2016 BIOLOGICAL ASSESSMENT

FOR USDA APHIS RANGELAND GRASSHOPPER and MORMON CRICKET SUPPRESSION PROGRAMS IN OREGON

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SUMMARY

This Biological Assessment addresses the possible effects of grasshopper suppression program activities on species listed as endangered, threatened, or proposed threatened (including candidate species) since USDA APHIS PPQ Oregon's last informal consultation with the Service. Information is provided on the biology and ecology of the aforementioned species, and protective measures are suggested when program activities may affect those species or their habitats.

The proposed protective measures will ensure that grasshopper suppression program activities will not likely jeopardize the continued existence of listed species or species proposed for listing, nor adversely modify critical habitat for listed or proposed species.

BACKGROUND

The USDA Animal and Plant Health Inspection Service (APHIS), in conjunction with other Federal Agencies, State Departments of Agriculture, Native American Tribes, and private individuals is planning for potential grasshopper/Mormon cricket suppression programs to protect rangelands from economic infestations. APHIS has the authority, according to the Plant Protection Act (PPA) (7 United States Code (U.S.C.) § 7701 et seq.) and subject to the available funds, to treat Federal, State, or private lands that have economic infestations of grasshoppers.

According to the authority delegated under section 417 of the PPA (7 U.S.C. § 7717), APHIS may be requested to work in conjunction with a Federal land management agency or a State agriculture department (on behalf of a State, a local government, or a private group or individual) to treat areas that are infested with grasshoppers when they reach a level of economic infestation. In satisfying this mandate, APHIS may be asked to carry out actions using insecticides to reduce grasshopper populations. The PPA mandates that APHIS control economic infestations of grasshoppers/Mormon crickets in order to protect rangeland, when requested, and provided funding is available.

Beginning in 1987, APHIS has consulted with USDI Fish and Wildlife Service (the "Service") on a national level for the Rangeland Grasshopper Cooperative Management Program. Biological Opinions (BO's) were issued annually by the Service from 1987 through 1995 for the national program.

The most recent national biological opinion on the Grasshopper/Mormon Cricket Program was issued by the Service July 21, 1995. In following years, no national Biological Assessment was prepared since control programs were not anticipated in most states due to lack of funding. A national Biological Assessment for the Rangeland Grasshopper and Mormon Cricket Suppression Program is currently under way, but the process for its completion and consideration by the Service will not be concluded in time for the 2016 season.

It has been necessary to consult on a state by state basis for those states where the potential exists for grasshopper/Mormon cricket suppression programs. Informal local consultations were completed for the state of Oregon from 2003 to 2014, resulting in annual concurrence letters from the Service on program activities. Those Biological Assessments prepared by APHIS and the Biological Opinions issued by the Service are incorporated by reference into this Biological Assessment. The 1995 National Biological Opinion issued by the Service and the 1998 Biological Assessment prepared by APHIS were used as a basis for the local consultations and are also incorporated into this Biological Assessment by reference. Until a programmatic concurrence is issued from the national consultation, a new local consultation and concurrence from the Service is needed for 2016.

PURPOSE

This Biological Assessment is for grasshopper and Mormon cricket suppression activities in the state of Oregon. Activities will be limited to rangeland in Baker, Crook, Deschutes, Gilliam, Grant, Harney, Jefferson, Lake, Klamath, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and, Wheeler counties in Oregon. Grasshopper suppression programs will only be conducted when potential economically damaging populations of grasshoppers occur, funding exists, there is a written request from the land manager(s), and APHIS determines that treatment is necessary.

An APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program Final Environmental Impact Statement was released in 2002 (2002 FEIS) (available at www.aphis.usda.gov). The 2002 FEIS includes an analysis of three chemicals (diflubenzuron, carbaryl, and malathion) available to APHIS for grasshopper suppression. Also analyzed is the use of the Reduced Agent and Area Treatment (RAATS) methodology.

APHIS requests informal ESA Section 7 consultation for those species that have been listed or are proposed for listing in Oregon since the October 3, 1995 National Biological Opinion or the biological opinions/letters of concurrence received as part of the informal consultations conducted with the Service from 2003 to 2014.

