Environmental Assessment

Rangeland Grasshopper and Mormon Cricket Suppression Program

Wyoming
EA Number: WY-16-01

Prepared by:

Animal and Plant Health Inspection Service
Plant Protection and Quarantine
5353 Yellowstone Road
Suite 208
Cheyenne, Wyoming 82009

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Acronyms

AChE	Acetylcholinesterase
APHIS	Animal and Plant Health Inspection Service
ATV	All Terrain Vehicle
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CPHST	Center for Plant Health Science and Technology
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
FONSI	Finding of No Significant Impact
FR	Federal Register
FS	Forest Service
FWS	Fish and Wildlife Services
IMP	Interim Management Policy
IPM	Integrated Pest Management
LWG	Local Working Group
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
PPQ	Plant Protection and Quarantine
RAATs	Reduced Agent Area Treatments
SGCN	Species of Greatest Conservation Need
ULV	Ultra Low Volume
USDA	United States Department of Agriculture
WGFD	Wyoming Game and Fish Department
WGSGCP	Wyoming Greater Sage Grouse Conservation Plan
WSA	Wilderness Study Area

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Wyoming

I. Need for Proposed Action

A. Purpose and Need Statement

An infestation of grasshoppers and/or Mormon crickets (hereafter referred to collectively as grasshoppers) may occur in Wyoming. The United State Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine (PPQ) and any cooperating agency, based on location of infestation may, upon request by land managers or State departments of agriculture, conduct treatments to suppress grasshopper infestations.

Populations of grasshoppers that trigger the need for a suppression program are normally considered on a case-by-case basis. Participation is based on potential damage, such as reduced forage, and benefits of treatments including reduction of pest outbreak populations and control of incipient pest populations. The goal of the proposed suppression program analyzed in this environmental assessment (EA) is to reduce grasshopper populations to acceptable levels in order to protect rangeland ecosystems and/or cropland adjacent to rangeland.

This EA analyzes potential environmental consequences of the proposed action and its alternatives. This EA applies to proposed suppression programs that would take place from March 15, 2016 to August 30, 2016 in Wyoming.

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

B. Background Discussion

In rangeland ecosystem areas of the United States, 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 or local government, or a private group or individual) when deemed necessary and if proper funding is available. 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 (EIS) document concerning suppression of grasshopper populations in 17 Western States (Rangeland Grasshopper and Mormon Cricket Suppression Program, Environmental Impact Statement, June 21, 2002). The EIS described the actions available to APHIS to reduce the destruction caused by grasshopper populations in 17 States (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).

APHIS will follow all state laws regarding pesticide application including Wyoming State Statutes §35-7-350 through §35-7-375 (http://legisweb.state.wy.us/lsoweb/wystatutes.aspx) and Chapter 28 Rules and Regulations, State of Wyoming, (http://soswy.state.wy.us/Rules/default.aspx).

In April 2014, APHIS and the United States Forest Service (USFS) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups 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 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 USFS.

The MOU further states that the responsible USFS official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on national forest land is necessary. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document.

In October 2015, APHIS and the Bureau of Land Management (BLM) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on suppression of grasshoppers and Mormon crickets on BLM lands (Document #15-8100-0870-MU, October 15, 2015). This MOU clarifies that APHIS will prepare and issue to the public site-specific environmental documents that evaluate potential impacts associated with proposed measures to suppress economically 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 land is necessary. The BLM must also prepare a Pesticide Use Proposal (Form FS-2100-2) for APHIS to treat infestations. According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document and BLM prepares and approves the Pesticide Use Proposal.

In June 2010, APHIS and the Bureau of Indian Affairs (BIA) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on suppression of grasshoppers and Mormon crickets on BIA lands (Document #10-8100-0941-MU, June 14, 2010). 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 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 official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on BIA land is necessary. The request should include the dates and locations of all tribal ceremonies and cultural events, as well as "not to be treated" areas that will be in or near the proposed treatment block(s). According to the provisions of the MOU, APHIS can begin treatments after APHIS issues an appropriate decision document.

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. Surveys help to determine general areas, among the scores of millions of acres that potentially could be affected, where grasshopper infestations may occur in the spring of the following year. There is considerable uncertainty, however, in the forecasts, so that framing specific proposals for analysis under NEPA is 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.

The 2002 EIS provides a solid analytical and regulatory foundation; however, it may not be enough to satisfy NEPA completely for actual treatment proposals, and the "conventional" EA process will seldom, if ever, meet the program's timeframe of need. Thus, a two-stage NEPA process has been designed to accommodate such situations. For the first stage, this EA will analyze aspects of environmental quality that could be affected by grasshopper treatment in Wyoming. This EA and finding of no significant impact (FONSI) will be made available to the public for a 30-day comment period. If comments are received during the comment period, they will be addressed in stage 2 of the process. For stage 2, when the program receives a treatment request and determines that treatment is necessary, the specific site within Wyoming will be extensively examined to determine if environmental issues exist that were not covered in this EA. This stage is intended mainly to insure that significant impacts in the specific treatment area will not be experienced. A

supplemental determination will be prepared to document this finding and would also address any comments received on this EA. Supplemental determinations prepared for specific treatment sites will be provided to all parties who comment on this EA.

II. Alternatives

The alternatives presented in the 2002 EIS and considered for the proposed action in this EA are: (A) no action; (B) insecticide applications at conventional rates and complete area coverage; (C) reduced agent area treatments (RAATS); and (D) research. Each of these alternatives, their control methods, and their potential impacts were described and analyzed in detail in the 2002 EIS. Copies of the complete 2002 EIS document are available for review at USDA APHIS PPQ, 5353 Yellowstone Road, Suite 208, Cheyenne, Wyoming. It is also available at the Rangeland Grasshopper and Mormon Cricket Program web site, http://www.aphis.usda.gov/plant_health/ea/downloads/fgheis.pdf.

The 2002 EIS is intended to explore and explain potential environmental effects associated with grasshopper suppression programs that could occur in 17 Western States (Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming). The 2002 EIS outlines the importance of grasshoppers as a natural part of the rangeland ecosystem. However, grasshopper outbreaks can compete with livestock and wildlife for rangeland forage and cause devastating damage to crops and rangeland ecosystems. Rather than opting for a specific proposed action from the alternatives presented, the 2002 EIS analyzes in detail the environmental impacts associated with each programmatic action alternative related to grasshopper suppression based on new information and technologies.

All insecticides used by APHIS for grasshopper suppression are used in accordance with applicable product label instructions and restrictions. Representative product specimen labels can be accessed at the Crop Data Management Systems, Inc. web site at http://www.cdms.net/Label-Database. Labels for actual products used in suppression programs will vary, depending on supply availability. All insecticide treatments conducted by APHIS will be implemented in accordance with APHIS' treatment guidelines, included as Appendix 1 to this EA.

A. No Action Alternative

Under Alternative A, the no action alternative, APHIS would not fund or participate in any program to suppress grasshopper infestations. Under this alternative, APHIS may opt to provide technical assistance, but any suppression program would be implemented by a Federal land management agency, a State agriculture department, a local government, or a private group or individual.

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

Alternative B, insecticide applications at conventional rates and complete area coverage, is generally the approach that APHIS has used for many years. Under this alternative,

carbaryl, diflubenzuron (Dimilin®), or malathion will be employed. Carbaryl and malathion are cholinesterase inhibitors. Diflubenzuron is an insect growth regulator. Applications 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 percent carbaryl bait per acre;
- 1.0 fluid ounce (0.016 lb a.i.) of diflubenzuron per acre; or
- 8.0 fluid ounces (0.62 lb a.i.) of malathion per acre.

In accordance with Environmental Protection Act (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, diflubenzuron, and malathion, under this alternative are discussed in detail in the 2002 EIS (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.

C. Reduced Agent Area Treatments (RAATs) Alternative

Alternative C, 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 directly 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 directly treated. Carbaryl, diflubenzuron, or malathion 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 percent carbaryl bait per acre;
- 0.75 fluid ounce (0.012 lb a.i.) of diflubenzuron per acre; or
- 4.0 fluid ounces (0.31 lb a.i.) of malathion per acre.

The area not directly 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 EIS 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. The reason for this is there is no way to predict how much area will 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 potential environmental effects of application of carbaryl, diflubenzuron, and malathion under this alternative are discussed in detail in the 2002 EIS (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.

D. Research *(applied using air and/or ground equipment)*

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, Arizona 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 Wyoming.

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.

Research that may occur in Wyoming in 2016 may involve a look at CP® nozzle and tip configuration in cooperation with USDA APHIS PPQ Aircraft and Equipment Operations, McAllen, Texas. 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 proposed 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 fluid ounce, 10 fluid ounces crop oil concentrate and 20 fluid ounces water applied in a RAATs application. The Prevathon would be applied at 2 fluid ounces with 0.32 fluid ounces methylated seed oil and water up to a total volume of 32 fluid ounces per acre applied as a RAATs application.

Another series of experiments using All Terrain Vehicles (ATVs) to apply labeled materials applied 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.

These treatments would be applied and monitored by USDA personnel.

III. Affected Environment

A. Description of Affected Environment

This EA covers the State of Wyoming. Additionally, APHIS recognizes that concerns outside this area could necessitate protection buffers that extend into this area.

The size of this region is approximately 97,914 square miles (62,664,960 acres). The total relief is 10,690 feet and ranges from 3,114 feet to 13,804 feet at Gannett Peak. Grasshopper and Mormon cricket treatments occur primarily between 3,640 feet and 7,500 feet in this region. Pine forests dominate the higher elevation. No treatments are anticipated in these forested areas. Annual precipitation in the primary area of concern ranges from 6 inches to 22 inches. Precipitation is higher in the mountains. Temperatures can be extremely variable at any location. Summer temperatures in the 90's and low 100's are common in the lower elevations. Winter low temperatures are often well below 0 ºF. The yearly mean temperatures for the region are 40 ºF to 48 ºF.

Croplands are concentrated along major rivers where irrigation is possible. Less than 3 percent of the region is cultivated. The major crops are:

CROP	ACRES	CROP	ACRES
Alfalfa	490,000	Corn	90,000
Other Hay	570,000	Oats	30,000
Wheat	140,000	Sugar Beets	30,700
Barley	80,000	Dry Beans	42,000

(Acreage figures are from National Agricultural Statistics Service, Wyoming Agriculture Statistics, 2014 Crop Estimates). Damage to these croplands is expected when migrating bands of Mormon crickets and grasshoppers enter these fields.

Information on the species composition of grasshoppers is available from USDA APHIS PPQ in Cheyenne, Wyoming through the Wyoming Grasshopper Information System. The species of major economic importance are: *Ageneotettix deorum, Amphitornus coloradus, Anabrus simplex, Aulocara elliotti, Aulocara femoratum, Camnula pellucida, Cordillacris crenulata, Cordillacris occipitalis, Melanoplus bivittatus, M. differentialis, M. femurrubrum, M. infantilis, M. occidentalis, M. sanguinipes, Phlibostroma quadrimaculatum, Phoetaliotes nebrascensis,* and *Trachyrhachys kiowa*. Approximately 96 other lesser important species were represented in surveys from this region. These 96 species may become economic pests if part of a high density species complex. Warm, dry weather is generally the most favorable for high populations, and severe loss of forage most often occurs in conjunction with drought.

The major population centers are in the towns of Cheyenne and Casper. Smaller towns are located throughout the region. The total population is approximately 563,626 (2010 census figure).

Major recreational areas in this region include eleven State parks and eight National Forests. The top five most visited State Parks in Wyoming are Hot Springs State Park with 1,821,006 visitors, Glendo State Park with 300,801 visitors, Bear River State Park with 261,540 visitors, Sinks Canyon State Park with 212,019 visitors and Keyhole State Park with 187,324 visitors in 2014 (Wyoming State Parks Visitor Use Program, 2016). Statistics for 2015 are pending publication. Wyoming's eight National Forests total 9.7 million acres (National Forest Service, 2016). The roads through the region are a major thoroughfare for tourist traffic to and from Wyoming's two National Parks, two National Monuments and over twenty National Historic Sites and Trails. Yellowstone National Park recorded 4,095,317 visitors for 2015 alone and has recorded between 2.8 million and 3.6 million visitors per year since 2000 (Yellowstone National Park Visitor Statistics, 2016).

Domestic honeybee yards are found throughout Wyoming. Approximately 268 hobbyist (10 hives or less) apiarists and 163 general commercial apiarists make up the total registered 431 apiarists who operate 48,000 bee yards and over 100 million bee hives in Wyoming. A large number of these colonies seasonally migrate to California to pollinate the almond orchards. Wyoming also has a hearty alfalfa seed production industry and alfalfa leafcutter bees are commonly used in some areas covered by this EA. Site specific locations can be found through apiary registrations at the Wyoming Department of Agriculture or checking with alfalfa seed producers in the case of leafcutter bees (WDA, 2015).

Many species of big game (antelope, mule deer, whitetail deer, elk, and others) and smaller animals (rabbits, squirrels, muskrats, beavers, minks, weasels, badgers, coyotes and foxes) range within the varied habitats. Livestock ponds, streams and reservoirs within the proposed treatment area provide a nesting and breeding habitat for waterfowl. Many nongame birds migrate through or nest in the region. Golden eagles, peregrine falcons and other raptors nest within the region and game birds (ringed-necked pheasant, greater sage-grouse, wild turkey, Hungarian partridge, chukar and dove) are present. Recreational hunting is very important to the local economy.

B. Other Considerations

1. Human Health

The 2002 EIS contains detailed hazard, exposure, and risk analyses for the chemicals available to APHIS. Impacts to workers and the general public were analyzed for all possible routes of exposure (dermal, oral, inhalation) under a range of conditions designed to overestimate risk. The operational procedures and spraying conditions examined in those analyses conform to those expected for operations. The following discussion summarizes the hazards, potential exposure, and risk to workers and the general public for operations in Wyoming. Operational procedures identified in Appendix 1 would be

required in all cases and further mitigation measures are identified in this section, as appropriate.

No treatment will occur over congested areas, recreation areas, or schools and if appropriate, a buffer zone will be enacted and enforced. Refer to the Operational Procedures for ground and aerial treatments listed in Appendix 1. Further Treatment information can be found in the Grasshopper Guidebook Provisional online at https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/grasshopper-mormon-cricket/ct_grasshopper_mormon_cricket.

