2006 BIOLOGICAL ASSESSMENT – FISH & WILDLIFE SERVICE

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

BACKGROUND

The USDA Animal and Plant Health Inspection Service (APHIS), in conjunction with Federal Agencies, State Departments of Agriculture, Native American Tribes, and private individuals is planning for potential grasshopper/Mormon cricket suppression programs to protect rangeland from economic infestations. APHIS' authority for carrying out control programs is found in the Plant Protection Act (PPA), Title IV, Agricultural Risk Protection Act of 2000, Section 417. 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 (FWS) on a national level for the Rangeland Grasshopper Cooperative Management Program. Biological Opinions were issued annually by FWS from 1987 through 1995 for the national program. After 1995, funding constraints and other considerations drastically reduced, or in some states completely eliminated, grasshopper/Mormon crickets suppression activities. Between 1995 and 2002 only a very small number of suppression programs were done. These programs were performed in accordance with the 1995 Biological Opinion (BO). They also avoided areas where the potential could exist to affect species that were either listed or proposed for listing since 1995. With renewed funding for this program as a result of the PPA, these supression activities have increased, and there is a need for consultation to update the 1995 BO.

On March 1, 2000 APHIS requested Endangered Species Act (ESA), Section 7 consultation for the Rangeland Grasshopper Cooperative Management Program, to include all seventeen western states, from FWS's Region 1 which is the designated lead region for this consultation. 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 longterm effects from these programs. Although this National Consultation is proceeding, a Biological Opinion will not likely be issued in time for grasshopper/Mormon cricket suppression programs in 2006. Therefore, it is necessary to consult on a state by state basis for those states where the potential exists for grasshopper/Mormon cricket suppression programs. APHIS will prepare local BA's in consultation with the local FWS Office to assist in the determination of protective measures. Informal local consultations were completed with for the state of Oregon in 2003-2005, resulting in annual concurrences from FWS on program activities. A new consultation and FWS concurrence is needed for 2006.

PURPOSE

This biological assessment is for grasshopper/Mormon cricket suppression activities in the state of Oregon. Activities will be limited to rangeland in Baker, Crook, Deschutes, Gilliam, Grant, Harney, Hood River, 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, and there is a written request from the land manager(s).

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

APHIS has requested ESA, Section 7, informal consultation for those species that have been listed or are proposed for listing in Oregon since the most recent FWS biological opinion dated July 21, 1995. Also, the 2002 FEIS includes an analysis of the chemical diflubenzuron, which was not addressed in the previous 1987 Rangeland Cooperative Management Program FEIS and subsequent BA's and BO's. The agreements reached for Oregon between APHIS and FWS will be in effect until a Biological Opinion for the entire Rangeland Grasshopper Suppression Program is issued and the nationwide consultation process is completed. FWS or APHIS may request local consultation annually until the national consultation is completed.

This biological assessment will address all chemicals and application methods for four species that have been listed since 1995, and have thus not been addressed in previous Biological Opinions. The four species which may occur in areas subject to grasshopper suppression programs inj Oreogn are: Canada lynx (*Lynx canadensis*); bull trout (*Salvelinus confluentus*); Howell's spectacular thelypody (*Thelypodium howellii var. spectabilis*); and Spalding's catchfly (*Silene spaldingii*). In addition, this assessment will address the use of diflubenzuron and the reduced agent-area treatment (RAAT) application method on the twelve species which are covered by the 1995 BO (listed below, under Species Accounts and Assessments). APHIS will consult separately with NOAA Fisheries for an Opinion on listed anadromous fishes.

Two Environmental Assessments (EAs) were prepared by APHIS in 2006 to address site specific issues with respect to potential grasshopper suppression programs in the above 18 county area (available at http://egov.oregon.gov/ODA/PLANT/ippm_control.shtml). APHIS treatment programs follow guidelines set forth by the Agency in the Grasshopper Program Guidelines and Operational Procedures (included in the EA as Appendix 1), and the Grasshopper

Program Prospectus. Both of these documents are being updated for 2006. Suppression treatments could begin as early as May, but generally take place in June and July.