The agreements reached for Oregon between APHIS and the Service will be in effect until a Biological Opinion for the entire Rangeland Grasshopper Suppression Program is issued and the national consultation process is completed. The Service or APHIS may request local consultation annually until the national consultation is completed.

APHIS has consulted separately with NOAA Fisheries for effects determinations for ESA listed anadromous fishes. In 2010, APHIS received a Concurrence from NOAA Fisheries on a national programmatic Biological Assessment for the grasshopper program.

A written response from the Service is requested regarding the Service's concurrence with the "no effect" and the "not likely to adversely affect" determinations in this Biological Assessment, for these species and their critical habitat.

DESCRIPTION OF ACTION

This document incorporates by reference portions of the Rangeland Grasshopper and Mormon Cricket Suppression Program Final Environmental Impact Statement-2002 (2002 FEIS) which discusses the purpose and needs, alternative strategies, affected environments, environmental consequences, and other environmental considerations of the APHIS grasshopper suppression program. This 2002 FEIS updates alternatives available to APHIS from the previous 1987 FEIS.

More detailed site-specific environmental assessments (EA's), tiered to the 2002 APHIS FEIS, are prepared to better describe the local site characteristics. Grasshopper suppression program decisions are then based on the conclusions reached in the site-specific EA's. Only the program alternatives found in the 2002 APHIS FEIS are available to APHIS for use in any site-specific treatment. APHIS will issue a Finding(s) of No Significant Impact (FONSI) based on the site-specific EA's. When APHIS receives a treatment request from a landowner/manager, and treatment is determined to be necessary and possible, a preferred alternative will be chosen. The proposed treatment site will be examined to determine if environmental issues exist that were not covered in the EA. A supplement to the EA will be issued to

address any site specific environmental concerns that were not thoroughly addressed in the original EA, and it will address any comments received during the initial EA 30 day comment period.

An EA (OR-16-01) was prepared to address site specific issues with respect to potential grasshopper suppression programs in the above 17 county area. That EA is incorporated into this Biological Assessment by reference. APHIS treatment programs also follow guidelines set forth by the Agency in the Treatment Guidelines (included in the EA OR-16-01) and the Grasshopper Program Statement of Work (SOW or Prospectus). Suppression treatments could happen from May through August, but generally take place in June and July.

The chemical control methods available to APHIS include the use of liquid sprays of carbaryl, diflubenzuron, and malathion, and carbaryl in a bait formulation applied at conventional rates. These chemicals can be applied to an area by either air or ground equipment. Also considered is the application of these same chemicals at reduced rates, and where untreated swaths (non-target refuges) are alternated with treated swaths. This method is known as Reduced Agent Area Treatments (RAATs). Diflubenzuron and the RAATs application technology are a result of the APHIS Grasshopper IPM Program, 1987-2000.

Conventional rates of carbaryl (.5 lb a.i. / acre) and malathion (.62 lb a.i. / acre) are the same as those in the 1987 APHIS FEIS. Conventional rate for diflubenzuron is .016 lb a.i. / acre. The RAATs application system uses approximately half the concentration of each chemical as compared to conventional rate applications, and is applied to 33-60% of the total area (FEIS page 18-22). Normally program chemicals would be applied to an area only one time per year, and programs do not generally take place in the same location in consecutive years. The infrequent nature of grasshopper suppression programs reduces the likelihood of cumulative effects.

Diflubenzuron

Diflubenzuron is a chemical that has received a label for grasshopper control since the 1987 APHIS FEIS. It is classified as an insect growth regulator that affects the formation and/or deposition of chitin in an insect's exoskeleton. An insect larva/nymph exposed to diflubenzuron is unable to successfully molt and thus dies. APHIS completed a risk assessment for the use of diflubenzuron in grasshopper suppression in March 2000. This report, "Chemical Risk Assessment for Diflubenzuron Use in Grasshopper Cooperative Control Program", was provided during 2003 consultation, and is considered incorporated in this BA by reference. It is normally applied by air for grasshopper suppression on rangeland, but it can also be applied using ground equipment.