Groundwater wells are a major source of domestic water supplies. Groundwater and surface water are the major rural and livestock water source. No impact is anticipated. Strict adherence to label requirements and USDA treatment guidelines (Appendix 1) will be followed in regard to treatments bordering open surface waters.

Malathion and carbaryl are cholinesterase inhibitors. Cholinesterases (including acetylcholinesterase) are enzymes that function at the nerve synapse. The nerve synapse is the point where information in the form of electrical impulses is relayed or transmitted by chemical messengers (called transmitters) from one nerve cell to another. Cholinesterase then inactivates or destroys the transmitter chemical (like acetylcholine) after it completes its job, otherwise the transmitter would continue indefinitely and precise control of the enervated tissue (muscle or organ) would be lost. Refer to the 2015 guidelines (Appendix 1) for further information on mitigating exposure to cholinesterase inhibitors.

No human health effects are likely from exposure to Dimilin 2L (diflubenzuron) if it is used according to label instructions. A human exposure assessment was done in detail for diflubenzuron and can be found in APHIS's "Chemical Risk Assessment for Diflubenzuron Use in Grasshopper Cooperative Control Program".

2. Non-target Species

Sensitive non-target species within the area include plants, terrestrial vertebrates and invertebrates, bats, resident and migratory birds, biocontrol agents, pollinators, aquatic organisms, and Federal and State listed threatened and endangered species. APHIS will use an Integrated Pest Management (IPM) approach to ensure non-target effects are reduced. APHIS will also consult with local agency officials to determine appropriate protective measures. Appropriate protective measures will be considered within an IPM framework. These strategies may include but are not limited to chemical selection, reduced rates, reduced coverage areas, buffer zones, timing restrictions and environmental monitoring. If such a request occurs and the grasshopper or Mormon cricket management option selected poses a clear threat to any of these species, APHIS will confer with the land managers, the U.S. Fish & Wildlife Service and/or Wyoming Game & Fish personnel to agree on protective measures.

a. Threatened and Endangered Species and Sensitive Species of Concern

The following are federally listed threatened and endangered species that reside in Wyoming.

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES:

Animals	Latin Name	Listed Status
Northern long-eared Bat	*Myotis septentrionalis*	Threatened
Grizzly bear	*Ursus arctos horribilis*	Threatened
Yellow-Billed Cuckoo	*Coccyzus americanus*	Threatened
Kendall warm springs dace	*Rhinichthys osculus thermalis*	Endangered
Black-footed ferret	*Mustela nigripes*	Endangered / Experimental
Canada lynx	*Lynx canadensis*	Threatened
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	Threatened
Wyoming toad	*Anaxyrus baxteri*	Endangered
Gray wolf	*Canis lupis*	Experimental

Plants	Latin Name	Listed Status
Colorado Butterfly plant	*Gaura neomexicana* var. *coloradensis*	Threatened
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened
Blowout penstemon	*Penstemon haydenii*	Endangered
Desert yellowhead	*Yermo xanthocephalus*	Threatened

A summary of species determinations and impact minimization measures can be found in Appendix 4. In the absence of a recent national biological opinion local section seven consultations are conducted yearly with Fish and Wildlife Service to mitigate impacts that grasshopper suppression programs may have on listed threatened and endangered species. These correspondences can be found in Appendix 2.

b. Greater Sage-Grouse (*Centrocercus urophasianus*)

The Wyoming Game and Fish Department (WGFD) and Bureau of Land Management (BLM) have indicated concern regarding the impacts of a grasshopper suppression program on greater sage-grouse, hereafter referred to as sage-grouse. Wyoming historically supports larger populations of sage grouse than other states due to the approximately 50 percent of land area that is composed of sagebrush habitats (Patterson 1952). "Sage-grouse numbers have declined throughout Wyoming in the second half of the 20th century" according to Wyoming greater sage-grouse Conservation Plan (WGSGCP), 2003. In order to break this trend WGFD has adopted the WGSGCP.

As part of the WGSGCP, Local Sage-Grouse Working Groups (LWGs) were created to develop and facilitate implementation of local conservation plans for the benefit of sage-grouse, their habitats, and whenever feasible, other species that use sagebrush habitats. The plans will identify management practices and the financial and personnel means to accomplish these practices, within an explicit time frame, for the purpose of improving sage-grouse numbers and precluding the need for listing under the Endangered Species

Act. These groups are made up of individuals from varying interest groups including federal land managers, conservation groups, mineral industry representatives, agriculture producers, and others.

As a result of the Governor's Executive orders 2008-2, 2010-4, 2011-5, and 2013-3 superseded by 2015-4 the Governor's sage grouse implementation team developed the sage grouse core area concept in order to protect critical habitat from further degradation. The BLM has adopted this core area strategy in their "Greater Sage-Grouse Habitat Management Policy" dated December 29, 2009. The BLM has also issued Instruction Memorandum WY 2012-019 regarding Greater Sage-Grouse habitat management policy on Wyoming BLM administered public lands including the federal mineral estate.

In 2009 USDA APHIS PPQ met with the three LWGs most likely to be affected by grasshopper control suppression activities in 2010 to explain how USDA APHIS PPQ grasshopper suppression activities may affect sage-grouse populations. Concerns to sage-grouse include the toxicity effects of the chemicals in question, the effects to the food base of the greater sage-grouse, and the physical disturbance factors related to a grasshopper suppression program.

Sage-grouse as a species of concern is addressed in the 2002 EIS. While it is clear that diflubenzuron poses less direct toxicity to greater sage-grouse than both carbaryl and malathion, toxicities were analyzed in the risk assessment and concluded that alternative B and C would not directly affect greater sage-grouse for any of the proposed insecticides.

The effect of grasshopper suppression programs to the food base of the greater sage-grouse can be significant during the early brood rearing timing of the sage-grouse life cycle. Study results indicate that sage-grouse chicks require insects for survival until about three weeks of age (Johnson, May 1987). For most of Wyoming, this timing coincides with the earliest likely timing of grasshopper suppression programs. In order to limit the effects to the food base of the greater sage-grouse APHIS PPQ will utilize alternative C (RAATS) within greater sage-grouse core areas. By using the RAATS method, effects to non-target insects and grasshoppers will be reduced. The Governor's executive order 2015-4 specifically lists Grasshopper / Mormon cricket control following Reduced Agent-Area Treatments (RAATS) protocols as an exempt activity under Attachment C Exempt ("de minimis") Activities.

In extreme cases grasshopper infestations may be so damaging that crucial sage-grouse habitat is compromised. These areas may not be apparent in time to use diflubenzuron and a faster knockdown may be required to protect the habitat. For these situations APHIS reserves the ability to use carbaryl and malathion in greater sage-grouse core areas. If treatments are late enough in the season that diflubenzuron is deemed ineffective then it is also most likely that sage-grouse chicks will be mature enough that they will have adjusted their diet to a mixture of forbs and sage brush versus insects only. Situations that require the use of carbaryl or malathion within sage-grouse core areas will be considered on a case by case situation only with input from the land manager, land owner and Wyoming Game and Fish Department.

In 2015 the FWS requested data from 11 western states, including Wyoming, to aide in the ESA listing decision of the sage grouse. The data included sage grouse populations' status, trends and numbers, habitat status and trends, hunting and other uses, disease and predation, impacts from pesticides, contaminants, recreational activities, and any literature pertinent to the FWS status review. The compiled data demonstrated Wyoming's commitment and assurance to sage grouse conservation and the determination of the western states to logistically and financially conserve sage grouse habitat and protect the sage grouse species. Reviews of the complied data lead to the United States Department of Interior determining that listing the greater sage grouse range wide as a threatened or endangered species is currently precluded making it a candidate species which will not receive statutory protection under the ESA and that individual states will continue to be responsible for their management. If grasshopper suppression treatments are requested in sage grouse core areas, APHIS PPQ will consider additional conditions and mitigation measures outlined in the request. Discussions with local entities such as FWS and BLM will also occur to determine appropriate steps to suppress grasshopper populations and protect sage grouse populations and habitat ranges.

c. Species of special concern to the Wyoming Game and Fish Department

The Wyoming Game and Fish lists Species of Greatest Conservation Need (SGCN). This list may be found in State Wildlife Action Plan, 2010, which can be found at https://wgfd.wyo.gov/Habitat/Habitat-Plans/Wyoming-State-Wildlife-Action-Plan.

WGFD has specific concerns regarding greater nongame birds and bats with respect to grasshopper suppression programs.

i. Nongame birds

The following species appear on the SGCN list and the Wyoming Partners in Flight Priority Species list, and may be negatively affected by grasshopper control in areas where they nest and forage: burrowing owl, short-eared owl, Brewer's sparrow, sage sparrow, McCown's longspur, loggerhead shrike, sage thrasher, vesper sparrow, lark sparrow, lark bunting, dickcissel, and bobolink. In particular, the following species consume large amounts of grasshoppers and/or Mormon Crickets; therefore the impact of grasshopper control on these species is likely to negatively affect both adult and young birds during the nesting season: McCown's longspur, loggerhead shrike, sage thrasher, and lark bunting. Grasshopper suppression activities are designed to leave behind some grasshopper populations in order to minimize impacts to species that use grasshoppers as a food base. At no time will APHIS strive to eradicate grasshopper populations.

ii. Bats

In previous years the Wyoming Game & Fish has raised concerns about possible impacts of this program on spotted bats. The spotted bat is a nocturnal feeder on flying insects primarily around desert water holes. The bat and its food source are protected by the buffers associated with water. Additional protective measures, such as the use of bait or

RAATs, will be negotiated with the Wyoming Game & Fish if proposed pesticide applications directly conflict with sites having recent spotted bat activity.

d. Bald and Golden Eagle Protection Act

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 Eagle 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.

As listed in the National Bald Eagle Management Guidelines (FWS, May 2007) the following mitigation measures will be followed when practical:

> "Category G. Helicopters and fixed-wing aircraft. Except for authorized biologists trained in survey techniques, avoid operating aircraft within 1,000 feet of the nest during the breeding season, except where eagles have demonstrated tolerance for such activity. In addition, Category A (Agriculture) and Category D (Off Road Vehicle Use) both provide the same guidance for use of ATV's or trucks: No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet."

Most bald eagles nest close to their food source, typically waterways, by policy and label restrictions APHIS will not conduct suppression activities within 500 feet of water bodies providing some inherent protection for Bald Eagles.

e. Aquatic Species not previously listed

The malathion label warns of its toxicity to fish, shrimp, and crabs and prohibits its use over water. EPA lists carbaryl and malathion as pesticides that may affect endangered aquatic species (EPA, 1986).

The Dimilin label warns that diflubenzuron is toxic to aquatic invertebrate animals and that it cannot be applied directly to water or to areas where surface water is present.

Important game fish in the region include: Walleye, Sauger, Cutthroat, Brown, Rainbow, Brook and Lake trout.

Programmatic protection for federally listed endangered and threatened species of aquatic animals is covered in the 2002 EIS, Biological Assessments and the Biological Opinions. These procedures will ensure protection of sensitive aquatic species from any adverse effects caused by grasshopper control.

f. Bees

i. Domestic Honey Bees (*Apis mellifera*)

Beekeepers are given notice when definitive treatment areas are identified. Treatment block maps will be available for beekeeper review at the County offices of the Weed & Pest Districts. Beekeepers will be advised to move their bees at least two miles from the spray block boundaries. In all cases when using malathion or carbaryl where beekeepers fail to move or otherwise protect their bees, a two mile buffer zone will be observed around the bee yard. The above procedures will ensure that there will be no significant impact on domestic bee production.

ii. Alfalfa Leafcutter Bees (*Megachile rotundata*)

Alfalfa leafcutter bees are managed for pollination of alfalfa in the area. The areas with these bees are mostly centered at Basin, Burlington, Emblem, Powell, Byron, Lovell and Riverton. Notification is on a case-by-case basis. Beekeepers will be advised to move their bees at least four miles from the spray block boundaries. In all cases when using malathion or carbaryl where beekeepers fail to move or otherwise protect their bees, a four mile buffer zone will be observed around the bee yard. The above procedures will ensure that there will be no significant impact on alfalfa leafcutter bee activity.

g. Wildlife Habitat Reservations and Wilderness Areas

The Wyoming Game & Fish Department operates 35 Wildlife Habitat Management Units in Wyoming. These can be located on the web at https://wgfd.wyo.gov/accessto/whmas.asp. If a request for treatment involves any of these lands APHIS will negotiate locally with the habitat biologist located at the nearest Game and Fish regional office for any protective measures necessary, additional to the operation procedures.

h. Bureau of Land Management Wilderness Study Areas

In Wyoming there are 42 Bureau of Land Management (BLM) administered Wilderness Study Areas (WSA), encompassing 577,504 acres. These WSA's are managed under BLM's Interim Management Policy (IMP).

The objective of the IMP is to continue resource uses within the WSA's in a manner that maintains the area's suitability for preservation as wilderness until Congress either designates these lands as wilderness or releases them for other purposes.

Handbook H-8550 -1 (Interim Management Policy for Lands under Wilderness Review) provides guidance regarding how BLM will manage the WSA's. H-8550-1 does provide for insect and disease control by chemical or biological means under certain conditions as discussed in Chapter 3, Section D Rangeland Management, 4 e.

Because of the special requirements found in H-8550-1, including NEPA related requirements, before conducting any Grasshopper and Mormon cricket project involving a WSA, the BLM Field Office administering the specific WSA will be consulted with and involved in the project.

i. 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 Number (E.O. No.) 13186 to ensure that all government programs protect migratory birds to the extent practicable. To further its purposes, the E.O. requires each agency with a potential to impact migratory birds to enter into a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service (FWS). In compliance with the E.O., APHIS has signed MOU August 02, 2012 with FWS.

j. Protective Mitigation Measures of Above Species

Protective mitigation measures that may be taken by APHIS in the grasshopper treatment areas covered by this EA may include, but is not limited to buffer zones and/or skip swaths. It is important to note that treatment goals are to reduce grasshopper populations to an economic threshold, not eradication. At no time will APHIS strive to reduce populations below levels encountered in non-outbreak years. This will help insure grasshopper populations sufficient to provide food sources and biodiversity for species of concern.