APHIS respectfully requests informal ESA, Section 7, consultation on the 16 listed species in the grasshopper program area of Oregon. There are no ESA proposed species in Oregon. **A written response from FWS is requested should FWS concur with the "no effect" and the "not likely to adversely affect" determinations in this Biological Assessment, for listed 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 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.

Two Environmental Assessments have been prepared to cover Oregon Rangeland Grasshopper and Mormon Cricket Suppression Programs, OR-06-01 and OR-06-02 and are incorporated in this Biological Assessment by reference (available at http://egov.oregon.gov/ODA/PLANT/ippm_control.shtml). These EAs were prepared by APHIS in 2006 to address site specific issues with respect to potential grasshopper suppression programs in the above 18 county area. APHIS treatment programs follow guidelines set forth by the Agency in the Grasshopper Program Guidelines and Operational Procedures (included in the EA as Appendix 1), and the Grasshopper Program Prospectus. Both of these documents are being updated for 2006. Suppression treatments could begin as early as May, but generally take place in June and July.

The chemical control methods available to APHIS include the use of ULV 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 (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 rates for the newly added chemical diflubenzuron are .016 lb a.i. / acre. The RAATs application system uses approximately half the concentration of each chemical as 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 in frequent 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). It has no significant effect on non-target, adult arthropods, including honey bees. Catangui, et. al., (IPM Manual study VII. 3.) observed no significant reduction in the number of pollinator bees or other flying nontarget arthropods following diflubenzuron treatment. Diflubenzuron is considered much less toxic, to most groups of organisms, than either carbaryl or malathion. However, all three chemicals are highly toxic to aquatic invertebrates arthropods. Diflubenzuron has only slight toxicity to fish, but if it found its way into water, it could cause an indirect effect by temporarily reducing a food source for juvenile fish. Any reduction in the food base would be temporary, and would likely be compensated for by other food items (FEIS pg 45). Protective measures are used to prevent chemicals from contaminating water.

Diflubenzuron is highly toxic to aquatic insects and crustaceans. The Dimilin 2L label instructions require it not be applied within 25 feet by ground or 150 feet by air of any body of water. Protective measures are imposed to prevent pesticide drift from reaching water or areas of concern (Oregon EA II.D.1, and Appendix 1).

Metabolites from diflubenzuron tend to degrade or are metabolized rapidly, and will occur at concentrations low enough that there should be no toxicological effects. The 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. Diflubenzuron may have synergistic effects with the defoliant DEF, and cumulative effects with certain compounds know to bind hemoglobin. DEF is not likely in a grasshopper control area. Methemoglobinemia is only a concern with human exposure.

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. It can find its way to water from leaf material as it drops in the fall. Bioaccumulation of diflubenzuron is minimal (Eisler, 2000).

Extensive studies were completed to determine the amount of chemical that would be expected to reach aquatic environments as a result of an APHIS grasshopper suppression project, and what effect that exposure will have on the environment. Appendix C of the FEIS analyses the environmental fate and transport of diflubenzuron. Table C-6 indicates the concentrations of insecticide expected to be found in moving and standing bodies of water when no buffer is used and also when water is directly sprayed. Using the full rate of 0.016 lb a.i./acre and no buffer, the amount of diflubenzuron detected in a 0.76m stream is .017 ppb, and .008 ppb in a 2 m pond. According to Eisler, 2000, only one species of mosquito larvae would experience lethal effects from these concentrations. When program buffers are used, concentrations would be much lower.

Appendix B of the FEIS analyses the risk of diflubenzuron on humans and non-target organisms, including aquatic species. Based on the values from the no buffer models in Appendix C, diflubenzuron in aquatic ecosystems would affect a few invertebrate species and have little or no effect on vertebrates.