Because of its mode of action and low toxicity, diflubenzuron would not be toxic to, or directly affect, humans, mammals, reptiles, amphibians, plants, or fish at the applications rates proposed (FEIS pg 42). Diflubenzuron is considered much less toxic, to most groups of organisms, than either carbaryl or malathion.

Metabolites from diflubenzuron tend to degrade or are metabolized rapidly, and will occur at concentrations low enough that there should be no toxicological effects. Since paraffinic oils used as carriers and adjuvants may have an adverse effect on nesting birds, paraffinic oils will be avoided when treating areas with sensitive species and nesting birds.

Diflubenzuron binds readily to organic matter in soils and is relatively immobile in the environment. The half-life is from 7-19 days depending on soil type. Diflubenzuron does not persist more than a few days in water. However, it adsorbs to plant surfaces and may persist there for several months. Bioaccumulation of diflubenzuron is minimal (Eisler, 2000).

Appendix B of the FEIS analyses the risk of diflubenzuron on humans and non-target organisms.

Carbaryl

Carbaryl is a carbamate insecticide. It's mode of toxic action occurs through inhibition of acetylcholinesterase (AChE) function in the nervous system. This inhibition reverses over time when exposure ceases. Carbaryl is not subject to significant bioaccumulation.

At program rates carbaryl is unlikely to be directly toxic to birds, mammals, or reptiles (FEIS pg 39). The use of carbaryl in bait form has considerable environmental advantages over liquid sprays. Since the chemical is incorporated into a solid media it must be ingested to be effective, thus eliminating many non-target effects. It can be more accurately applied with less potential for drift, and is less likely to be transported in the soil or runoff.

Appendix B of the FEIS analyses the environmental risk of Carbaryl. It has a relatively short half-life in soil due to rapid degradation: 7- 28 days depending on soil type. Carbaryl does not transport well due to low water solubility, moderate sorbtion, and rapid degradation. It degrades rapidly in water: 1-2 days in freshwater. It remains active on vegetation for 3-10 days. Carbaryl does not bioaccumulate and mammals and fishes readily breakdown and excrete it. Inert ingredients and metabolites are less toxic than carbaryl itself. There are no known synergistic effects.

Carbaryl can be applied by air for grasshopper suppression on rangeland, or it can also be applied using ground equipment. APHIS can use carbaryl in either ULV liquid or bait formulations. A study of aerial bait application by APHIS in 2003 (unpublished) indicated the maximum particle drift to be 150 feet in cross winds up to 13 mph.

Malathion

Malathion is an organophosphate. It is also an AChE inhibitor, but unlike carbaryl, AChE inhibition from malathion is not readily reversible if exposure ceases.

At program rates, there is little possibility malathion will to be directly toxic to birds, mammals, or reptiles. No direct toxic effects have been observed in field trials (FEIS pg 46). It will most likely affect insects exposed to ULV spray. While the number of insects in the treated area would diminish, there would be insects remaining. The remaining insects and those migrating in from outside the treated area would be available prey for insectivores. Those insects with short generations would soon increase in number (FEIS pg 47).

Appendix B of the FEIS analyses the environmental risk of malathion. It has a short half-life in soil due to rapid degradation: 1-6 days depending on soil type. Malathion does not penetrate far into soil due to adsorption to organic matter and rapid degradation. Heavy rain after treatment could lead to runoff. It degrades by photolysis in water, a half-life of 8-32 hours during the 1997 Florida Medfly program. The half-life of malathion on vegetation 1-6 days. Malathion does not bioaccumulate in mammals.

Inert ingredients and metabolites are not known to have adverse effects at program application rates. Synergistic effects could occur if applied in combination with certain other organophosphates. A thorough analysis of the proposed treatment area would need to be done to assure no synergistic effects. Malathion

is normally applied by air for grasshopper suppression on rangeland, but it can also be applied using ground equipment.

