are discussed on pages 61-74 of the 2002 FEIS.

Under this alternative, there is a reduced risk that grasshopper outbreaks on rangeland would decrease the availability of forage for cattle and sheep. There is also a reduced risk of unchecked movement of grasshopper outbreaks into crops resulting in crop loss and additional expenditures for insecticidal control in the crop fields.

Organic farmers face less risk of significant losses from grasshopper outbreaks on rangeland which could emigrate to organic cropland. However, organic farmers would be put at increased risk of contamination from spray originating from grasshopper suppression programs. APHIS will procure a listing of certified organic growers and determine buffers needed to protect organic farm operations.

Air pollutants will be produced by fuel combustion in airplanes, vehicles, and machinery used in grasshopper control activities. Allowable emission levels and concentrations are enforced by state air control agencies. The amounts of these pollutants are not expected to exceed the normal background levels, and should have a negligible temporary effect on air quality.

Increases in ozone concentration from the volatilization of pesticides and carriers are also expected to be negligible. The chemicals approved for use have low vapor pressure and are essentially nonvolatile.

Negative socioeconomic impacts would be minimized by the implementation of the Treatment Guidelines.

Cultural resources and events

The availability of grasshoppers for fish bait and other human uses would be reduced from outbreak levels to more normal levels. Persons using rangelands for recreation would respond to grasshoppers as they do under normal conditions versus under outbreak conditions.

Native American tribes in the area reserve the right to hunt and gather traditional foods and medicines on public lands within the proposed suppression area. Where Native American tribal lands or resource gathering areas will be involved in a program area, or when tribal resources may be impacted, the affected tribes will be consulted. Tribal representatives will be provided the opportunity to identify cultural sites,

native plant use areas, and any other resource areas which might be impacted. Consultation will allow for mitigation of impacts to these sites and resources.

When a request for suppression is received, APHIS' will provide tribal authorities with maps of proposed treatment block(s) whenever tribal resource areas occur in the county where the action is proposed. Tribal authorities can then determine if any cultural sites or resource areas are in or near a proposed treatment block. In consultation with tribal authorities, determination will be made whether and where signs should be placed on entries to resource gathering areas during the actual application and for the re-entry period specified on the label for the product being used. Such notification and posting of signs as agreed will reduce the potential for human exposure during pesticide application and the label re-entry period.

Artificial surfaces

Carbaryl spray can damage some painted surfaces. Automotive and sign finishes are susceptible to damage, and their owners could suffer economic loss repairing cosmetic damage. Public notice of carbaryl spray programs will include a warning about how to avoid potential damage. APHIS will consult with land managers if carbaryl spray was going to be used so they could elect to cover or remove signs during treatment. APHIS will consult with land managers to ensure that Native American petroglyphs are excluded from spray areas.

3. Reduced Area Agent Treatments (RAATs) Alternative

Under Alternative 3 (RAATs Alternative), one of the insecticides carbaryl and/or diflubenzuron would be used at a reduced rate and over reduced areas of coverage. Rarely would APHIS apply more than a single treatment to an area per year. The maximum insecticide application rate under the RAATs strategy is reduced 50 percent from the conventional rates for carbaryl and 25 percent from the Alternative 2 rate for diflubenzuron. Although this strategy involves leaving variable amounts of land not directly treated, the risk assessment conducted for the 2002 EIS assumed 100 percent area coverage because not all possible scenarios could be analyzed. However, when utilized in grasshopper suppression, the amount of untreated area in RAATs often ranges from 20 to 67 percent of the total infested area but can be adjusted to meet site-specific needs.

Potential exposures to insecticides to the general public and workers from RAATs application rates are of a commensurately lower magnitude than conventional rates. These low exposures to the public pose basically no risk of direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity.

Using alternating swaths is expected to reduce adverse effects because organisms that are in untreated swaths will be mostly unexposed to pesticides. While carbaryl applied at a RAATs rate will reduce susceptible insect populations, the decrease will be less than under conventional rates.

As with the Conventional Rates Alternative, non-target species exposure to program insecticides to would occur under the RAATs Alternative. Exposures and effects on representative species in each non-target group are discussed in the 2002 FEIS Appendix B and part V. C. pp. 50-57.

As with the Conventional Rates Alternative, operational procedures are in place to prevent pesticides from entering water. Negative impacts to non-target organisms would be minimized by the implementation of the Treatment Guidelines.