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 pg39). It will most likely affect insects exposed to ULV spray or that consume carbaryl bait. Field studies have shown that affected insect populations recover rapidly

and generally do not suffer long term effects (FEIS pg40). 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.

Should carbaryl enter water, there is the potential to effect aquatic invertebrates, especially amphipods. Field studies have concluded that there is no biologically significant effect on aquatic resources, although invertebrate downstream drift increased for a short period after treatment due to toxic effects (FEIS pg42). Carbaryl is moderately toxic to fish, but they are at extremely low risk of adverse effects from carbaryl applications at expected exposure rates (FEIS pg B-47). Buffers and other protective measures are included in the guidelines to prevent the chemical from entering water. (Oregon EA II.D.1, and Appendix 1)

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 bioacumulate, and mammals and fishes readily breakdown and excrete it. Carbaryl is extremely toxic to honey bees and predatory mites.

Inert ingredients and metabolites are less toxic than carbaryl itself. There are no known synergistic effects.

Extensive studies were completed to determine the amount of chemical that would be expected to reach aquatic environments as a result of an APHIS grasshopper suppression project, and what effect that exposure will have on the environment. Appendix C of the FEIS analyses the environmental fate and transport of carbaryl. Table C-5 indicates the concentrations of insecticide expected to be found in moving and standing bodies of water when no buffer is used and when water is directly sprayed. Using the full rate of 0.5 lb a.i./acre and no buffer, the amount of carbaryl detected in a 0.76m stream is 5.3 ppb, and 12.0 ppb in a 2 m pond.

Appendix B of the FEIS analyses the risk of carbaryl on humans and non-target organisms, including aquatic species. Based on the values from the no buffer models in Appendix C, carbaryl in aquatic ecosystems, would affect a few invertebrate species and have little or no effect on vertebrates. Concentrations generally known to begin to affect invertebrates is 2-1900 ppb, (Winks, et. al., IPM Manual Study III.8).

Studies in the Little Missouri River during a drought year (1991), when discharge and the dilution potential of the river was low, detected an increase in invertebrate drift during the first 3 hours after pesticide application (Beyers et al. 1995). This increase was primarily composed of Ephemeroptera, especially Heptageniidae. There was no change in drift at the reference site. Subsequent sampling during the day of pesticide

application showed that the increase in invertebrate drift was transient and undetectable after 3 hours. The increase in invertebrate drift was mostly due to Ephemeroptera; other taxa were unaffected. Analyses of brain AChE activity in flathead chub (a T&E species) showed that fish were not affected by the pesticide application. Similar monitoring studies conducted during a year when precipitation was above average (1993) did not detect any increase in aquatic invertebrate drift or effects on fish (Beyers et al. 1995). The overall conclusion was that these grasshopper control operations had no biologically significant affect on aquatic resources (Beyers and McEwen, IPM Manual III.6).

Carbaryl is normally applied by air for grasshopper suppression on rangeland, but it can also be applied using ground equipment. APHIS can use carbaryl in either ULV liquid or bait formulations. APHIS' standard buffers of 500 feet for aerial ULV applications, 200 feet for aerial bait applications, and 50 feet for all ground applications have been shown through monitoring programs to keep measurable amounts of chemical from reaching water. 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 13mph.

Malathion

Malathion is an organophosphate. It is also a 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 pg46). 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 insectivors. Those insects with short generations would soon increase in number (FEIS pg 47).

Malathion is highly toxic to some fish and aquatic invertebrates. However, buffers and other protective measures are included in the guidelines to prevent the chemical from entering water. (Oregon EA II.D.1, and Appendix 1)

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 bioacumulate in mammals. Concentrations in fishes decreases consistently with decreasing malathion in water. Malathion is extremely toxic to aquatic and terrestrial invertebrates, including honey bees.