RAATs

RAATs, Reduced Agent-Area Treatment, technology is a product of the IPM alternative in the 1987 FEIS. This strategy combines insect suppression and conservation biological control. Rather than treat the entire infested area, treated swaths are alternated with untreated swaths. Grasshoppers are controlled by chemicals in the treated areas. The untreated swaths provide a refuge for naturally occurring grasshopper parasites and predators, as well as other non-target insects. Even those organisms that move into the treated swaths will be largely unaffected unless they feed on treated foliage or bait. Immature grasshoppers are extremely mobile compared to other immature insects and movement into treated areas will contribute to additional mortality. The RAATs system puts less insecticide into the environment and lowers the risk to non-target species, water quality, and humans. The goal of the RAATs alternative is to provide a more economical and environmentally friendly method to suppress grasshopper populations rather than reduce those populations to the greatest extent possible. A full description of the environmental consequences, environmental fate, and risk evaluation of the chemical alternatives is found in the FEIS chapter V and Appendices B and C.

SPECIES ACCOUNTS AND ASSESSMENTS

The listed species (including those proposed for listing) within the potential treatment area in Oregon (not considered in previous consultation efforts with the Service) include the **Fisher (PT) (***Martes pennant) and* **Gentner's Fritillary (E) (***Fritillaria gentneri*).

Fishers (PT) (*Martes pennanti)* use forest habitats with dense canopy closure, large diameter live trees (conifers and hardwoods) and snags (dead trees) with cavities and other deformities, large diameter down wood, multiple canopy layers. Mature and Late-successional coniferous or mixed forests that contain key habitat and structural components provide the most suitable fisher habitat because they provide abundant potential den sites and preferred prey species. Fishers search for prey in forested stands, avoiding openings. Since potential suppression activities may occur in rangelands and adjacent croplands, there will be no effect to fishers from potential grasshopper/Mormon cricket suppression program activities.

Gentner's Fritillary (E) (*Fritillaria gentneri*) came up on the IPaC Trust Resource Report because it is listed as known to or is believed to occur in Klamath County, but this species is not located within the potential grasshopper/Mormon cricket suppression program area. Therefore, Gentner's Fritillary (E) (*Fritillaria gentneri*) will not be affected by potential grasshopper/Mormon cricket suppression program activities.

APHIS has considered impacts to candidate species that could potentially occur within the grasshopper and Mormon cricket suppression program area. The candidate species within the potential treatment area in Oregon (not considered in previous consultation effort with the Service) include the **Washington Ground Squirrel (C** *Urocitellus washingtoni***), Northern Wormwood (C)** (*Artemisia campestris var. wormskioldii),*and the **Whitebark pine (C) (***Pinus albicaulis*).

Northern Wormwood (C) (*Artemisia campestris var. wormskioldii)* came up on the IPaC Trust Resource Report because it is listed as known to or is believed to occur in Sherman and Wasco Counties, but this species is not located within the potential grasshopper/Mormon cricket suppression

program area. Currently, Northern Wormwood (C) (*Artemisia campestris var. wormskioldii)* is known from only two sites along the Columbia River, separated by approximately 322 km (200 mi) in Klickitat and Grant Counties, Washington. Northern Wormwood (*Artemisia campestris var. wormskioldii)* is restricted to exposed basalt, cobbly-sandy terraces, and sand habitat along the banks of the Columbia River at elevations ranging from 50 to 150 meters (m) (160 to 500 feet). This species is outside of the potential grasshopper/Mormon cricket suppression program area. Therefore, potential grasshopper/Mormon cricket suppression program activities will have no effect on Northern Wormwood (C) (*Artemisia campestris var. wormskioldii*).

Whitebark pine (C) (*Pinus albicaulis)* is a hardy conifer that tolerates poor soils, steep slopes, and windy exposures and is found at alpine tree line and subalpine elevations throughout its range (Tomback et al. 2001, pp. 6, 27). Whitebark pine may occur as a climax species, early successional species, or seral (midsuccessional stage) co-dominant associated with other tree species. Although it occurs in pure or nearly pure stands at high elevations, it typically occurs in stands of mixed species in a variety of forest community types. Since potential suppression activities may occur in rangelands and adjacent croplands, there will be no effect to Whitebark pine (C) (*Pinus albicaulis*) from potential grasshopper/Mormon cricket suppression program activities.