Overall, the potential impacts and risks to human health and cultural resources under the RAATs Alternative are basically the same as those under the Conventional Rates Alternative. The risk of pesticide spills is roughly equivalent to the risk under the Conventional Rates Alternative.

The main differences between the Conventional Rates Alternative and the RAATs Alternative include the following:

- The general level of reduction and risk to non-target insect species (including non-native biological control agents) and other invertebrate populations would be somewhat less under RAATs Alternative.
- The risk to managed pollinators under the RAATs Alternative would be similar to the risk under the Conventional Rates Alternative, but the risk to unmanaged native pollinators would be somewhat less under the RAATs Alternative.
- The reduction in prey available to insectivores (birds and other wildlife) would be significantly less under the RAATs Alternative.
- The temporary decrease in insect biodiversity within treatment areas would be significantly less under the RAATs Alternative.
- The risk of contamination from spray originating from grasshopper suppression programs to organic farmers would be somewhat less than under the RAATs Alternative because less insecticide is applied in a treatment area.
- The risk of grasshopper damage is somewhat higher under the RAATS Alternative than under the Conventional Rates Alternative. Because of reduced insecticidal rates and coverage, the RAATS Alternative reduces the grasshopper population to a lesser degree than the Conventional Rates Alternative.
- Probability of damage to artificial surfaces would be less in the RAATS Alternative than in the Conventional Rates Alternative.

B. Other Environmental Considerations

1. Cumulative Impacts

Cumulative impact, as defined in the 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. The pesticide used and type of application will influence overall impacts. Depending on the specific exposure scenario and the nature of the available data, the consequences of cumulative exposures are assessed in a variety of ways in the 2002 FEIS.

Under APHIS programs, rangeland areas normally are only treated one time per season to suppress grasshopper populations. Label restrictions and cost share constraints limit projects to one treatment. If used, periodic treatments may have a longer term impact, since the exposure period is longer. However, the pesticides used breakdown relatively quickly in the environment and biological populations are quick to recover.

Use of pesticides by land managers for other pest control operations (e.g. noxious weed control or mosquito control) in rangeland areas receiving grasshopper treatments may result in cumulative impacts, but such a scenario is unlikely due to differing application areas and modes of action. APHIS will consult with land managers to determine if herbicides or insecticides have been utilized within the past year on any proposed spray area within the proposed suppression area. APHIS will not apply any insecticide in a manner that conflicts with EPA requirements regarding multiple treatments or to an area known to have been treated recently with a pesticide known to have harmful cumulative effects with carbaryl and/or diflubenzuron.

Cumulative effects are not expected to significantly affect human health or the environment in program areas. Residues of the pesticides used are not expected to persist in the environment from year to year. If analysis of a proposed control area identifies potential cumulative impacts, these impacts will be further described in a supplement to this EA.

2. Synergistic Effects

There may be situations where it is appropriate to use one insecticide or formulation in one part of a treatment area and a different insecticide or formulation in another part of that same treatment area with all applications conducted according to the label directions. Should these situations occur, no area would be treated with more than one insecticide, except for minor overlap in the border area, and there would be no mixing or combination of insecticides.

APHIS will not apply any insecticide in a manner that conflicts with EPA requirements regarding multiple treatments or to an area known to have been treated recently with a pesticide known to have synergistic effects with carbaryl and/or diflubenzuron. If analysis of a proposed control area identifies potential synergistic effects, these effects will be further described in a supplement to this EA.

Diflubenzuron

Diflubenzuron is only reported to be synergistic with the defoliant DEF. Because the defoliant is unlikely to be applied concurrently with grasshopper suppression treatments, there is minimal risk of synergistic effects (2002 FEIS p B-16).

Carbaryl

The only studies of chemical interactions with carbaryl indicate that toxicity of organophosphates combined with carbaryl is additive not synergistic (2002 FEIS p B-13).

Inert Ingredients and Metabolites

A full discussion of inert ingredients and metabolites is found in the 2002 FEIS pp B-12, B-15, and B-20.

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

Consistent with Executive Order No. 12898, consideration has been made to the potential for disproportionately high and adverse human health or environmental effects on any minority and low-income populations.

Although specific data are not available, observations indicate that Hispanics and Asians are the minority groups which would be most impacted by the suppression programs because of their involvement in agricultural production systems.