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

Extensive studies were completed to determine the amount of chemical that would be expected to reach aquatic environments as a result of an APHIS grasshopper suppression project, and what effect that exposure will have on the environment. Appendix C of the FEIS analyses the environmental fate and transport of malathion. Table C-7 indicates the concentrations of insecticide expected to be found in moving and standing bodies of water when no buffer is used and when the water is directly sprayed. Using the full rate of 0.61 lb a.i./acre and no buffer, the amount of malathion detected in a 0.76m stream is 4.5 ppb, and 10.2 ppb in a 2 m pond.

Appendix B of the FEIS analyses the risk of malathion on humans and non-target organisms, including aquatic species. Based on the values from the no buffer models in Appendix C malathion, in aquatic ecosystems, would affect a few invertebrate species and have little or no effect on vertebrates. Malathion was found to be many times less toxic to sensitive fishes than carbaryl (Beyers and McEwen, IPM Manual III.6).

Malathion is normally applied by air for grasshopper suppression on rangeland, but it can also be applied using ground equipment. APHIS' standard buffers of 500 feet for aerial applications and 50 feet for ground applications have been shown through monitoring programs to keep measurable amounts of chemical from reaching water. Based on the findings for carbaryl mentioned above, from Beyers and McEwen, IPM Manual III.6, the affects of malathion, from suppression programs, on aquatic organisms should be no greater than carbaryl, and therefore have no biologically significant affect on aquatic resources.

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

Protection Measures for Species Covered in 1995 BO

Diflubenzuron is much less toxic to all groups of non-target organisms, except immature insects, than either carbaryl or malathion. Although APHIS feels the data presented here indicates a strong case for much smaller buffers, until the national consultation is completed, we are proposing to use buffers for difulbenzuron similar to those concurred with for the other ULV sprays in the 1995 BO, for grasshopper suppression programs in Oregon.

The following table lists all 16 Threatened (T) & Endangered (E) species that are considered in this BA, and whether Critical Habitat (CH) is designated or proposed (PCH). It summarizes the protective measures agreed to in the 1995 BO and the newly proposed protection measures which result in a "not likely to adversely affect" or "no effect" determination. Until the current national consultation is complete, APHIS plans to adhere to the buffers as set forth in the Biological Opinions dated June 1, 1987; July 26, 1988; July 17, 1989; August 3, 1990; August 29, 1990; September 24, 1992; September 16, 1993; December 6, 1994; and July 21, 1995. APHIS proposes no changes at this time for the species and chemicals considered in those Opinions.

Table 1. Current and Proposed Protection Measures and Determinations to Protect Threatened (T), Endangered (E), or Proposed (PT) Species

Name, Species, and Status,	Determination	Protective Measures from 1995 Biological Opinion	Proposed Protective Measures for Oregon
Bald Eagle (T) *Haliaeetus leucocephalus*	Not likely to adversely affect (NLAA)	Maintain a 1-mile radius treatment-free zone around active bald eagle eyries found on rivers or lakes with no flyovers of this area by contract pilots. A 2.5 mile no-aerial ULV spray zone will be maintained upstream and downstream from the nest site as a forage area. This will include a 0.25 mile buffer	Same measures as 1995 BO for diflubenzuron and RAATs application method.