Protection Measures

The following table (Table 1) lists Threatened (T), Proposed Threatened (PT), Endangered (E), and Candidate (C) species that are considered in this Biological Assessment and previously submitted Biological Assessments, and whether Critical Habitat (CH) is designated or proposed (PCH). The table summarizes the protective measures agreed to in the 1987-1995 BO's as set forth in the Biological Opinions dated June 1, 1987; July 26, 1988; July 17, 1989; August 3, 1990; August 29, 1991; November 13, 1992; September 16, 1993; December 15, 1994; July 21, 1995, and October 3, 1995. The proposed protection measures for Oregon, which result in a "not likely to adversely affect" (NLAA) or "no effect" determination, reflect those arrived at during current and previous local consultations with the Service, 2003-2014.

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	Proposed Protective Measures for Oregon
Mammals				
Canada Lynx (T) (CH) *Lynx canadensis*	Contiguous U.S. DPS wherever found. Lake	No Effect	Listed after 1995	Known ranges and travel corridors in Oregon will not be treated. No Effect. (FWS March 27, 2013)
Gray Wolf (E) *Canis lupus*	Wherever found outside the Northern Rocky Mountain DPS	No Effect	Proposed chemicals and rates will not affect the gray wolf or its prey base. Gray wolves are unlikely to be found in open range. (FWS 06/01/87)	No effect on wolves or their prey. Gray wolves are unlikely to be found in open range in Oregon. (FWS March 27, 2013)
Washington Ground Squirrel (C) *Urocitellus washingtoni*	Gilliam, Morrow, and Umatilla	NLAA	Candidate species, after 1995	Aerial applications of liquid pesticides will not be used within 3 miles of Washington ground squirrel occupied habitats. Aerial applications of carbaryl bait will not be used within 1.5 miles of these species occupied habitats. Ground applications of any pesticides will not be used within 1 mile of occupied habitats. APHIS will not conduct any treatments within the United States Navy's (Navy) Boardman Naval Weapons Systems Training Facility (BNWSTF) or the adjacent Nature Conservancy-managed Boardman

				Conservation Area (BCA). (FWS pending)
Fisher (PT) *Martes pennanti*	Klamath	No Effect		Known ranges in Oregon will not be treated. No effect. (FWS pending)
Birds				
Northern Spotted Owl (T) (CH) *Strix occidentalis caurin*	Deschutes, Jefferson, Wasco	No Effect	Occurs primarily in old growth forest and not in rangeland. (FWS 08/03/91)	Known ranges in Oregon will not be treated. No effect. (FWS March 27, 2013)
Greater Sage Grouse (C) *Centrocercus urophasianus*	Baker, Crook, Deschutes, Grant, Harney, Lake, Malheur, Union, Wheeler	NLAA	Candidate species, after 1995	APHIS will abide by the protective measures in the December 22, 2011 BLM Instruction Memorandum No. 2012-043. (FWS March 27, 2013)
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. (April 11, 2014)
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. (FWS 06/01/87)	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 pesticides diflubenzuron, carbaryl, and malathion; and 500 feet for ground application. The buffers will apply to habitats occupied by these
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) *Rhinichthys osculus ssp.*	Lake	NLAA		

Hutton Tui Chub (T) *Gila bicolor spp*.	Lake	NLAA	should be adhered to (FWS 06/01/87)	species or adjacent aquatic habitat designated as critical habitat for the listed species. (FWS March 27, 2013)
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. (FWS 07/26/88)	
Bull Trout (T) (CH) *Salvelinus confluentus*	Baker, Crook, Deschutes, Grant, Gilliam, Harney, Jefferson, Lake, Malheur, Umatilla, Union, Wasco, Wallowa, Wheeler	NLAA		
Chinook Salmon(upper Columbia River spring run**) (E) (CH)** *Oncorhynchus (=Salmo) tshawytscha*	Gilliam, Morrow, Sherman, Umatilla, Wasco	NLAA	Listed after 1995	
Chinook Salmon (Snake River fall run**) (T) (CH)** *Oncorhynchus (=Salmo) tshawytscha*	Gilliam, Morrow, Sherman, Umatilla, Union, Wasco, Wallowa	NLAA	Listed after 1995	Streams and off channel areas which are considered occupied habitat or designated as critical habitat for listed species will have no application buffers when water is present. Buffers for aerial liquid (ULV) applications of Carbaryl and Malathion will be 3500 feet, 1500 feet for Dimilin, and 1000
Chinook Salmon (Snake River spring/summer run**) (T) (CH)**	Gilliam, Morrow, Sherman, Umatilla, Union, Wasco, Wallowa			