If after specific program boundaries have been set and if it has been determined by Fish and Wildlife Services or the land manager that species of concern are within the specific area, mitigation measures as described in Appendix 4 or site specific documentation will be followed.

3. Socioeconomic Issues

a. Economic Considerations

The possible treatment areas are subject to reoccurring drought. A combination of drought and grasshopper damage causes economic stress to landowners and permittees.

The control of grasshoppers and Mormon crickets in this area would have beneficial economic impacts to local landowners (or permittees). The forage not utilized by grasshoppers will be available for livestock consumption, and harvesting. This will allow greater livestock grazing, decreased needs for supplemental feed, and increased monetary returns. The control of migrating bands of Mormon crickets is most important in protection of crops but if populations are extreme, damage to rangeland forage will occur.

4. Cultural Resources and Events

In previous years, BLM has expressed concerns regarding the effect of pesticide applications on Cation-ratio dating techniques of pictographs and petroglyphs. There is presently no information on this subject. Until such information is available USDA APHIS will confer with BLM on a local level to protect known sites on BLM managed lands.

Where tribal lands are involved APHIS will confer locally with Tribal Officials on possible cultural impacts of proposed grasshopper/Mormon cricket treatment.

No other known historical or cultural resource area will be affected by any proposed control program.

5. Special Considerations for Certain Populations

a. Executive Order Number 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

Executive Order Number 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.

Consistent with E.O. No. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations," APHIS considered the potential for disproportionately high and adverse human health or environmental effects from the proposed treatment is minimal and is not expected to have disproportionate adverse effects to any minority or low income populations.

b. Executive Order Number 13045, Protection of Children from Environmental Health Risks and Safety Risks

The increased scientific knowledge about the environmental health risks and safety risks associated with hazardous substance exposures to children and recognition of these issues in Congress and Federal agencies brought about legislation and other requirements to protect the health and safety of children. On April 21, 1997, President Clinton signed E.O. No. 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).

The human health risk assessment for the 2002 EIS 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 treatment will occur over congested areas or schools and if appropriate, a buffer zone will be enacted and enforced.

Impacts on children will be minimized by the implementation of the treatment guidelines as further described in Appendix 1:

Aerial Broadcast Applications of Liquid Insecticides

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

- No treatments will occur over congested urban areas. For all flights over congested areas, the contractor must submit a plan to the appropriate Federal Aviation Administration District Office and this office must approve of the plan; a letter of authorization signed by city or town authorities must accompany each plan. Whenever possible, plan aerial ferrying and turnaround routes to avoid flights over congested areas, bodies of water, and other sensitive areas that are not to be treated.

Aerial Application of Dry Insecticidal Bait

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

Ultra-Low-Volume Aerial Application of Liquid Insecticides

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

c. Executive Order Number 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 E.O. No. 13186 to ensure that all government programs protect migratory birds to the extent practicable. To further its purposes, the E.O. requires each agency with a potential to impact migratory birds to enter into a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service (FWS). In compliance with the E.O., APHIS is currently working with FWS to develop such an MOU.

IV. Environmental Consequences

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

A. Environmental Consequences of the Alternatives

1. No Action Alternative

Under this alternative, APHIS would not fund or participate in any program to suppress grasshoppers. If APHIS does not participate in any grasshopper suppression program, Federal land management agencies, State agriculture departments, local governments, or private groups or individuals may not effectively combat outbreaks in a coordinated effort. In these situations, grasshopper outbreaks could develop and spread unimpeded.

Grasshoppers in unsuppressed outbreaks would 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. Habitat loss for birds and other wildlife and rangeland susceptibility to invasion by non-native plants are among the consequences that would likely occur should existing vegetation be removed by grasshoppers. Loss of plant cover due to grasshopper consumption will occur. Plant cover may protect the soil from the drying effects of the sun, and plant root systems hold the soil in place that may otherwise be eroded.

Another potential scenario, if APHIS does not participate in grasshopper suppression programs, is 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. It is not possible to accurately predict the environmental consequences of the no action alternative because the type and amount of insecticides that could be used in this scenario are unknown.

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 one of the insecticides carbaryl, diflubenzuron, or malathion, depending upon the various factors related to the grasshopper outbreak and the site-specific characteristics. The use of an insecticide would 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.

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 (U.S. 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 is 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 ULV spray or bait at Alternative 2 rates posed little risk to killdeer (McEwen *et al*., 1996a), vesper sparrows (McEwen *et al*., 1996a; Adams *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 than 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. Field studies with carbaryl concluded that there was no biologically significant effect on aquatic resources, although invertebrate downstream drift increased for a short period after treatment due to toxic effects (Beyers *et al*., 1995). Carbaryl is moderately toxic to most fish (Mayer and Ellersieck, 1986).

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 (a compound in blood responsible for the transport of oxygen) in blood.

Potential exposures to the general public from Alternative 2 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 and early life stages of aquatic invertebrates (Eisler, 2000). 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. Many of the aquatic organisms most susceptible to diflubenzuron are marine organisms that would not be exposed to rangeland treatments. Freshwater invertebrate populations would be reduced if exposed to diflubenzuron, but

these decreases would be expected to be temporary given the rapid regeneration time of many aquatic invertebrates.

Possible exposure to freshwater invertebrate populations would be minimized by strict adherence to label requirements.

Malathion

Malathion is of slight acute oral toxicity to humans. The mode of toxic action of malathion occurs through inhibition of AChE function in the nervous system. Unlike carbaryl, AChE inhibition from malathion is not readily reversible over time if exposure ceases. However, strong inhibition of AChE from malathion occurs only when chemical oxidation results in formation of the metabolite malaoxon. Human metabolism of malathion favors hydroxylation and seldom produces much malaoxon.

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, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Potential worker exposures are higher, but still have little potential for adverse health effects except under accidental scenarios. Malathion has been used routinely in other programs with no reports of adverse health effects. Therefore, routine safety precautions are expected to continue to provide adequate protection of worker health.

The EPA has recently reviewed the potential for carcinogenic effects from malathion. EPA's classification describes malathion as having suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential (U.S. EPA, 2000). This indicates that any carcinogenic potential of malathion cannot be quantified based upon EPA's weight of evidence determination in this classification. The low exposures to malathion from program applications would not be expected to pose carcinogenic risks to workers or the general public.

Malathion is of slight acute oral toxicity to mammals. There is little possibility of toxicity induced mortality of upland birds, mammals, or reptiles, and no direct toxic effects have been observed in field studies. Malathion is not directly toxic to vertebrates at the concentrations used for grasshopper suppression, but it may be possible that sublethal effects to nervous system functions caused by AChE inhibition may lead directly to decreased survival. AChE inhibition at 40 to 60 percent affects coordination, behavior, and foraging ability in vertebrates. Multi-year studies at several grasshopper treatment areas have shown AChE inhibition at levels of no more than 40 percent with most at less than 20 percent (McEwen *et al*., 1996a). Field studies of birds within malathion treatment areas showed that, in general, the total number of birds and bird reproduction were not different from untreated areas (McEwen *et al*., 1996a). Malathion does not bioaccumulate (HSDB, 1990; Tsuda *et al*., 1989).

Malathion will most likely affect non-target insects within a treatment area. Large reductions in some insect populations would be expected after a malathion treatment under

Alternative 2. While the number of insects would be diminished, there would be some insects remaining. The remaining insects would be available prey items for insectivorous organisms, and those insects with short generation times may soon increase.

Malathion is highly toxic to some fish and aquatic invertebrates; however, malathion concentrations in water, as a result of grasshopper treatments, are expected to be low presenting a low risk to aquatic organisms, especially those organisms with short generation times.

The implementation of pesticide label instructions and restrictions and the APHIS treatment guidelines will reduce potential impacts from the program use of insecticides (see Appendix 1 Treatment Guidlines).

3. Reduced Area Agent Treatments (RAATs) Alternative

Under Alternative 3, the insecticide carbaryl, diflubenzuron, or malathion 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 malathion 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.

Carbaryl

Potential exposures to the general public and workers from RAATs application rates are lower than those from conventional application rates, and adverse effects decrease commensurately with decreased magnitude of exposure. 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 is negligible if proper safety procedures are followed, including wearing the required protective clothing. Routine safety precautions are expected to provide adequate protection of worker health at the lower application rates under RAATs.

Carbaryl will most likely affect nontarget insects that are exposed to liquid carbaryl or that consume carbaryl bait. While carbaryl applied at a RAATs rate will reduce susceptible insect populations, the decrease will be less than under Alternative 2 rates. Carbaryl ULV applications applied in alternate swaths have been shown to affect terrestrial arthropods less than malathion applied in a similar fashion.

Direct toxicity of carbaryl to birds, mammals, and reptiles is unlikely in swaths treated with carbaryl under a RAATs approach. Carbaryl bait also has minimal potential for direct effects on birds and mammals. Field studies indicated that bee populations did not decline after carbaryl bait treatments, and American kestrels were unaffected by bait applications

made at a RAATs rate. Using alternating swaths will furthermore reduce adverse effects because organisms that are in untreated swaths will be mostly unexposed to carbaryl.

Carbaryl applied at a RAATs rate has the potential to affect invertebrates in aquatic ecosystems. However, these affects would be less than effects expected under Alternative 2. Fish are not likely to be affected at any concentrations that could be expected under Alternative 3.

Diflubenzuron

Potential exposures and adverse effects to the general public and workers from RAATs application rates are commensurately less than conventional application rates. These low exposures to the public pose no risk of methemoglobinemia, direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Potential worker exposures pose negligible 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. Diflubenzuron exposures at Alternative 3 rates are not hazardous to terrestrial mammals, birds, and other vertebrates. Insects in untreated swaths would have little to no exposure, and adult insects in the treated swaths are not susceptible to diflubenzuron's mode of action. The indirect effects to insectivores would be negligible as not all insects in the treatment area will be affected by diflubenzuron.

Diflubenzuron is most likely to affect immature terrestrial insects and, if it enters water, will affect early life stages of aquatic invertebrates. While diflubenzuron would reduce insects within the treatment area, insects in untreated swaths would have little to no exposure. Many of the aquatic organisms most susceptible to diflubenzuron are marine organisms that would not be exposed to rangeland treatments. Freshwater invertebrate populations would be reduced if exposed to diflubenzuron, but these decreases may be temporary given the rapid regeneration time of many aquatic invertebrates.

Possible exposure to freshwater invertebrate populations would be minimized by the strict adherence to label requirements.

Malathion

Potential exposures 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 no risk of direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity.

Potential risks to workers are negligible if proper safety procedures are adhered to, including the use of required protective clothing. Malathion has been used routinely in other programs with no reports of adverse health effects. The low exposures to malathion

from program applications are not expected to pose any carcinogenic risks to workers or the general public.

Malathion applied at a RAATs rate will cause mortalities to susceptible insects. Organisms in untreated areas will be mostly unaffected. Field applications of malathion at a RAATs rate and applied in alternate swaths resulted in less reduction in non-target organisms than would occur in blanket treatments. Birds in RAATs areas were not substantially affected. Should malathion applied at RAATs rates enter water, it is most likely to affect aquatic invertebrates. However, these effects would soon be compensated for by the surviving organisms given the rapid generation time of most aquatic invertebrates and the rapid degradation of malathion in most water bodies.

The implementation of pesticide label instructions and restrictions and the APHIS treatment guidelines will reduce potential impacts from the program use of insecticides (see Appendix 1 Treatment Guidelines).

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.

APHIS does not anticipate cumulative impacts and does not expect overlapping grasshopper treatments. There are a number of other chemicals that may be applied on rangeland in Wyoming. Herbicides do not have a known cumulative effect with Carbaryl, Diflubenzuron, or Malathion. If at the time of treatment other chemical treatment programs are discovered within the site specific area an addendum will be added explaining the synergistic effects that may occur.

2. Endangered Species Act

Under the Endangered Species Act of 1973, Section 7, federal agencies are required to consult with the U.S. Fish and Wildlife Service regarding the degree of impact to federally proposed and listed species and critical habitat from the program action and the necessary protective measures to avoid or minimize adverse effects. Informal consultation between APHIS and the FWS may be used to determine whether any adverse effects to species or habitat by the proposed action can be avoided or summarily minimized.

Currently, documents to initiate formal consultation between APHIS and FWS are underway, but the biological assessment will not be completed in time for 2016 treatments. These documents are pending final approval. The last formal consultation resulted in the 1998 biological assessment prepared by APHIS and the 1995 biological opinion issued by

FWS. This environmental assessment uses information from past formal consultations in determining protective measures.

Malathion and carbaryl have been included in consultation procedures in the past. The 1995 biological opinion has summarized the language from former assessments and opinions on the effects of both pesticides:

Carbaryl:

In general, carbaryl demonstrates low to moderate mammalian toxicity, low toxicity to birds, and moderate toxicity to fish. It is very toxic to aquatic invertebrates and many terrestrial insects. Carbaryl remains effective on vegetation for approximately seven days and 28 days in anaerobic soils (U.S. Fish and Wildlife Service, 1995).

Malathion:

Malathion is relatively low in toxicity to mammals and birds. It is moderately to highly toxic to fish and amphibians. Malathion is extremely toxic to aquatic invertebrates and highly toxic to most insects, including bees. Malathion is relatively non-persistent in soil, water, plants, and animals. Its half-life in alkaline soils is generally less than one day; in water, the half-life is generally less than two days. Malathion residues in plants persist up to five to seven days. Malathion does not bioaccumulate in animals; it is rapidly excreted after exposure ceases (U.S. Fish and Wildlife Service, 1995).

Diflubenzuron:

The chemical, diflubenzuron (dimilin), has been added to the treatment program, as described in the 2002 EIS. This chemical is new to the consultation process and will be locally consulted on at a site-specific level and included in the forthcoming biological assessment.

Further information on carbaryl, malathion, and diflubenzuron is included earlier in this EA and in the 2002 EIS.

Due to the incomplete formal consultation, local informal consultations have been completed. Correspondence regarding local consultations between APHIS and FWS are included in Appendix 2 “FWS/NMFS Correspondence”.