		along each side of the rivers. Lakes will be protected by a 0.25 no-aerial ULV spray buffer if they are considered foraging areas of the bald eagle. (FWS 06/01/87)	
Lahontan Cutthroat Trout (T) *Oncorhynchus clarki henshawi*	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)	Same measures as 1995 BO for diflubenzuron and RAATs application method.
Borax Lake Chub (E) (CH) *Gila boraxobius*	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 should be adhered to (FWS 06/01/87)	No diflubenzuron application within 0.5 miles of occupied habitat. Carbaryl bait can be used to within 500 feet of occupied habitat. Same buffers for RAATs application method.
Foskett Speckled Dace (T) *Rhinichthys osculus ssp.*	NLAA		
Hutton Tui Chub (T) *Gila bicolor spp*.	NLAA		
Modoc sucker (E) (CH) *Catostomus microps*	NLAA		
Warner Sucker (T) (CH) *Catostomus warnerensis*	NLAA		
Lost River Sucker (E) (PCH) *Deltistes luxatus*	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)	No diflubenzuron application within 0.5 miles of occupied habitat. Carbaryl bait can be used to within 500 feet of occupied habitat. Same buffers for RAATs application method.
Shortnose Sucker (E) (PCH) *Chasmiste brevirostris*	NLAA		
Applegate's Milk-vetch (E) (CH) *Astragalus applegatei*	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)	Same measures as 1995 BO for diflubenzuron and RAATs application method. No ground bait application within 50 feet of known locations or critical habitat.
Malheur Wire-lettuce (E) (CH) *Stephanomeria malheurensis*	NLAA		
Northern Spotted Owl (T) (CH) *Strix occidentalis caurin*	No effect	Occurs primarily in old growth forest and not in rangeland. (FWS 08/03/91)	No effect determination for diflubenzuron and RAATs application method.
MacFarlane's Four-o'clock (T) (CH) *Mirabilis*	No Effect	No control will occur in the Snake River Canyon habitat of this species. (FWS 06/01/87)	No effect determination for diflubenzuron and RAATs application method.

macfarlanii			
Bull Trout (T) (CH) *Salvelinus confluentus*	NLAA	Listed since 1995	No ULV (liquid) treatments will occur within 0.5 miles of occupied habitat. Carbaryl bait will not be used within 500 feet of occupied habitat. Known migratory habitats will be treated as occupied habitat unless otherwise directed by FWS personnel prior to treatments.
Howell's Spectacular Thelypody (T) *Thelypodium howellii Spectabilis*	NLAA	Listed since 1995	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. Same measures for RAATs application method. No ground bait application within 50 feet of known locations or critical habitat.
Spalding's Catchfly (T) *Silene spaldingii*	NLAA		
Canada Lynx (T) *Lynx Canadensis*	No Effect	Listed since 1995	Known ranges of the Canada lynx and its travel corridors, in Oregon, will not be considered for treatment. No Effect.

Protective Measures for Species Listed Since the 1995 BO

Howell's spectacular thelypody (*Thelypodium howellii* ssp. s*pectabillis*)

Thelypodium howellii ssp. s*pectabilis* is an herbaceous biennial that occurs in moist, alkaline meadow habitats as approximately 1000 meters (m) (3000 feet (ft)) to 1,100 m (3,500ft) elevation in northwest Oregon. This plant grows to approximately 60 cm (ft) tall, with branches arising from near the base of the stem. The basal leaves are approximately 5 cm (2in) long with wavy edges and are arranged in a rosette. Stem leaves a shorter, narrow, and have smooth edges. Flowers appear in loose spikes at the end of the stems. Flowers have four purple petals approximately 1.9 cm (0.75 in) in length, each which is borne on a short (0.6 cm (0.25 in)) stalk. Fruits are long, slender pods

Thelypodium howellii ssp. s*pectabilis* occurs in wet alkaline meadows in valley bottoms, usually in and around woody shrubs that dominate the habitat on the knolls and along the edge of the wet habitat between the knolls. The plant is currently known from 11 sites (5 populations) ranging in size from 0.01 hectares (ha) (0.03 acres (ac) to 16.8 ha (41.4 ac) in the Baker-Powder River valley in Baker and Union counties. The total occupied habitat for this species is approximately 40 ha (100 ac). All remaining populations occur on private land. Plants at the type locality in Malheur County have not been found since 1927 and are considered to be extirpated. The entire extant range of this taxon lies within a 21-kilometer (km) 13-mile (mi) radius of Haines, Oregon.