No Action Alternative may cause low income and minority farm workers to be exposed to additional insecticides applied to cropland. No Action Alternative may increase costs of operation for low income and minority farm operators. No Action alternative may affect minority groups that gather foods and medicines from traditional natural areas due to grasshopper consumption of gathered medicines and traditional plants

Insecticide Applications at Conventional or RAAT Rate Alternative may cause concern for those groups that gather foods and medicines from traditional natural areas. However, public notification of treatment dates and areas along with posting signs for re-entry as necessary will allow them to avoid exposure. Insecticide Applications at Conventional or RAAT Rate Alternatives would be expected to have no disproportionate impact on minority or low income populations.

Human health effects on individuals with poor nutritional status are analyzed in the 2002 EIS pp B-24, B-27, and B-28.

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

Consistent with Executive Order No. 13045, APHIS has considered the potential for disproportional high and adverse environmental health and safety risks to children.

The human health risk assessment for the 2002 FEIS analyzed the effects 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 primarily conducted on open rangelands where children would not be expected to be present during treatment or enter should there be any restricted entry period after treatment. No urban areas or schools would be subject to treatment under the proposed action.

The potential for impacts of pesticides on children would be minimized by the implementation of the operating procedures outlined in the Treatment Guidelines.

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

In accordance with various environmental statutes, APHIS routinely conducts programs in a manner that minimizes impact to the environment, including any impact to migratory birds. In January 2001, President Clinton signed Executive Order 13186 to ensure that all government programs protect migratory birds to the extent practicable. To further its purposes, this Executive Order requires each agency with a potential to impact migratory birds to enter into an MOU with FWS.

On August 2, 2012 APHIS and US Fish and Wildlife Service signed a Memorandum of Understanding (MOU) detailing cooperative efforts to strengthen migratory bird conservation and further the purposes of the Migratory Bird Treaty Act, and other statues pertinent to migratory birds. This MOU focuses on avoiding or minimizing adverse impacts on migratory birds and strengthen migratory bird conservation through enhanced collaboration between APHIS and FWS by identifying and enhancing areas of concern. This MOU directs APHIS to consider and evaluate the conservation of migratory bird populations when initiating any plant pest or animal management action. Under the MOU FWS will provide migratory bird population and habitat information and partner with APHIS in NEPA evaluations in support of migratory bird management goals. FWS will process and assess the impacts of migratory bird take and depredation permits.

Under a grasshopper suppression program no direct harm, including take, of any migratory birds is expected to occur. Program guidelines and buffers will assure that pollution or detrimental alteration of the environment used by migratory birds is minimal and will not harm any migratory birds.

6. Bald and Golden Eagle Protection Act

On June 28, 2007 the Interior Department took the American bald eagle off the Endangered Species List. The bald eagle will still be protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The Bald Eagle Protection Act prohibits the take, transport, sale, barter, trade, import and export, and possession of eagles, making it illegal for anyone to collect eagles and eagle parts, nests, or eggs without a permit.

As listed in the National Bald Eagle Management Guidelines (USFWS, May 2007) the following mitigation measures will be followed when practical, unless the land managing agency requires more strict measures.

Helicopters and fixed-wing aircraft will not be used within 1000 feet of an active nest during the breeding season. No buffer is necessary around nest sites outside the breeding season.

Agriculture and Off Road Vehicle Use both provide the same guidance for use of ATV's or trucks. No buffer is necessary around nest sites outside the breeding season. During the breeding season if the activity will not be visible from the nest, off-road vehicles will not be operated within 330 feet of the nest. If the activity will be visible from the nest, off-road vehicles will not be operated within 660 feet of the nest.

7. Endangered Species Act

Policies and procedures for protecting endangered and threatened species of wildlife and plants were established by the Endangered Species Act (ESA) of 1973, as amended (16 United States Code (U.S.C.) § 1531 *et seq*.). The ESA is designed to ensure the protection of Endangered and Threatened species and the habitats upon which they depend for survival. Regulations implementing the provisions of the ESA have been issued. In accordance with Section 7 of the ESA, consultation is to be conducted for any action authorized, funded, or carried out by a Federal agency that may affect listed endangered or threatened species or their habitats. APHIS also includes proposed species in their consultations. Consultations are conducted with the Department of Interior Fish and Wildlife Service (FWS) for terrestrial species and freshwater aquatic species, and with U.S. Department of Commerce NOAA Fisheries for marine and anadromous species.