3. Monitoring

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. Work achievement reports are available from the Cheyenne, Wyoming USDA APHIS PPQ office

for specific spray blocks upon request. No treatments were conducted in 2012, 2013, 2014, or 2015.

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. The cholinesterase health monitoring program is mandatory and prevents and/or reduces overexposure to cholinesterase inhibiting compounds such as carbamate and organophosphate pesticides. Since the effect of these pesticides is cumulative during a period of exposure, it is mandatory that all exposed individuals be monitored. The APHIS cholinesterase monitoring program will help protect employees from pesticide poisoning and will also help monitor the use and condition of personal protective equipment. APHIS program personnel are also provided proper hearing protection equipment. Chemical application equipment such as planes, trucks and sprayer motors may affect hearing if exposed for long periods of time. (See APHIS Safety and Health Manual, USDA APHIS, 1998 located online at https://www.aphis.usda.gov/aphis/resources/manualsandguidelines)

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 endangered and threatened 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 current environmental monitoring plan can be found at https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/sa_emt/ct_support_docs. Past years environmental monitoring reports are available upon request from the Cheyenne, Wyoming USDA APHIS PPQ office.

Treatments conducted by PPQ in 2010 amounted to 1,027,099 protected acres. All treatments in 2010 were conducted using Dimilin 2L and RAATS methodology.

Treatments conducted by PPQ in 2011 amounted to 81,527 protected acres. All treatments in 2011 were conducted using Dimilin 2L and RAATS methodology.

No treatments were conducted by PPQ in Wyoming during 2012, 2013, 2014 and 2015.

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VI. Listing of Agencies and Persons Consulted

R. Mark Sattelberg
Field Supervisor
Wyoming State Office
Fish and Wildlife Service
United States Department of Interior
5353 Yellowstone Rd. Suite 308a
Cheyenne, WY 82009

Kimberly Dickerson
Environmental Contaminants Biologist
Wyoming State Office
Fish and Wildlife Service
United States Department of Interior
5353 Yellowstone Rd. Suite 308a
Cheyenne, WY 82009
(307) 772-2374

Lisa Solberg Schwab
Fish and Wildlife Biologist
Wyoming ES Field Office
1625 W. Pine St.
P.O. Box 768
Pinedale, WY 82941
(307) 367-5340

Ken Henke
Weed and Pest Coordinator
Bureau of Land Management
PO Box 1828
5353 Yellowstone Rd.
Cheyenne WY 82009

Bill Hill
Field Manager
Bureau of Land Management
PO Box 1828
5353 Yellowstone Rd.
Cheyenne WY 82009

Chris Keefe
Biologist
Bureau of Land Management
Big Horn Basin Resource Area
PO Box 119
Worland, WY 82401

Gary Long
WSA Coordinator
Bureau of Land Management
PO Box 1828
5353 Yellowstone Rd
Cheyenne WY 82009

Mary Flanderka
Habitat Protection Supervisor
Wyoming Game and Fish
5400 Bishop Blvd.
Cheyenne WY 82006

Tom Christensen
Greater Sage-Grouse Coordinator
Wyoming Game and Fish
351 Astle Ave.
Green River WY 82935

Zack Walker
Non-Game Coordinator
Wyoming Game and Fish
260 Buena Vista
Lander WY 82520

Ian Tator
Wildlife and Habitat Manager
Wyoming Game and Fish
5400 Bishop Blvd
Cheyenne WY 82006

John Kennedy
Deputy Director
Wyoming Game and Fish
5400 Bishop Blvd
Cheyenne WY 82006

Appendix 1: APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program FY-2015 Treatment Guidelines

Version 2/09/2015

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.

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 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:
   - loaning equipment(an agreement may be required):
   - contributing in-kind services such as surveys to determine insect species, instars, and infestation levels;
   - monitoring for effectiveness of the treatment;
   - 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
    c) Malathion ultra low volume spray
4. Do not apply insecticides directly to water bodies (defined herein as reservoirs, lakes, ponds, pools left by seasonal streams, springs, wetlands, and perennial streams and rivers).

    Furthermore, provide the following buffers for water bodies:
    - 500-foot buffer with aerial liquid insecticide.
    - 200 foot buffer with ground liquid insecticide.
    - 200-foot buffer with aerial bait.
    - 50-foot buffer with ground bait.

5. Instruct program personnel in the safe use of equipment, materials and procedures; supervise to ensure 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 Manaual and treatment experience is critical; attendace to the Aerial Applicators Workshop is very beneficial.

8. Each suppression program will conduct environmental monitoring as outlined in the 2015 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 2015 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.

Appendix 2: FWS/NMFS/WGFD Correspondence

WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

Phone: (307) 777-4600 Fax: (307) 777-4699

wgfd.wyo.gov

April 19, 2016

WER 9810.00q
Animal and Plant Health Inspection Service
2016 Environmental Assessment
Rangeland Grasshopper and Mormon Cricket
Suppression Program
Wyoming: EA Number WY-16-01

Kathleen Meyers
USDA APHIS PPQ
5353 Yellowstone Road, Suite 208
Cheyenne, WY 82009

Dear Ms. Meyers:

The staff of the Wyoming Game and Fish Department (WGFD) has reviewed the 2016 Environmental Assessment for the Rangeland Grasshopper and Mormon Cricket Suppression Program. We have no comments on this EA. Thank you for incorporating our previous comments.

Thank you for the opportunity to comment. If you have any questions or concerns, please contact Mary Flanderka, Habitat Protection Coordinator, 307-777-4587.

Sincerely,

Mary Flanderka
Habitat Protection Supervisor

MF/ns

cc: USFWS
Chris Wichmann, Wyoming Department of Agriculture, Cheyenne
Tom Christiansen, WGFD, Green River Region

Appendix 3: FONSI

FINDING OF NO SIGNIFICANT IMPACT

Rangeland Grasshopper and Mormon Cricket Suppression Program
Environmental Assessment in Wyoming
EA Number WY-16-01

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), has prepared an environmental assessment (EA) that analyzes alternatives for suppressing grasshopper and Mormon cricket outbreaks on rangeland in Wyoming. The EA, incorporated by reference in this document, is available from USDA APHIS PPQ, 5353 Yellowstone Rd. Suite 208, Cheyenne, WY 82009.

- The EA includes an analysis of the potential impacts of 4 alternatives. They included (1) No Action, (2) Insecticide Applications at Conventional Rates and Complete Area Coverage, (3) Reduced Agent Area Treatments (RAATs), and (4) research methods. The preferred method will be (3) Reduced Agent Area Treatments. APHIS participation in this suppression program may be necessary to reduce grasshopper populations in order to preserve rangeland forage levels used for grazing, protect adjacent cropland from being infested with damaging grasshopper species, and to protect range conditions for long term range management. The goal of these suppression treatments is not to eradicate grasshopper species, but to mitigate outbreak populations back to normal levels without causing any significant adverse effects to human health or the environment.

APHIS has determined that the proposed suppression program, conducted in accordance with the Guidelines for Treatment of Rangeland Grasshoppers and Mormon Crickets (treatment guidelines), which contains the operational procedures, will not significantly impact the quality of the human environment.

The finding of no significant impacts was determined on the following:

1. Human health: The 2002 EIS contains detailed hazard, exposure, and risk analyses for the chemicals available to APHIS. Impacts to workers and the general public were analyzed for all possible routes of exposure (dermal, oral, inhalation) under a range of conditions designed to overestimate risk. No treatment will occur over congested areas, recreational areas, or schools and if appropriate, a buffer zone will be enacted and enforced. No treatment will occur directly over water bodies. Furthermore, the following buffers will also be adhered to: 500 foot buffer for aerial liquid insecticides; 200 foot buffer with aerial bait; and a 50 foot buffer for all ground applications. No impact to groundwater is anticipated. Workers will utilize necessary safety protection measures to mitigate the risk of exposure. All APHIS treatments will strictly adhere to label requirements and further protection measures as outlined in the Treatment Guidelines and Operational Procedures. No human health effects are likely.

2. Non-targets: Chemical label instructions and APHIS Treatment Guidelines and Operational Procedures will be strictly followed. This will mitigate any adverse effect on non targets. Bee keepers will be given notice of any potential treatments in areas that contain domestic or leaf cutter bees. In all cases when using malathion or carbaryl a two mile buffer for domestic bees and a four mile buffer for leaf cutter bees will be enforced either by the movement of bees or

with buffer zones. APHIS will conduct environmental monitoring in areas where buffers are implemented. No adverse effects are likely for non-targets.

3. Endangered and threatened species: Protection measures that resulted from the Section 7 Consultation process will be implemented and strictly followed. APHIS will confer with land managers, the U.S. Fish & Wildlife Service and/or Wyoming Game & Fish personnel once treatment areas are identified to determine if any threatened or endangered species occur and, if so, which mitigating measures are needed for the selected treatment option. Suppression treatments are not likely to adversely affect endangered or threatened species or their habitats.

4. Socioeconomic issues: Potential suppression efforts would likely have beneficial economic impacts to local landowners and permittees. The forage not utilized by grasshopper and Mormon crickets will allow for greater livestock grazing, decreased needs for supplemental feed and increased monetary returns.

5. Cultural resources and events: USDA-APHIS does not anticipate any impact on cultural resources or events. APHIS will confer with BLM on a local level to protect known pictograph and petroglyph sites. Where tribal lands are involved, APHIS will confer locally with Tribal Officials on possible cultural impacts of proposed suppression efforts.

6. Executive Orders 12898 (low income and minorities), 13045 (children), and 13186 (migratory birds): No adverse effects are anticipated on low income and minority populations or children because possible suppression treatments will be conducted primarily on open rangeland where human activity is unlikely. APHIS routinely conducts programs in a manner that minimizes the impact to the environment, including any impact to migratory birds.

The time between the receipt of a request for treatment and the start of a suppression program is very short. In order to inform the public and give them time to submit comments on the proposed program, APHIS has made the EA available for comment from April 20th till May 20th 2016. At this time the comments have been received and have been addressed. Once a treatment request is received and it has been determined that a suppression program will take place, APHIS will prepare a supplemental determination if any site specific information shows that there may be additional affects on the quality of the human environment that have not already been addressed in the EA. The supplemental determination will be provided to all parties that commented on the EA.

Based on the analysis of potential environmental impacts contained in the EA, the implementation of the treatment guidelines (containing the operational procedures) the protection measures for endangered and threatened species, and the comments received I have determined that the proposed suppression program will not significantly impact the quality of the human environment.

Bruce A Shambaugh ---------- 4/12/16

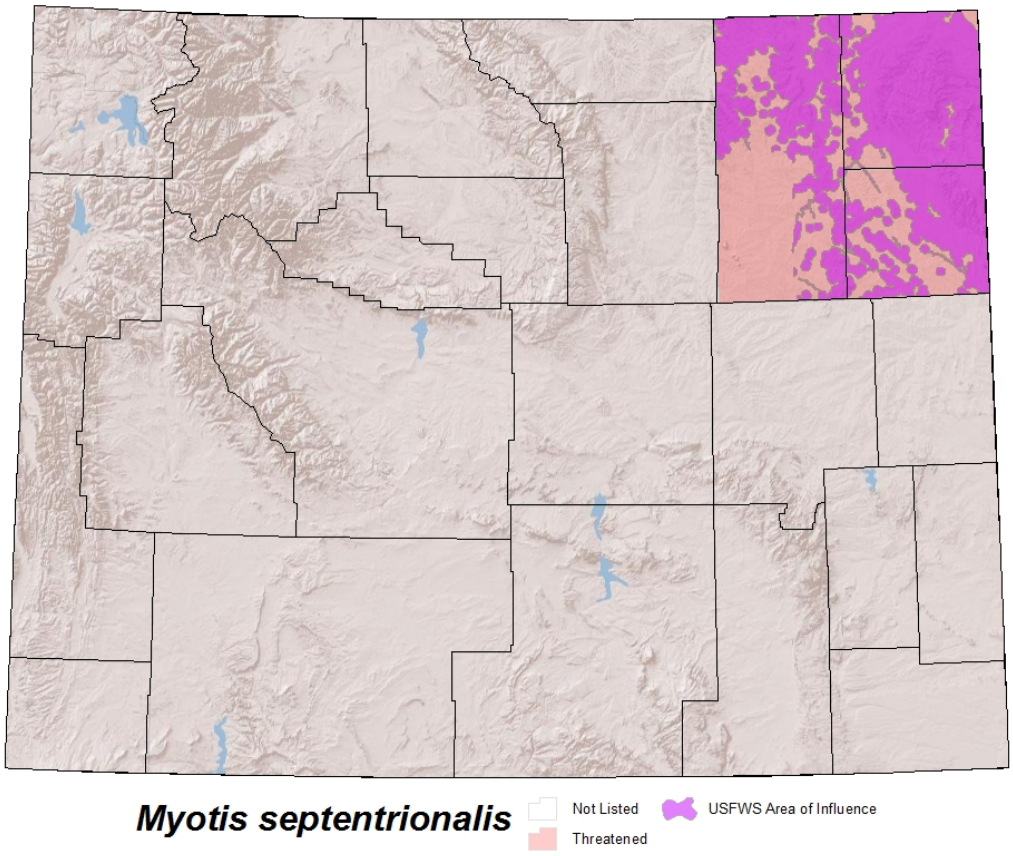
Bruce Shambaugh
State Plant Health Director