While diflubenzuron, malathion and carbaryl are not phytotoxic at the proposed application rates, concern has been expressed that insecticide treatments might prevent pollination of Endangered and Threatened plant species by reducing or eliminating the insect pollinators. While some of these plant species are self-pollinating, others reproduce by bulbs, corms, rhizomes. Species such as *Thelypodium howellii* ssp. s*pectabilis,* which require pollination by insects, may bloom before, during, or after a grasshopper treatment. Those which are in full bloom during the treatment period and are insect pollinated are still highly likely to be frequented by insects as it would be unusual for all pollinators to be totally eliminated from an area. RAATs treatments in particular provide for untreated refuges of unharmed non-target species. Carbaryl bait applications only affect species that consume bait directly, or prey that have consumed bait. Therefore bait applications should not adversely affect pollinators. Repopulating of other insects species to normal levels occurs fairly rapidly due to natural migration from outside the treatment area.

Although APHIS feels the data presented here indicates a strong case for smaller buffers for RAATs and diflubenzuron, until the national consultation is completed, we propose using buffers similar to those agreed upon, in the 1995 BO, for similar species. The implementation of a three mile buffer with no aerial application of ULV pesticide (includes diflubenzuron) would be in place to protect pollinators. Within the buffer, only carbaryl bait will be used, and if applied by ground, a 50 ft. buffer from the edge of known locations and critical habitat of this plant will be used to avoid physical disturbance. By using these protective measures, the Grasshopper Suppression Program would not likely adversely affect *Thelypodium howellii* ssp *spectabilis*.

Spalding's Catchfly (*Silene spaldingii*)

Spalding's Catchfly is a member of the pink or carnation family (Caryophyllaceae). *Silene spaldingii* (Watson) is a long lived perennial herb with four to seven pairs of lance-shaped leaves a spirally arranged inflorescence (group of flowers) consisting of small greenish-white flowers. The foliage is tightly to densely covered with sticky hairs. Reproduction is by seed only; *S. spaldingii* does not possess rhizomes or other means of vegetative reproduction. Plants range from 2 to 6 decimeters (dm) (8-24 inches (in) in height.

The species is currently known from a total of 52 populations in the United States and British Columbia, Canada. Of the 51 populations in the United States, 7 occur in Oregon. All seven populations occur in Wallowa County. This species is primarily restricted to mesic (not extremely wet or extremely dry) grasslands (prairie or steppe vegetation) that make up the Palouse region in southeastern Washington, northwestern Montana, and adjacent portions of Idaho and Oregon. *S. spaldingii* sites range from approximately 530 m (1,750 ft) to 1,600 m (6,100 ft) elevation.

While diflubenzuron, malathion and carbaryl are not phytotoxic at the proposed application rates, concern has been expressed that insecticide treatments might prevent pollination of Endangered and Threatened plant species by reducing or eliminating the insect pollinators. While some of these plant species are self-pollinating, others reproduce by bulbs, corms, or rhizomes. Species such as *Silene spaldingii* which may require pollination by insects may bloom before, during, or after a grasshopper treatment. Those which are in full bloom during the treatment period and are insect pollinated are still highly likely to be frequented by insects as it would be unlikely for all pollinators to be totally eliminated from an area. RAATs treatments in particular provide for untreated refuges of unharmed non-target species. Carbaryl bait applications only affect species that consume bait directly, or prey that have consumed bait. Therefore bait applications should not adversely affect pollinators. Repopulating of other insects species to normal levels occurs fairly rapidly due to natural migration from outside the treatment area.

Although APHIS feels the data presented here indicates a strong case for smaller buffers for RAATs and diflubenzuron, until the national consultation is completed, we propose using buffers similar to those agreed upon, in the 1995 BO, for similar species. The implementation of a three mile buffer with no aerial application of ULV pesticide (includes diflubenzuron) would be in place to protect pollinators. Within the buffer, only carbaryl bait will be used, and if applied by ground, a 50 ft. buffer from the edge of known locations and critical habitat of this plant will be used to avoid physical disturbance. By using these protective measures, the Grasshopper Suppression Program would not likely adversely affect *Silene spaldingii*.