Oncorhynchus (=Salmo) tshawytscha				ft for aerial applications of Carbaryl bait. Ground application buffers will be 350 feet for liquid Carbaryl, 200 feet for Carbaryl bait, 500 feet for Malathion, and 200 feet for Dimilin. RAAT's application technique will be used. (NOAA August 12, 2010)
Sockeye Salmon (E) (CH) *Oncorhynchus (=Salmo) nerka*	Gilliam, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco			
Steelhead (middle Columbia River) **(T) (CH)** *Oncorhynchus (=Salmo) mykiss*	Crook, Gilliam, Grant, Jefferson, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, Wheeler	NLAA		
Steelhead (upper Columbia River) **(T) (CH)** *Oncorhynchus (=Salmo) mykiss*	Gilliam, Morrow, Sherman, Umatilla, Wasco	NLAA		
Steelhead (Snake River Basin) **(T) (CH)** *Oncorhynchus (=Salmo) mykiss*	Gilliam, Morrow, Sherman, Umatilla, Union, Wasco, Wallowa			
<u>Plants</u>				
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. (FWS 09/24/92, 06/01/87)	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. (FWS March 27, 2013)

Gentner's Fritillary (E) *Fritillaria gentneri*	Klamath	No Effect		Known occurrences/populations in Oregon will not be treated. No effect. (FWS pending)
MacFarlane's Four-o'clock (T) *Mirabilis macfarlanii*	Wallowa	No Effect	No control will occur in the Snake River Canyon habitat of this species. (FWS 06/01/87)	Known ranges in Oregon will not be treated. No Effect. (FWS March 27, 2013)
Malheur Wire-lettuce (E) (CH) *Stephanomeria malheurensis*	Harney	NLAA	No control will occur in the Snake River Canyon habitat of this species. (FWS 06/01/87)	Known ranges in Oregon will not be treated. No effect. (FWS March 27, 2013)
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. (FWS 09/24/92, 06/01/87)	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. (FWS March 27, 2013)
Spalding's Catchfly (T) *Silene spaldingii*	Wallowa	NLAA	Listed after 1995	
Slender Orcutt Grass (T) (CH) *Orcuttia tenuis*	Lake	NLAA		
Green's Tuctoria (E) (CH) *Tuctoria greenei*	Lake	NLAA	Listed after 1995	The programmatic buffers listed in the Treatment Guidelines (Appendix 1) will be used from the edge of any water present at the time of application. For all ground applications a 50 ft. buffer from the edge of known locations and critical habitat of these plants will be used to avoid physical disturbance. (FWS March 27, 2013)

Northern Wormwood (C) *Artemisia campestris var. wormskioldii*	Sherman and Wasco	No Effect		Known occurrences/populations and habitat in Oregon will not be treated. No effect. (FWS pending)
Whitebark pine (C) *Pinus albicaulis*	Baker, Deschutes, Grant, Jefferson, Klamath, Lake, Union, Wallowa, and Wasco	No Effect		Known occurrences/populations in Oregon will not be treated. No effect. (FWS pending)
<u>Amphibians</u>				
Oregon Spotted Frog (T) *Rana pretiosa*	Deschutes, Klamath, Lane, and Wasco	NLAA		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. (April 11, 2014)

APHIS has considered program impacts and proposed mitigation measures for the **Washington Ground Squirrel (C) (***Urocitellus washingtoni*). This species has not been addressed in previous Biological Assessments.