Date

Appendix 4: Summary of Species Determinations and Impact Mitigation Measures

1. Northern Long-Eared Bat; *Myotis septentrionalis*

a. Species Status Map



b. FWS Status: Endangered

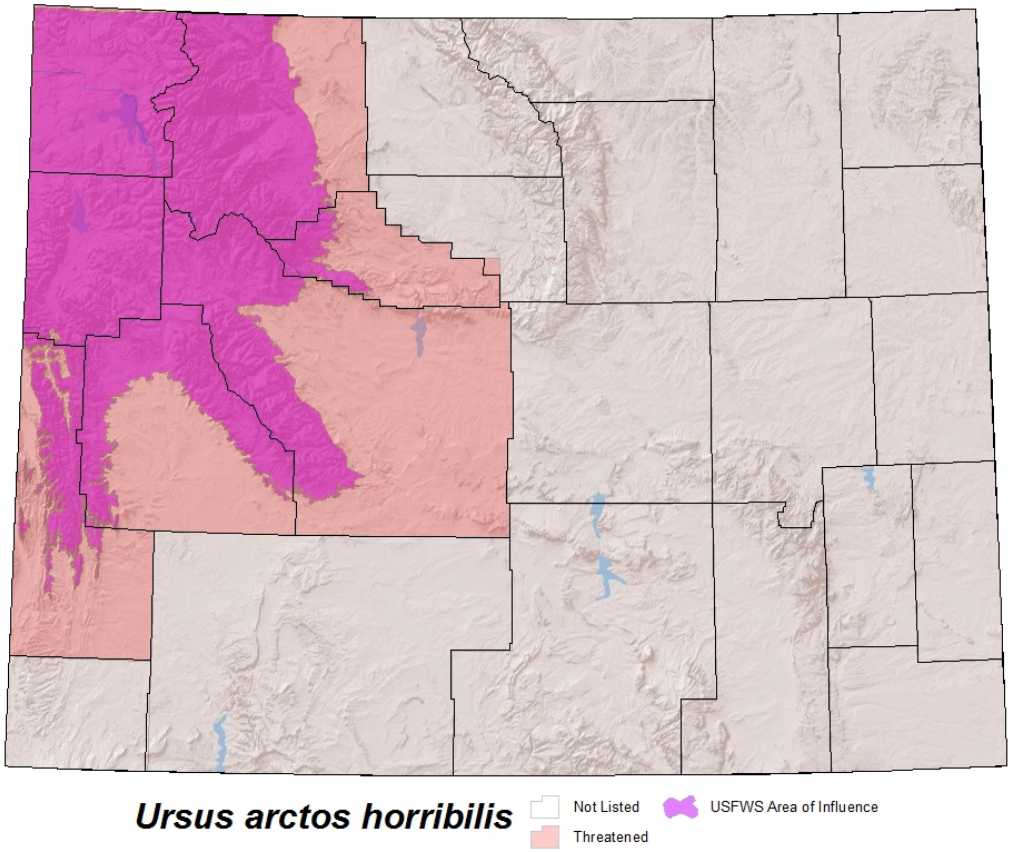
APHIS grasshopper suppression programs may affect but are not likely to adversely affect the Northern Long-Eared Bat.

Wyoming is on the edge of the species range and there are no known active maternity areas in Wyoming. APHIS would use RAAT methodologies for treatments in most cases and this would be expected to leave adequate prey base for insectivorous species such as the NLEB. The preferred foraging areas for the NLEB are forested areas that would not receive grasshopper or Mormon cricket treatments. In addition treatments would not occur during peak foraging activity reducing the potential for exposure to program insecticides. Dietary exposure from ingestion of contaminated prey or water is also not anticipated to be a major pathway of exposure for the northern long-eared bat. Indirect impacts to the NLEB from loss of invertebrate prey items due to program treatments are not anticipated.

Please see Appendix 6 for additional risk summary information.

2. Grizzly bear; *Ursus arctos horribilis*

a. Species Status Map

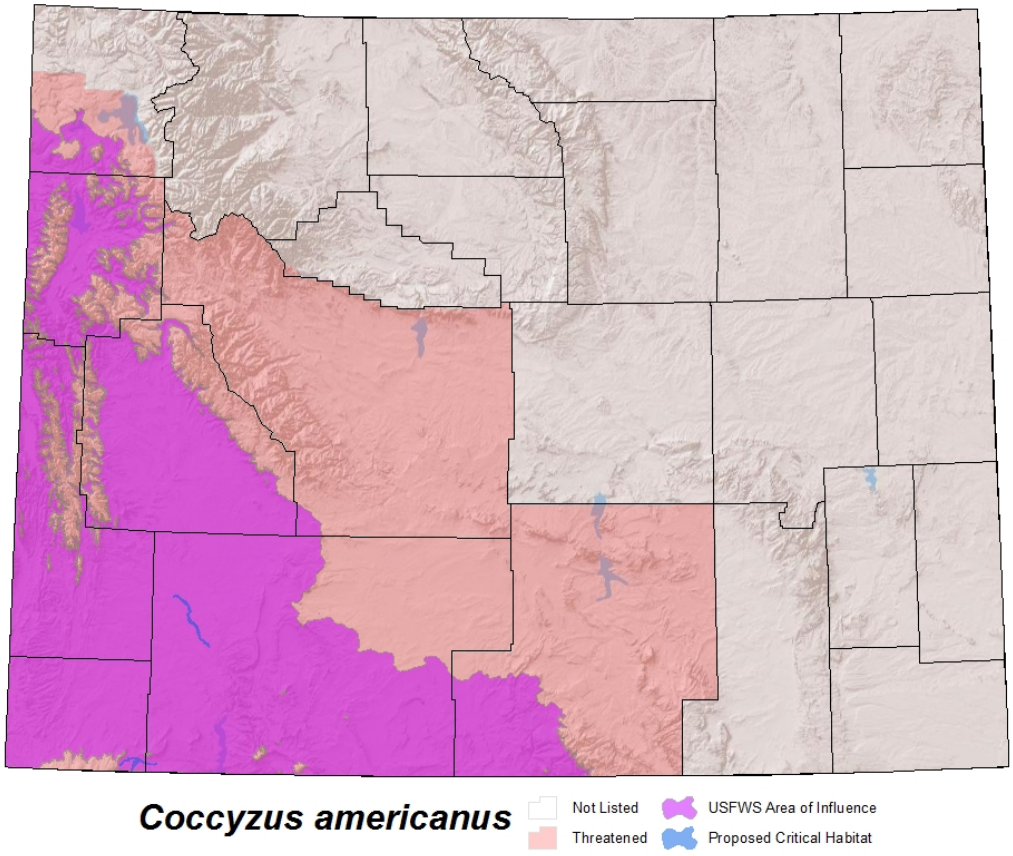


b. FWS status: Threatened

APHIS grasshopper suppression programs will have no effect on the grizzly bear. It is not likely that APHIS grasshopper suppression programs will occur in areas of the bear's preferred habitat, montane forests. If a suppression program does overlap with the habitat areas of the grizzly bear then a site specific consultation will be initiated with FWS.

3. Yellow billed Cuckoo; *Coccyzus americanus*

a. Species Status Map



b. FWS Status: Threatened

APHIS grasshopper suppression programs may affect but are not likely to adversely affect the yellow billed cuckoo. The following mitigation measures will be followed.

1. Malathion & carbaryl ULV: 500 foot ground buffer and 1320 foot aerial buffer at the edge of known locations of yellow-billed cuckoos or their critical habitat.

2. Carbaryl bait: 500 foot ground buffer and 750 foot aerial buffer at the edge of known locations of yellow-billed cuckoos or their critical habitat.

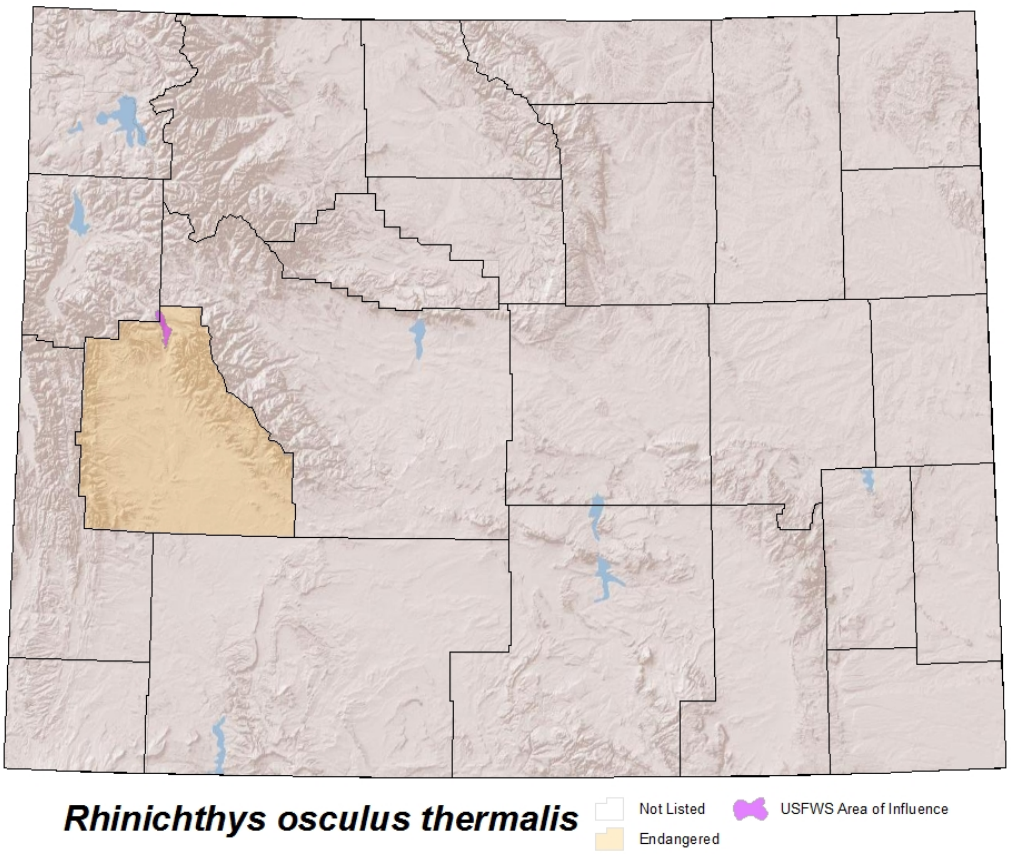
3. Diflubenzuron: 500 foot ground buffer and 1000 foot aerial buffer at the edge of known locations of yellow-billed cuckoos or their critical habitat.

4. Chlorantraniliprole ULV: 500 foot ground/aerial buffer at the edge of known locations of yellow-billed cuckoos or their critical habitat.

Please see Appendix 5 for additional risk summary information.

4. Kendall Warm Springs dace; *Rhinichthys osculus thermalis*

a. Species Status Map

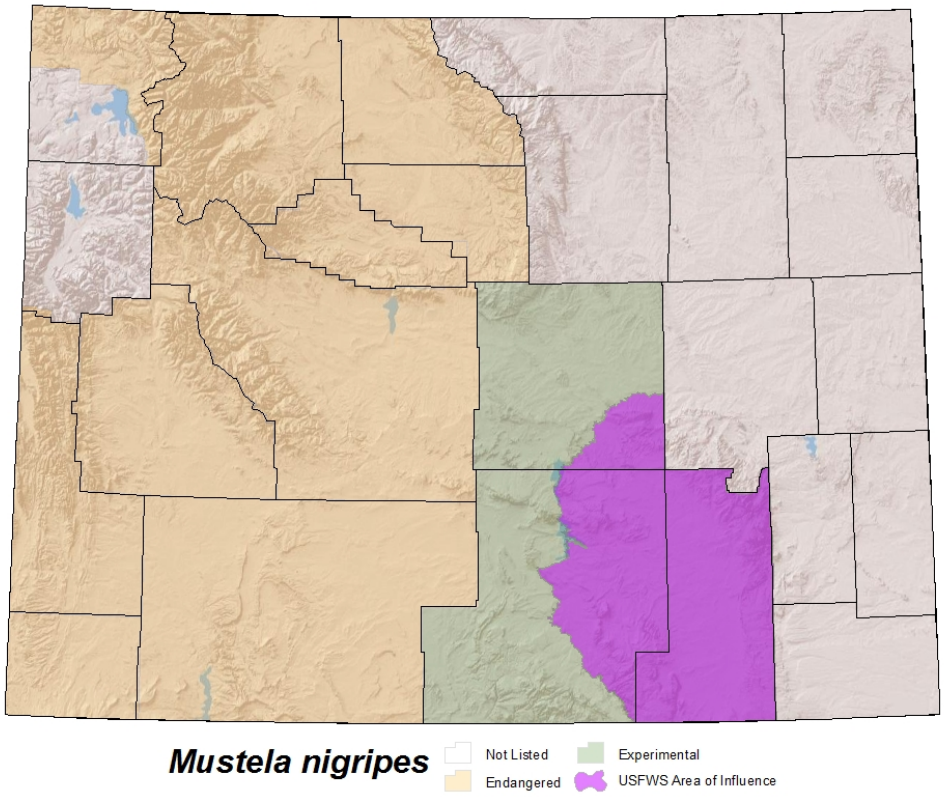


b. FWS status: Endangered

Grasshopper suppression activities in Wyoming are not likely to adversely affect the Kendall warm springs dace. It is not likely that APHIS grasshopper suppression activities will occur in the vicinity of Kendall warm springs. If suppression activities are conducted in Sublette County then the following impact minimization efforts will be utilized. A 0.25 mile buffer shall be maintained around the Kendall warm springs site for all chemicals, and ground applications of malathion. For aerial applications of malathion, a 1 mile buffer will be maintained.

5. Black-footed ferret; *Mustela nigripes*

a. Species Status Map



b. FWS status: Endangered

Grasshopper suppression activities in Wyoming are not likely to adversely affect black-footed ferrets. This determination is based on the fact that there are no known non-reintroduced black-footed ferret populations in Wyoming.