Canada lynx (*Lynx Canadensis*)

The Canada lynx is a medium-sized cat with long legs, large, well-furred paws, long tufts on the ears, and a short, black-tipped tail. Adult males average 10 kilograms (kg) (22 pounds (lb)) in weight and 85 centimeters (cm) (33.5 inches (in) in length (head to tail) and females average 8.5 kg 919 lb) and 82 cm (32 in). Canada lynx are specialized predators that are highly dependent on the snowshoe hare (*Lepus americanus*) for food. Canada lynx also prey opportunistically on other small mammals and birds, particularly when hare populations decline.

Canada lynx utilize late successional forest with large woody debris, such as downed logs and windfalls, to provide denning sites with security and thermal cover for kittens. Lynx require adequate travel cover to provide connectivity (linkage) within a forest landscape for security, movement within home ranges, and access between den sites and foraging areas. Such areas also may provide foraging opportunities. Resident Canada lynx populations were historically low in Oregon. Recent observations of lynx have been reported from the Cascades and the Blue Mountains in northeastern Oregon. The Canada lynx is currently classified as a fur bearer with a closed trapping and hunting season.

While diflubenzuron, malathion and carbaryl bait are highly toxic to insects they are all relatively nontoxic to mammals. Impacts on any prey species of the lynx would be negligible, even in possible linkages connecting the various areas of the lynx's range that might fall near treatment areas. Since grasshopper programs will only take place in rangeland, known ranges of the Canada lynx in Oregon are removed from any possible treatment areas. Therefore the Grasshopper Suppression Program activities will have no effect on the Canadian lynx (*Lynx canadensis*).

Bull Trout (*Salvelinus confluentus*)

Bull trout, members of the family Salmonidae, are char native to the Pacific Northwest and western Canada. Bull trout are relatively dispersed throughout tributaries of the Columbia River Basin, including its headwaters in Montana and Canada. Bull trout also occur in the Klamath River Basin of south-central Oregon. Bull trout exhibit both resident and migratory life-history strategies through much of their current range. Resident bull trout complete their life cycle in tributary streams, and juvenile fish rear from 1 to 4 years before migrating to either a lake, river, or in certain costal areas, saltwater to mature.

Bull trout are opportunistic feeders, with food habits primarily a function of size and life-history strategy. Resident and juvenile bull trout prey on terrestrial and aquatic insects, macrozooplankton, amphipods, mysids, crayfish, and small fish. Adult migratory bull trout are primarily piscivorous, known to feed on various trout and salmon species, whitefish, yellow perch, and sculpin.

Although APHIS feels the data presented here indicates a strong case for much smaller buffers, until the national consultation is completed, we propose using buffers similar to those agreed upon, in the 1995 BO, for similar species. For grasshopper suppression programs in Oregon in 2004, APHIS proposes that no ULV (liquid) treatments will occur within 0.5 miles of occupied habitat. Carbaryl bait will not be used within 500 feet of occupied habitat. Known migratory habitats will be treated as occupied habitat unless otherwise directed by FWS personnel prior to treatments. These protective measures will assure that the Grasshopper Suppression Program will not likely adversely affect bull trout (*Salvelinus confluentus*).

SUMMARY

This biological assessment addresses the possible effects of grasshopper suppression program activities on four species listed since 1995. Also addressed is the use of diflubenzuron and the RAATs application method on 16 listed species that could be affected by a grasshopper suppression program in Oregon. Information is provided on the biology and ecology of those species. Protective measures are suggested when program activities may affect those species or their habitats.

There may also be species in the affected areas that have not been addressed, either in this assessment or in previous years, because the species have been newly listed, newly proposed, or otherwise not mentioned in previous biological opinions. For those species APHIS will contact F&WS prior to undertaking any program to determine if any additional protective measures are needed. This 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 species.

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