On March 2, 2000, the Service received a petition to list the Washington Ground Squirrel (Spermophilus washington) as Endangered. In a notice published December 24, 2015, the Service found that continued listing of this species is warranted but precluded as of the date of publication of that notice. In Oregon, Washington ground squirrels occur in Gilliam, Morrow, and Umatilla counties.

Approximately 85 percent of lands within the Washington ground squirrel's range are privately owned (Washington Department of Fish and Wildlife [WDFW] 2005, Oregon Department of Fish and Wildlife [ODFW] 2006). While much of the land within the squirrel's range has been converted to agriculture or residential uses, there are unquantified, scattered areas of both privately-owned and government-managed shrub-steppe and grassland habitat within the squirrel's range. The greatest concentration of Oregon sites is located on the United States Navy's (Navy) Boardman Naval Weapons Systems Training Facility (BNWSTF) and the adjacent Nature Conservancy-managed Boardman Conservation Area (BCA). There are additional sites, mostly west of these properties, on private and Bureau of Land Management (BLM) land.

Together, the BCA and BNWSTF support 75 to 80 percent of currently known Oregon sites and approximately one-third of known sites within the species' range. While not all of the BNWSTF and BCA are occupied, site distribution fluctuates, covering large portions of the properties at various densities. This area constitutes the largest continuous area of occupied habitat in Oregon, and is likely the largest area of contiguous occupied habitat in the entire range of the Washington ground squirrel, as it covers approximately 26,775 hectares (ha), or 66,162 acres.

Historically, the Washington ground squirrel is primarily associated with sagebrush (Artemisia sp.) and bluebunch-wheatgrass (Agropyron spicatum.) habitats (Verts and Carraway 1998), although cheatgrass (Bromus tectorum) and rabbitbrush (Chrysothamnus sp.) have replaced much of the original flora on nonagricultural land. They are currently found in all these habitats where there is sufficient forage and suitable soils. Washington ground squirrel occur on habitat that may be classified as rangelands. Therefore, this species occurs within an area that may potentially be targeted for grasshopper suppression.

Washington ground squirrels eat a broad range of succulent forb and grass stems, buds, leaves, flowers, roots, bulbs, and seeds (Greene 1999). The ground squirrels are also know to feed on insects. Therefore, the application of any of the proposed pesticides and application methods would pose a high risk of ingestion by Washington ground squirrels if applied within occupied sites.

Klein et al. (2005) studied dispersal patterns of 125 radio-collared juvenile males in north-central Oregon. Mean dispersal probability was 0.718. Median dispersal distance was 880 meters (range up to 3.5 kilometers).

Rangelands are the primary habitat for the Washington ground squirrel, there is a high probability of the Washington ground squirrel coming into contact with or ingesting pesticides if treatment is conducted with occupied sites, and the pesticides used in grasshopper suppression activities have the potential to affect the health of mammals. Therefore, even though the pesticides proposed for use in grasshopper suppression activities been found to have negligible effect on non-target mammals, it would be prudent to err on the side of caution and assume that pesticide applications associated with grasshopper suppression activities may affect the Washington ground squirrel. The following protection measures are proposed to ensure that APHIS' grasshopper suppression activities do not adversely affect the Washington ground squirrel.

> Aerial applications of liquid pesticides will not be used within 3 miles of Washington ground squirrel occupied habitats. Aerial applications of carbaryl bait will not be used within 1.5 miles of these species occupied habitats. Ground applications of any pesticides will not be used within 1 mile of occupied habitats. APHIS will not conduct any treatments within the United States Navy's (Navy) Boardman Naval Weapons Systems Training Facility (BNWSTF) or the adjacent Nature Conservancy-managed Boardman Conservation Area (BCA).

A written response from the Service is requested regarding the Service's concurrence with the "no effect" and the "not likely to adversely affect" determinations for the aforementioned species and their critical habitat reviewed in this Biological Assessment. Any necessary changes to the Proposed Protective Measures for Oregon are also requested.

REFERENCES

IPM Manual studies can be found at http://www.sidney.ars.usda.gov/grasshopper/Handbook/index.htm

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