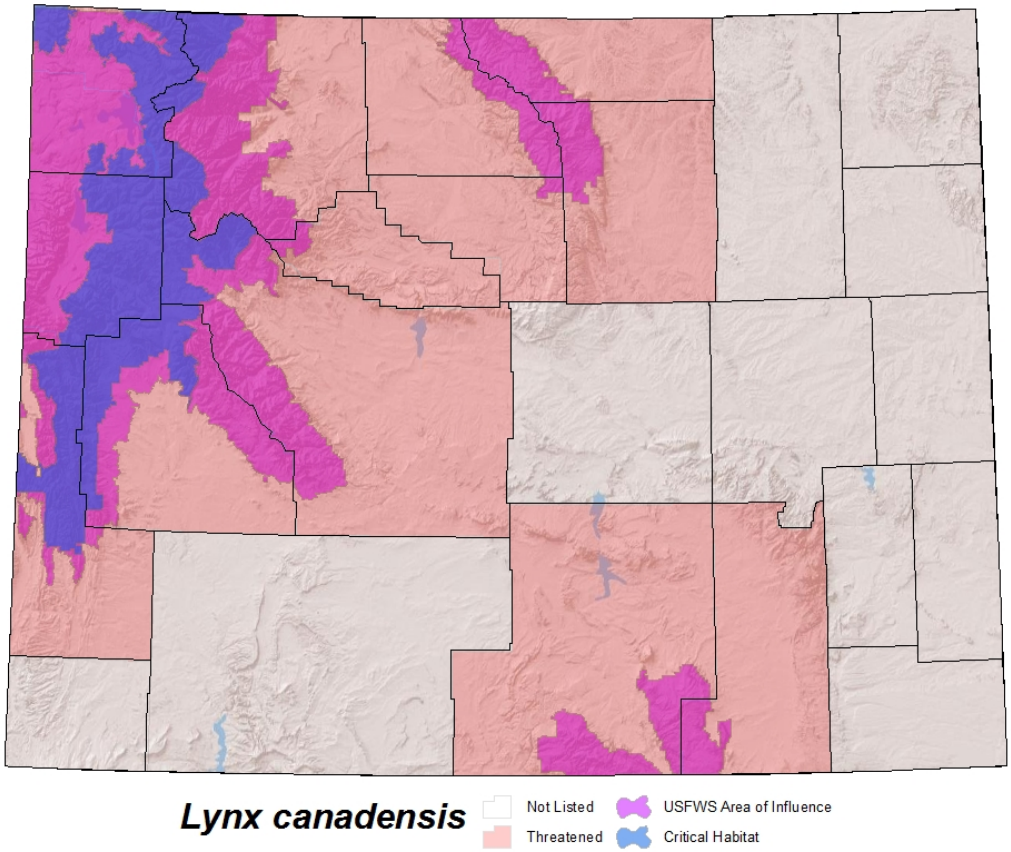
c. FWS Status: Experimental (Shirley Basin population)

There is one non-essential experimental population of black-footed ferrets in Wyoming. Located in the Shirley Basin, ferrets were reintroduced in 1991.

Grasshopper suppression activities in Wyoming are not likely to jeopardize the continued existence of the species based on the fact, by definition; any effects to an experimental non-essential population of any species will not jeopardize the continued existence of the species. The Shirley Basin recovery area has historically not been a high grasshopper density area so APHIS does not expect to have treatments in this area.

6. Canada Lynx; *Lynx canadensis*

a. Species Status Map

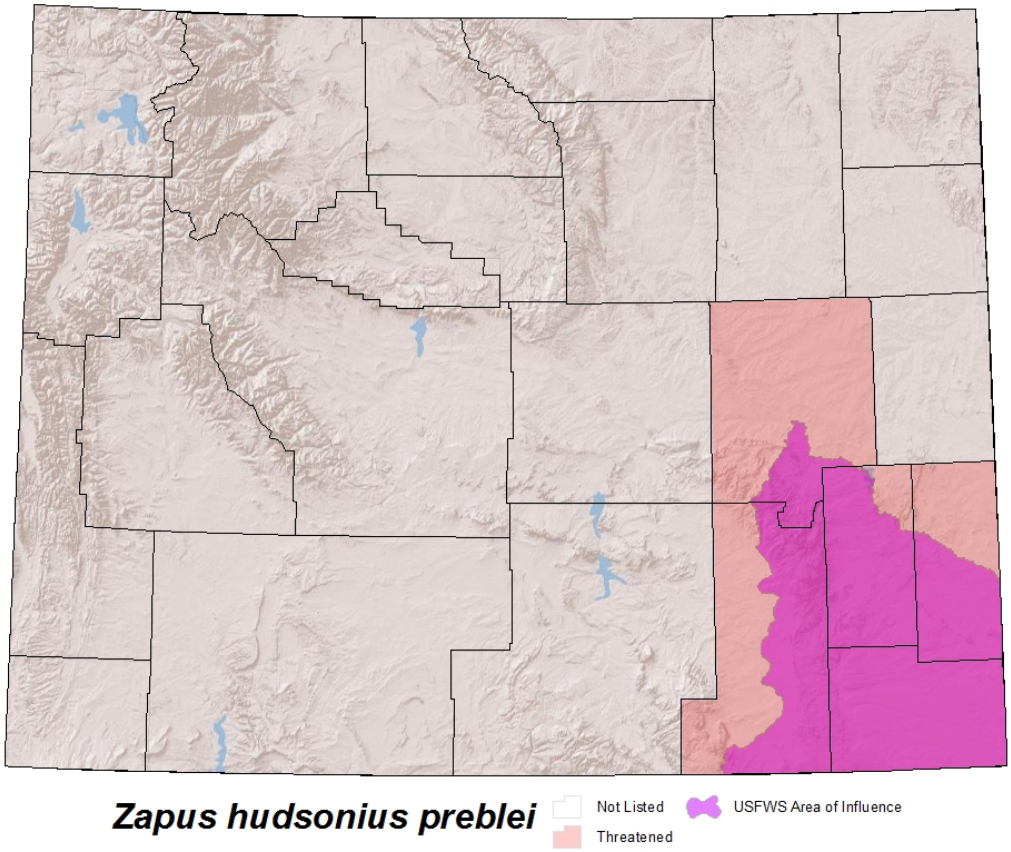


b. FWS status: Threatened, Critical Habitat designated

APHIS grasshopper suppression programs will have no effect on the Canada lynx or its designated critical habitat. It is not likely that APHIS grasshopper suppression programs will occur in areas of the lynx preferred habitat, boreal forests. If a suppression program does overlap with the critical habitat areas of the Canada lynx then a site specific consultation will be initiated with FWS.

7. Preble's meadow jumping mouse; *Zapus hudsonius preblei*

a. Species Status Map



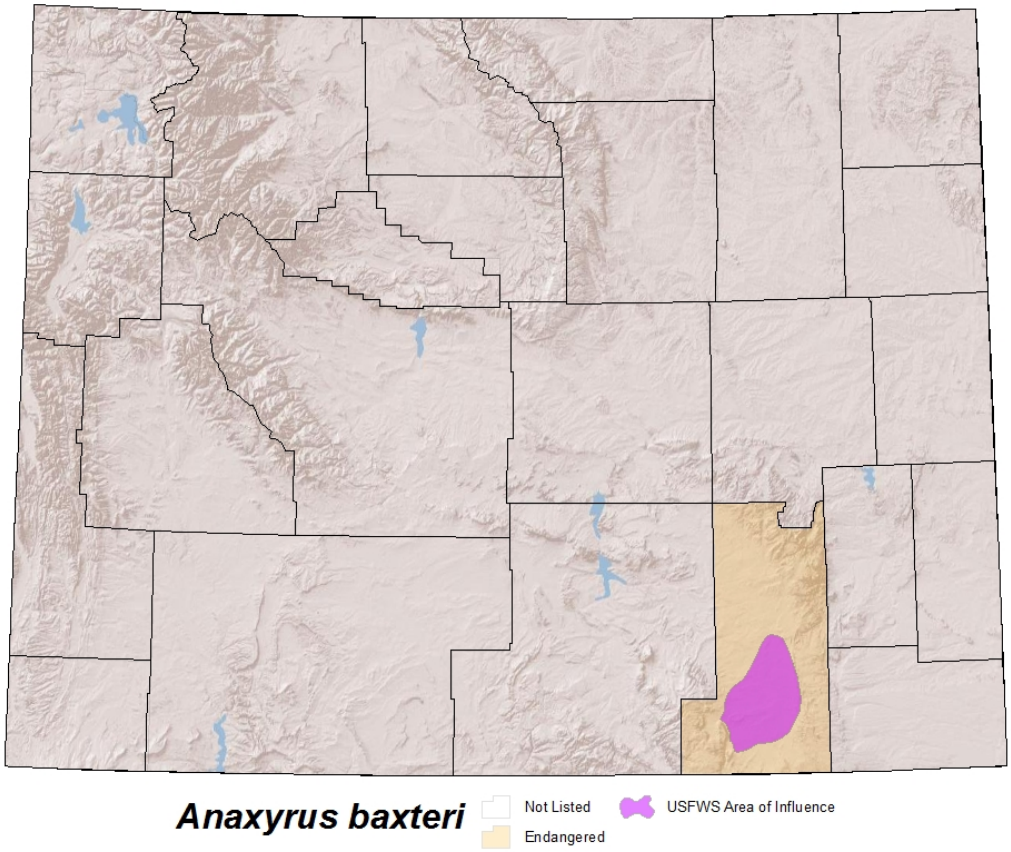
b. FWS status: Threatened, Critical Habitat designated: Colorado only

Grasshopper suppression activities in Wyoming are not likely to adversely affect the Preble's meadow jumping mouse. It is not likely that APHIS grasshopper suppression programs will occur in areas of the mouse's preferred habitat, riparian areas due to a programmatic buffer placed on either side of streams or water bodies. This 500 foot buffer is standard procedure for all USDA APHIS PPQ grasshopper aerial suppression programs. For those areas that may be treated using ground equipment the 50 foot buffer will be increased to 500 feet around waters and riparian areas that are Preble's meadow jumping mouse suitable habitat, within the range of the species.

In addition to the programmatic 200 foot ground treatment buffer and 500 foot aerial treatment buffer around bodies of water, to protect the Preble's meadow jumping mouse and its prey base from ULV application of chlorantraniloprole, there will be a 500 foot treatment buffer from the edge of known occupied habitat or critical habitat.

8. Wyoming toad; *Anaxyrus baxteri*

a. Species Status Map

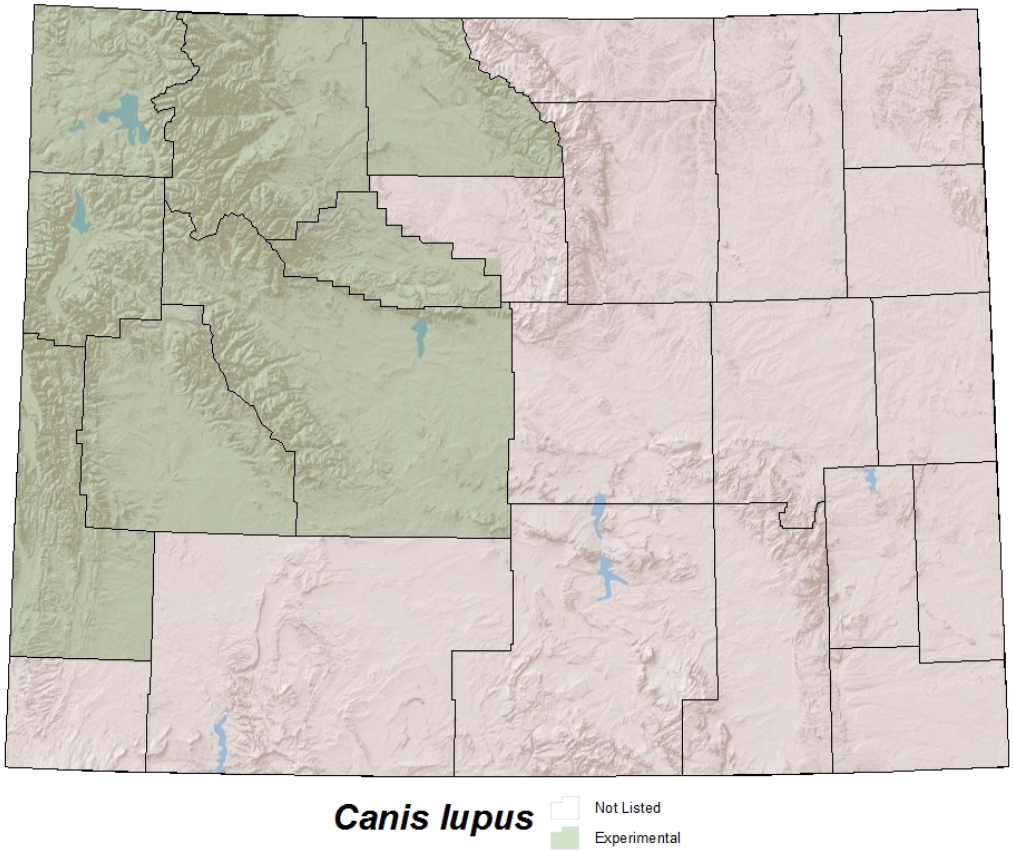


b. FWS status: Endangered

Grasshopper suppression activities in Wyoming are not likely to adversely affect the Wyoming toad. It is not likely that APHIS grasshopper suppression activities will occur in the vicinity of Mortenson Lake. If suppression activities are conducted in Albany County then the following impact minimization efforts will be put into place. A one mile buffer for aerial spray shall be maintained on each side of the Little Laramie River and no treatments will be applied within a one mile buffer of Mortenson NWR.