The most recent national biological opinion (BO) on the grasshopper program issued by FWS was issued in October 3, 1995. APHIS prepared a national Biological Assessment (BA) for the 1998 program, but no BO was issued because control programs were not anticipated that year. In February 2005, APHIS presented a Programmatic Biological Assessment (BA), along with a threat matrix, for all listed species, to FWS for comment. FWS responded in June 2005 with a request for more information on toxicity data, buffer models, and long-term effects from these programs. As the National Consultation is proceeding, a Programmatic Biological Opinion or concurrence letter will not likely be issued in time for grasshopper/Mormon cricket suppression programs in the current year. In order to comply with section 7 requirements APHIS conducts local informal consultations with the FWS as needed. The 1995 BO and 1998 BA have been used as a basis for these local consultations.

APHIS has initiated informal consultation with both the FWS Oregon State Office and Klamath Falls Office because of shared jurisdiction for parts of Klamath and Lake Counties. In the past, concurrence letters were received annually from FWS for 2003-2018. Informal consultation for 2019 is currently ongoing to arrive at an effects determination for each listed or proposed species and corresponding critical habitat which occur in the proposed suppression (action) area of Oregon. Where it is determined that the action may affect a listed species or its habitat, the BA specifies mitigation measures that are designed to reduce the potential effects to the point where they are "not likely to adversely affect" the listed species or its habitat. These consultations will most likely result in concurrences to APHIS' effects determinations in the BA.

APHIS completed a national informal consultation with NOAA Fisheries for actions affecting listed anadromous fishes. In May 2010, APHIS submitted a Programmatic BA which evaluates the potential impacts of suppression programs on listed salmonids and their critical habitat in the 17 Western states. NOAA Fisheries provided a letter of concurrence with APHIS affects determinations on August 12, 2010. Any suppression programs undertaken in Oregon will adhere to the mitigation measures in the Programmatic BA. The Programmatic BA, NOAA Fisheries letter of concurrence and other correspondence are available upon request, but those documents may also be found online at the ODA Plant Division website (www.oregon.gov).

a) Species Not Affected By the Proposed Action

The following listed species (and/or critical habitat) may have the potential to be found within the 17 Oregon counties where APHIS may conduct grasshopper suppression. However, APHIS has determined that these species will not be affected by the proposed action and no further review of these species will be conducted in this BA. The proposed action would have no effect on Canada lynx (T) (CH) (*Lynx Canadensis*) because known ranges and travel corridors of the lynx in Oregon will not be treated. The proposed action would have no effect on gray wolf (E) (*Canis lupus*) because the proposed chemicals and

rates will not affect the gray wolf or its prey base and gray wolves are unlikely to be found in open range in Oregon. The proposed action would have no effect on northern spotted owl (T) (CH) (*Strix occidentalis caurin*) because the spotted owl occurs primarily in old growth forest and not in rangeland. The proposed action would have no effect on Gentner's fritillary (E) (*Fritillaria gentneri*) because known occurrences/populations of Gentner's fritillary in Oregon will not be treated. The proposed action would have no effect on MacFarlane's four-o'clock (T) (*Mirabilis macfarlanii*) because no control will occur in the Snake River Canyon habitat of this species. The proposed action would have no effect on Malheur wire-lettuce (CH) (*Stephanomeria malheurensis*) because known occurrences/populations in Oregon will not be treated. The proposed action would have no effect on whitebark pine (C) (Pinus albicaulis) because known occurrences/populations of whitebark pine in Oregon will not be treated. The proposed action would have no effect on slender Orcutt grass (T) (CH) (*Orcuttia tenuis*) or Green's Tuctoria (E) (CH) (*Tuctoria greenei*) because these species are not found within the proposed action area. Additionally, no treatments will be conducted in or near vernal pool critical habitat (Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon).

b) Species That May Be Affected By the Proposed Action

The table shown below (Table 1) is a summary of protection measures developed for federally listed or proposed species that may be affected by the grasshopper suppression programs in the areas of Oregon covered by this EA. These measures were agreed to by APHIS through Formal Section 7 Consultation with the US Fish and Wildlife Service and found in the 1995 FWS Biological Opinion (BO), or through local informal consultation with FWS for the use of diflubenzuron, the RAAT application methodology, and those species listed since the 1995 national BO. Measures for listed salmonids were agreed to through national informal consultation and concurrence with NOAA Fisheries in 2010. Protective measures shown in Table 1 were developed to ensure that grasshopper suppression program activities in Oregon are "not likely to adversely affect" federally listed or proposed species.