9. Gray Wolf; *Canis lupus*

a. Species Status Map

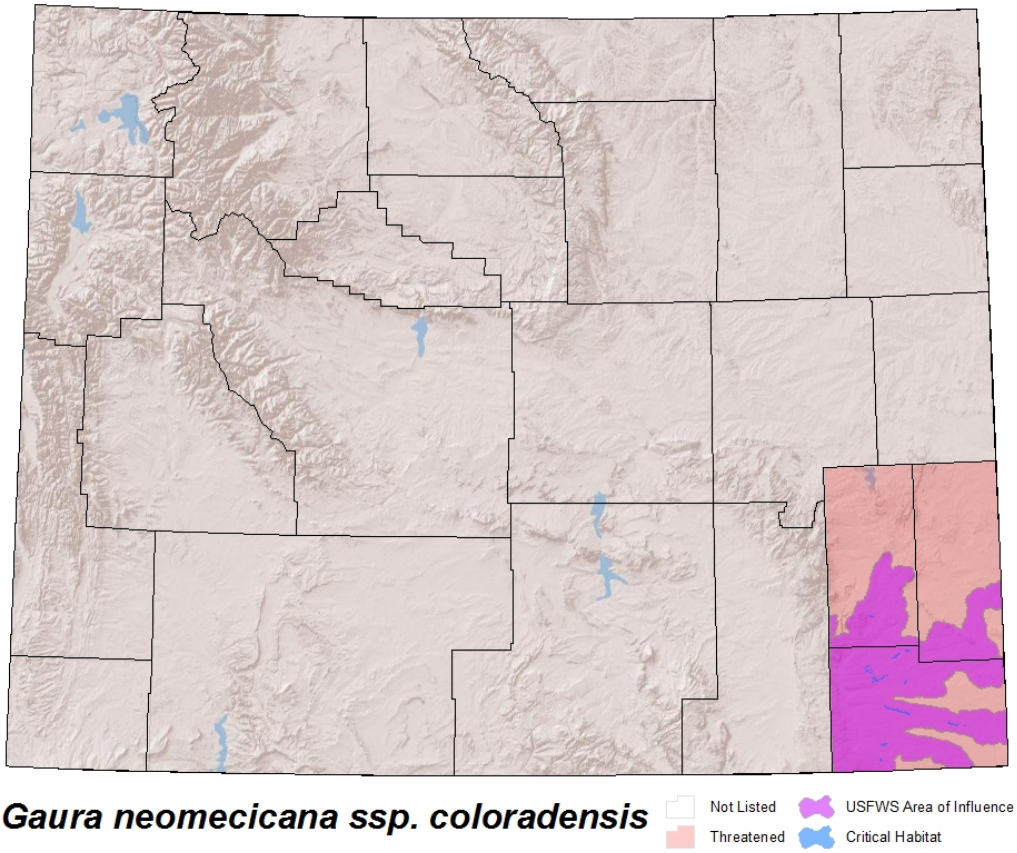


b. FWS status: Experimental

APHIS grasshopper suppression programs will have not likely to jeopardize on the Gray wolf based on the fact, by definition; any effects to an experimental non-essential population of any species will not jeopardize the continued existence of the species.

10. Colorado butterfly plant; *Gaura neomecicana* ssp. *coloradensis*

a. Species Status Map



b. FWS status: Threatened, Critical Habitat designated

Grasshopper suppression activities in Wyoming are not likely to adversely affect the Colorado butterfly plant or its designated critical habitat. APHIS will take the following impact minimization measures for the protection of pollinators if a spray block occurs within critical habitat or known occupied habitat.

1. No aerial application of malathion or carbaryl or gamma-cyhalothrin within 3 miles of the critical habitat or known occupied habitat.

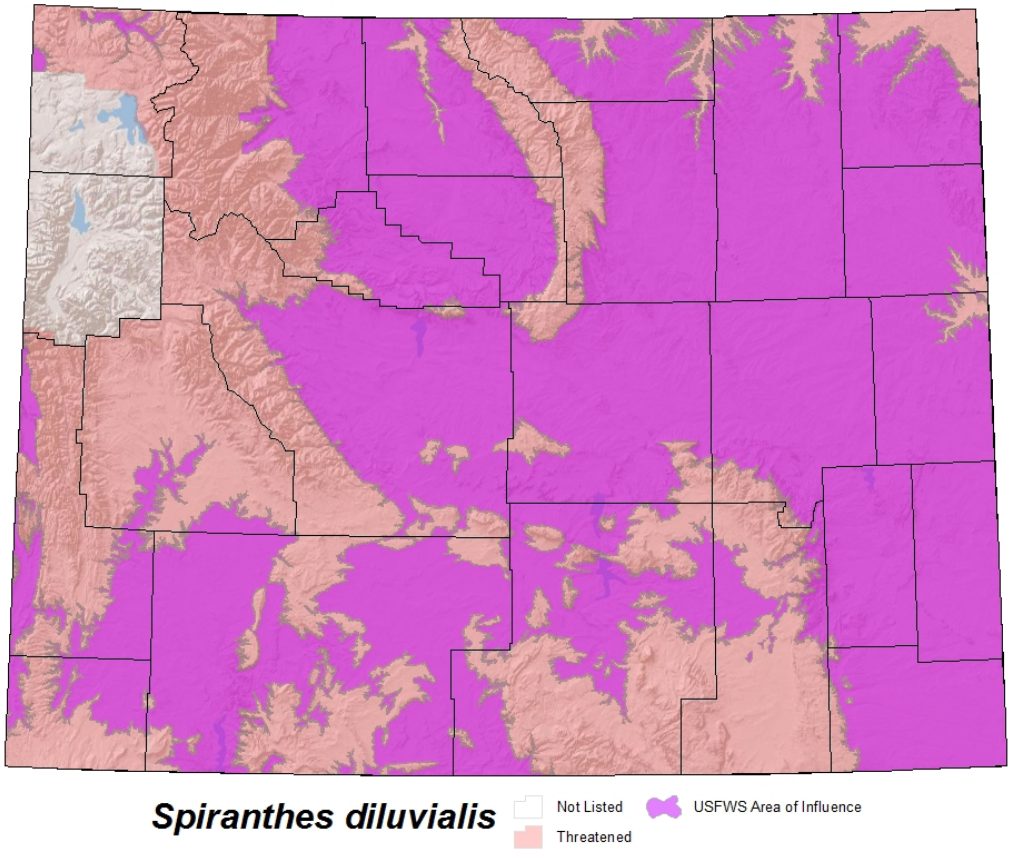
2. Only carbaryl bran bait or diflubenzuron or chlorantraniliprole combined with RAATS will be used within the 3 mile buffer.

3. No application of carbaryl bran bait will be applied within a 0.25 mile buffer of the potential range of species.

4. No buffer is required for diflubenzuron or chlorantraniliprole as they have no effect on adult insect pollinators. A 50ft buffer for ground applications will be applied.

11. Ute ladies' tresses; *Spiranthes diluvialis*

a. Species Status Map



b. FWS status: Threatened

Grasshopper suppression activities in Wyoming are not likely to adversely affect the Ute ladies' tresses. APHIS will take the following impact minimization measures for the protection of pollinators if a spray block occurs within known occupied habitat. The latest data available from WYNDD will be used to determine the known distribution of Ute ladies' tresses. If treatments occur after August 1st the following buffers will be put in place for areas of potential habitat and known populations of Ute ladies' tresses in addition to the programmatic 500 foot buffer from water bodies.

1) No aerial application of malathion or carbaryl or gamma-cyhalothrin within 3 miles of the known occupied habitat.

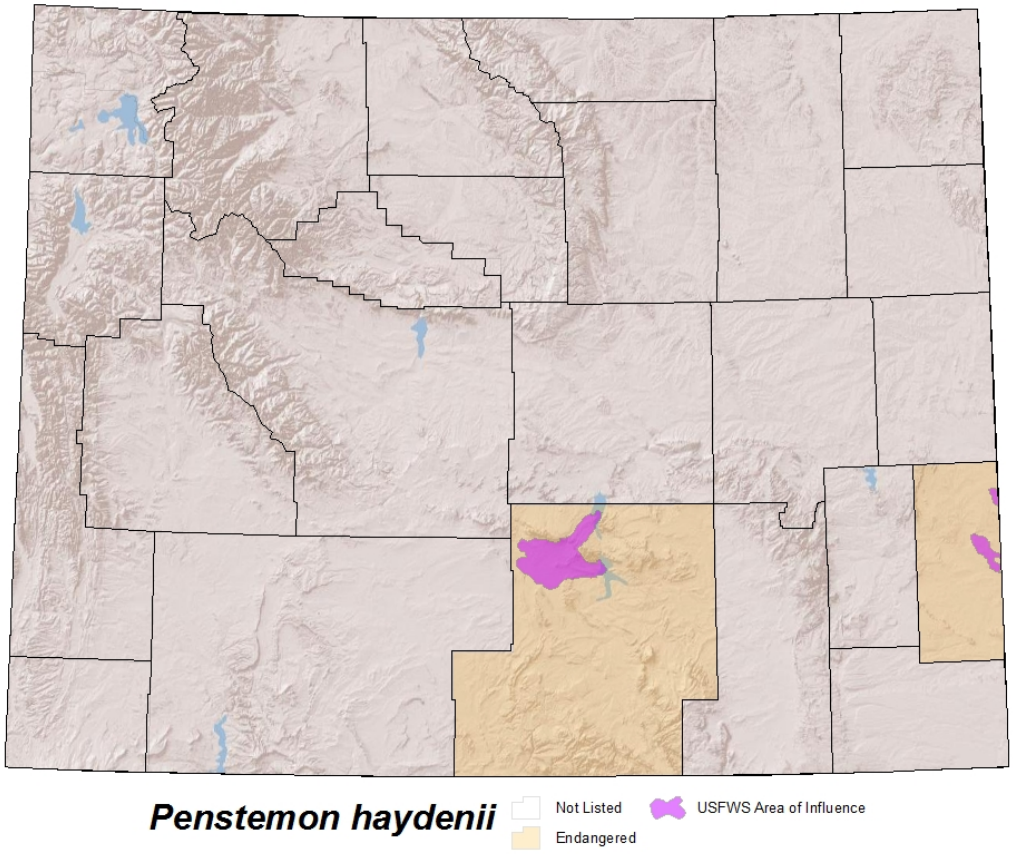
2) Only carbaryl bran bait or diflubenzuron or chlorantraniliprole combined with RAATS will be used within the 3 mile buffer.

3) No application of carbaryl bran bait will be applied within a 0.25 mile buffer of the potential range of species.

4) No buffer is required for diflubenzuron or chlorantraniliprole as they have no effect on adult insect pollinators. A 50 foot buffer for ground applications will be applied.

12. Blowout penstemon; *Penstemon haydenii*

a. Species Status Map



b. FWS status: Endangered

Grasshopper suppression activities in Wyoming are not likely to adversely affect the blowout penstemon. APHIS will take the following impact minimization measures for the protection of pollinators if a spray block occurs within the FWS potential range of species.

1) No aerial application of malathion or carbaryl or gamma-cyhalothrin within 3 miles of the potential range of species.

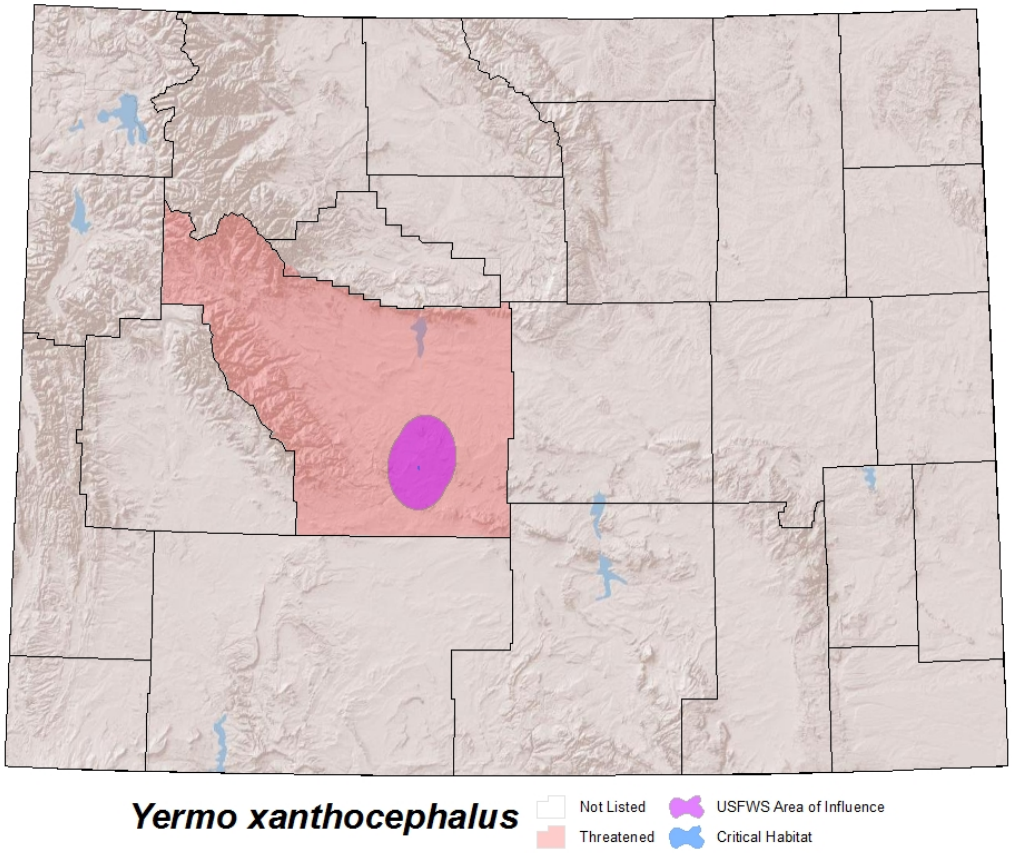
2) Only carbaryl bran bait or diflubenzuron or chlorantraniliprole combined with RAATS will be used within the 3 mile buffer.

3) No application of carbaryl bran bait will be applied within a 0.25 mile buffer of the potential range of species.

4) No buffer is required for diflubenzuron or chlorantraniliprole as they have no effect on adult insect pollinators. A 50 foot buffer for ground applications will be applied.

13. Desert yellowhead; *Yermo xanthocephalus*

a. Species Status Map



b. FWS status: Threatened, Critical Habitat designated

Grasshopper suppression activities in Wyoming are not likely to adversely affect the desert yellowhead or its designated critical habitat. APHIS will take the following impact minimization measures for the protection of pollinators if a spray block occurs within critical habitat or occupied habitat.

1. No aerial application of malathion or carbaryl or gamma-cyhalothrin within 3 miles of the critical habitat or known occupied habitat.

2. Only carbaryl bran bait or diflubenzuron or chlorantraniliprole combined with RAATS will be used within the 3 mile buffer.

3. No application of carbaryl bran bait will be applied within a 0.25 mile buffer of the potential range of species.

4. No buffer is required for diflubenzuron or chlorantraniliprole as they have no effect on adult insect pollinators. A 50 foot buffer for ground applications will be applied.