Table 1. Current and Proposed Protection Measures and Determinations to Protect Threatened (T), Proposed Threatened (PT), Endangered (E), or Candidate (C) Species and Their Critical Habitat (CH)

Name, Species, and Status	EA Counties found	Determination	Protective Measures from 1987-95 Biological Opinions (Date of FWS Biological Opinion)	Protective Measures for Oregon
Birds				
Yellow-billed Cuckoo (T) *Coccyzus americanus*	Deschutes, Lake, Malheur	NLAA	listed after 1995	The programmatic buffers of 500' for liquid by air, 200' for bait by air and liquid by ground, and 50' for bait by ground will be used from the edge of any water present at the time of application. Plus RAATs application method will be used to protect the yellow-billed cuckoo and its prey. Yellow-billed cuckoo foraging areas should be appropriately avoided for pesticide treatment.
Fishes				
Lahontan Cutthroat Trout (T) *Oncorhynchus clarki henshawi*	Harney, Malheur	NLAA	No aerial application of ULV (spray) pesticides within 0.25 mile of occupied habitats. Only carbaryl bait will be used within 0.25 miles. (June 01, 1987)	The proposed action includes a protective (no application of pesticides, bait and liquid) buffer from the edge of the stream or water body containing standing or flowing water at the time of application, out to 0.5 mile for aerial application of liquid pesticides; and 500 feet for ground application of liquid pesticides. The buffers will apply to
Borax Lake Chub (E) (CH) *Gila boraxobius*	Harney	NLAA	No aerial ULV application of malathion should be applied within 1 mile of occupied habitat. A 0.25 mile no-aerial ULV application of carbaryl	
Foskett Speckled Dace (T)	Lake	NLAA		

Rhinichthys osculus ssp.			should be adhered to (June 01, 1987)	habitats occupied by these species or adjacent aquatic habitat designated as critical habitat for the listed species.
Hutton Tui Chub (T) *Gila bicolor spp.*	Lake	NLAA		
Warner Sucker (T) (CH) *Catostomus warnerensis*	Lake	NLAA		
Lost River Sucker (E) (CH) *Deltistes luxatus*	Lake	NLAA		
Shortnose Sucker (E) (CH) *Chasmiste brevirostris*	Lake	NLAA	Buffers around areas of occurrence of 0.5 mile for the use of malathion and 0.25 mile for the use of aerially applied carbaryl. Within the buffers, only carbaryl bait will be used. (July 26, 1988)	
Bull Trout (T) (CH) *Salvelinus confluentus*	Baker, Crook, Deschutes, Grant, Gilliam, Harney, Jefferson, Lake, Malheur, Umatilla, Union, Wasco, Wallowa, Wheeler	NLAA		
Plants				
Applegate's milk-vetch (E) *Astragalus applegatei*	Klamath	NLAA	Aerial applications of ULV (spray) pesticides will not be used within 3 miles of these species occupied habitats. Within the 3 mile buffer, only carbaryl bait will be used. (September 24,1992, June 01, 1987)	Aerial applications of liquid pesticides will not be used within 3 miles of these species occupied habitats. Within the 3 mile buffer, only carbaryl bait will be used. No ground bait application within 50 feet of known locations or critical habitat to avoid physical disturbance.

Howell's Spectacular Thelypody (T) *Thelypodium howellii Spectabilis*	Baker, Union	NLAA	Aerial applications of ULV (spray) pesticides will not be used within 3 miles of these species occupied habitats. Within the 3 mile buffer, only carbaryl bait will be used. (September 24,1992, June 01, 1987)	Aerial applications of liquid pesticides will not be used within 3 miles of these species occupied habitats. Within the 3 mile buffer, only carbaryl bait will be used. No ground bait application within 50 feet of known locations or critical habitat to avoid physical disturbance.
Spalding's Catchfly (T) *Silene spaldingii*	Wallowa	NLAA	Listed after 1995	
<u>Amphibians</u>				
Oregon Spotted Frog (T) (CH) *Rana pretiosa*	Deschutes, Klamath, Lane, and Wasco	NLAA	Listed after 1995	The programmatic buffers of 500' for liquid by air, 200' for bait by air and liquid by ground, and 50' for bait by ground will be used from the edge of any water present at the time of application.

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