14. River Species

a. Platte River Species

Least Tern - Interior Population (*Sterna antillarum*) Status: Endangered
Pallid Sturgeon (*Scaphirhynchus albus*) Status: Endangered
Piping Plover (*Charadrius melodus*) Status: Endangered
Western Prairie Fringed Orchid (*Platanthera praeclara*) Status: Threatened
Whooping Crane (*Grus americana*) Stauts: Endangered

b. Colorado River Species

Bonytail (*Gila elegans*) Status: Endangered
Coloradao Pikeminnow (*Ptychocheilus lucius*) Status: Endangered
Humpback Chub (*Gila cypha*) Status: Endangered
Razorback Sucker (*Xyrauchen texamus*) Status: Endangered

c. Grasshopper suppression activities in Wyoming will have no effect on any of the river species listed by the FWS. Suppression activities will not deplete any water sources listed as tributaries to the Platte or Colorado River system nor will any activities have any effect on water quality downstream from Wyoming.

Appendix 5: Yellow-billed cuckoo (YBC) risk summary for grasshopper and Mormon cricket suppression program

The acute toxicity of Program insecticides, in particular carbaryl and diflubenzuron, range from practically non-toxic to highly toxic for birds, in the case of carbaryl, and practically non-toxic in the case of diflubenzuron (USDA APHIS, 2015). Carbaryl avian toxicity is variable based on the test species with the European starling, (*Sturnis vulgaris*) being the most sensitive and the ring-necked pheasant, *Phasianus colchicus*, being the least sensitive bird species (USDA APHIS, 2015). Carbaryl acts by inhibiting the neurotransmitter, acetylcholinesterase, while diflubenzuron acts to inhibit chitin synthesis in developing invertebrates. Chronic toxicity between the two chemistries is similar with a lack of effects at field-relevant doses (USDA APHIS, 2015). The potential for risk to the YBC from the proposed use of program insecticides is related to the toxicity of each chemical and the probability of exposure which is discussed below.

Direct exposure to the YBC from proposed grasshopper and Mormon cricket applications is expected to be unlikely. The YBC use riparian habitats that contain willow-cottonwood and other woodland habitats. Optimal habitat size for the YBC is 200 acres with nesting rarely occurring in sites that are less than 50 acres. Forested areas typically have dense closed canopies. Nesting usually occurs in willow trees of various species but may also occur in other riparian tree species (FWS, 2014). These are habitats that are not part of the Program for treatment and due to their proximity to water would have no application buffers regardless of whether they may contain YBC or their designated critical habitat. In cases where there are YBC and/or critical habitat APHIS increases the no application buffer which further reduces the potential for direct exposure to any Program applications. Estimates of drift from the use of proposed treatments and no application buffers suggest that any potential resides that could move into YBC habitat would be below any potential for direct risk (USDA APHIS, 2015). The presence of dense, closed canopies of riparian trees in YBC habitat would also serve to intercept and remove the small amount of insecticide that could drift into these types of habitat.

Dietary exposure from ingestion of contaminated prey or water is also not anticipated to be a major pathway of exposure for the YBC. There may be some incidental consumption of program insecticides that could be on the surface of some insect prey that receive a sublethal dose following treatment, however, there is not a plausible exposure scenario that could result in the ingestion of enough prey to result in risk to the YBC. Insects that receive a lethal dose would not be available for foraging by the YBC since they prefer live prey items. In the case of carbaryl bait applications, the probability of exposure would be less since the material is not applied as a liquid where it could result in residues on the surface of insects. Dietary exposure from the ingestion of contaminated surface water is also not anticipated to be a major pathway of exposure for the YBC. The program use of no application buffer zones from aquatic areas minimizes the potential for exposure to surface water.

Indirect impacts to the YBC from loss of invertebrate and vertebrate prey items due to program treatments are not anticipated. The YBC has a varied diet including invertebrates

as well as some vertebrates including tree frogs and lizards. Diet studies show that approximately 45% of its diet consists of lepidopteran larvae, followed by tree frogs (24%), katydids (22%), grasshoppers (9%) and the remaining amount from various invertebrates including, but not limited to beetles, flies, spiders, caddisflies, dragonflies, crickets and cicadas (FWS, 2014). This preference may change based on availability of large invertebrate fauna. YBC prefer nesting and foraging in tree canopies along riparian corridors using a "sit and wait" strategy watching foliage movement for prey items (FWS, 2014). The primary constituent elements and preferred habitat of YBC for nesting and foraging are not areas where the Program will be making applications. Proposed no application buffers from critical habitat and known locations of the YBC, as well as the use of Reduced Agent Area Treatments (RAATs) where applications will occur adjacent to habitat would mitigate the impacts to potential food items for the YBC. In cases where YBC would forage outside of their preferred habitat there would be adequate food items for foraging based on their varied diet and the lack of effects to terrestrial invertebrates and vertebrates in the no application buffer zones that have been proposed, as well as negligible impacts to non-target terrestrial invertebrates and vertebrates in treatment blocks. The impacts to non-target invertebrates within treatment blocks from Program applications are summarized below and show minimal impacts to most non-target terrestrial invertebrates.

Available field studies suggest the program insecticide applications have minimal impacts to non-target terrestrial invertebrates (Quinn et al., 1990; Swain, 1986; Smith et al., 2006). Smith et al. (2006) assessed changes in non-target arthropod populations following applications of diflubenzuron, carbaryl, or malathion using RAATs. In the 2-year study, post application surveys of the major insect fauna revealed that only ants were negatively affected by grasshopper applications within treatment areas. As stated previously, Weiland et al. (2002) assessed the impacts of Sevin XLR Plus applications at 750 g a.i./ha to several invertebrate groups over a 21-day period. This rate equates to 0.67 lb a.i./ac which is 1.34 times higher than the highest rate allowed in the program. Results from the study demonstrated no negative effects on abundance in the following insect groups: Homoptera, Hymenoptera, Coleoptera, Hemiptera, Lepidpotera, and Neuroptera. Previously conducted research, as well as field studies carried out as part of the grasshopper IPM project, indicates that diflubenzuron has minimal impact on most terrestrial nontarget arthropods (Catangui et al., 1996). Weiland et al. (2002) in Wyoming monitored the effects of Dimilin 25W for 21 days post-application on terrestrial invertebrates after full treatment applications of 17.5 and 52.5 g a.i./ha. From high and low sweep net captures, no effect on invertebrates in the orders Homoptera, Hymenoptera, Coleoptera, Hemiptera, Lepidoptera, or Neuroptera were found. There was a statistically significant increase in Diptera and a statistically significant decrease in Araneae (spiders) but the authors question the spider analysis since untreated populations dropped dramatically during the study. Tingle (1996) assessed the impacts of diflubenzuron applications in two field trials occurring in two separate years with applications of 93 g a.i./ha (0.08 lb a.i./ac). Based on an analysis of 28 taxonomic groupings only two were affected and included non-target grasshoppers and lepidopteran larvae. This effect only occurred in the treated areas but did not occur in the untreated buffer areas that were sampled. Grasshopper IPM field studies have shown diflubenzuron to have a minimal impact on ants, spiders, predatory beetles, and scavenger beetles. There was no significant reduction in populations of these species from 7 to 76

days after treatment. Although ant populations exhibited declines of up to 50 percent, these reductions were temporary, and population recovery was described as immediate (Catangui et al., 1996). No significant reductions in flying non-target arthropods, including honey bees, were reported. Within 1 year of diflubenzuron applications in a rangeland environment, no significant reductions of bee predators, parasites, or pollinators were observed for any level of diflubenzuron treatment (Catangui et al., 1996). Graham et al. (2008) evaluated the impacts of diflubenzuron treatments on aquatic and terrestrial invertebrates for Mormon cricket suppression in Utah. A majority of terrestrial invertebrate taxa were not significantly different pre- and post-treatment among three sites that were evaluated. There was a noted decrease in some ant genera but results were not consistent between sites and not all genera were impacted. Non-ant Hymenoptera showed increased numbers at two of the three sites and a decrease at a third site when comparing numbers pre- and post-treatment. Impacts to aquatic invertebrates, such as caddisflies and dragonflies, that may serve as prey for the YBC would be minimal due to the implementation of Program no-application buffer zones adjacent to aquatic habitat. Impacts to vertebrate food items for the YBC such as frogs and lizards would also be minimal based on risk estimates for each Program insecticide and the proposed mitigation to protect the YBC (USDA APHIS, 2015).

Based on the qualitative risk assessment above and the proposed mitigation for protection of YBC and its critical habitat, APHIS has determined that the Program may affect but is not likely to adversely affect the YBC.

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Appendix 6: Northern long-eared bat (NLEB) risk summary for grasshopper and Mormon cricket suppression program

The acute toxicity of Program insecticides, in particular carbaryl and diflubenzuron, are considered moderate for mammals, in the case of carbaryl, and practically non-toxic in the case of diflubenzuron (USDA APHIS, 2015). Similar differences in toxicity between the two insecticides are seen in sublethal and chronic studies, as well. The difference in toxicity between the two insecticides is related to the mode of action. Carbaryl acts by inhibiting the neurotransmitter, acetylcholinesterase, while diflubenzuron acts to inhibit chitin synthesis in developing invertebrates. The potential for risk to the NLEB from the proposed use of program insecticides is related to the toxicity of each chemical and the probability of exposure.

Direct exposure to the northern long-eared bat from proposed grasshopper and Mormon cricket applications is expected to be minimal. Program applications will occur during the day when bats are not foraging and would be under bark on trees, in crevices, and in mines or caves where exposure to drift would be limited (FWS, 2014). Emerging at dusk, most hunting occurs above the understory, 1 to 3 meters (m) (3 to 10 feet (ft)) above the ground, but under the canopy (Nagorsen and Brigham, 1993) on forested hillsides and ridges, rather than along riparian areas (Brack and Whitaker, 2001; LaVal et al., 1977). This coincides with data indicating that mature forests are an important habitat type for foraging northern long-eared bats (Caceres and Pybus, 1997). Occasional foraging also takes place over forest clearings and water, and along roads (van Zyll de Jong, 1985). Foraging patterns indicate a peak activity period within 5 hours after sunset followed by a secondary peak within 8 hours after sunset (Kunz, 1973). The preferred foraging areas for the NLEB are areas that would not receive grasshopper or Mormon cricket treatments. In addition treatments would not occur during peak foraging activity reducing the potential for exposure to Program insecticides.

Dietary exposure from ingestion of contaminated prey or water is also not anticipated to be a major pathway of exposure for the northern long-eared bat. There may be some incidental consumption of program insecticides that could be on the surface of some insect prey that receive a sublethal dose following treatment, however, there is not a plausible exposure scenario that could result in the ingestion of enough prey based on the daily food consumption rates for similar *Myotis* species. Insects that receive a lethal dose would not be available for foraging by the NLEB since they prefer live prey items. In the case of carbaryl bait applications, the probability of exposure would be less since the material is not applied as a liquid where it could result in residues on the surface of insects. Dietary exposure from the ingestion of contaminated surface water is also not anticipated to be a major pathway of exposure for the NLEB. The program use of no application buffer zones from aquatic areas minimizes the potential for exposure to surface water.

Indirect impacts to the NLEB from loss of invertebrate prey items due to program treatments are not anticipated. NLEB depends on a variety of invertebrates in its diet

using foraging behaviors including hawking, and gleaning of insect prey from plant surfaces and water (Ratcliffe and Dawson, 2003). Its diet may include insects from the orders Lepidoptera, Neuroptera, Coleoptera, Trichoptera, Hymenoptera, Diptera, Hemiptera, and Homoptera (Thomas et al., 2012; Feldhamer et al., 2009; Carter et al., 2003; Lee and McCracken, 2004). Coleoptera and Lepidoptera appear to make up the largest percentage of their diet, although proportions vary spatially and temporally, similar to other *Myotis* species, suggesting opportunistic feeding for available flying invertebrates (Griffith and Gates, 1985; Whitaker, 1972). Available field studies suggest the program insecticide applications have minimal impacts to non-target terrestrial invertebrates (Quinn et al., 1990; Swain, 1986; Smith et al., 2006). Smith et al. (2006) assessed changes in non-target arthropod populations following applications of diflubenzuron, carbaryl, or malathion using RAATs. In the 2-year study, post application surveys of the major insect fauna revealed that only ants were negatively affected by grasshopper applications within treatment areas. As stated previously, Weiland et al. (2002) assessed the impacts of Sevin XLR Plus applications at 750 g a.i./ha to several invertebrate groups over a 21-day period. This rate equates to 0.67 lb a.i./ac which is 1.34 times higher than the highest rate allowed in the program. Results from the study demonstrated no negative effects on abundance in the following insect groups: Homoptera, Hymenoptera, Coleoptera, Hemiptera, Lepidpotera, and Neuroptera. Previously conducted research, as well as field studies carried out as part of the grasshopper IPM project, indicates that diflubenzuron has minimal impact on most terrestrial nontarget arthropods (Catangui et al., 1996). Weiland et al. (2002) in Wyoming monitored the effects of Dimilin 25W for 21 days post-application on terrestrial invertebrates after full treatment applications of 17.5 and 52.5 g a.i./ha. From high and low sweep net captures, no effect on invertebrates in the orders Homoptera, Hymenoptera, Coleoptera, Hemiptera, Lepidpotera, or Neuroptera were found. There was a statistically significant increase in Diptera and a statistically significant decrease in Araneae (spiders) but the authors question the spider analysis since untreated populations dropped dramatically during the study. Tingle (1996) assessed the impacts of diflubenzuron applications in two field trials occurring in two separate years with applications of 93 g a.i./ha (0.08 lb a.i./ac). Based on an analysis of 28 taxonomic groupings only two were affected and included non-target grasshoppers and lepidopteran larvae. This effect only occurred in the treated areas but did not occur in the untreated buffer areas that were sampled. Grasshopper IPM field studies have shown diflubenzuron to have a minimal impact on ants, spiders, predatory beetles, and scavenger beetles. There was no significant reduction in populations of these species from 7 to 76 days after treatment. Although ant populations exhibited declines of up to 50 percent, these reductions were temporary, and population recovery was described as immediate (Catangui et al., 1996). No significant reductions in flying non-target arthropods, including honey bees, were reported. Within 1 year of diflubenzuron applications in a rangeland environment, no significant reductions of bee predators, parasites, or pollinators were observed for any level of diflubenzuron treatment (Catangui et al., 1996). Graham et al. (2008) evaluated the impacts of diflubenzuron treatments on aquatic and terrestrial invertebrates for Mormon cricket suppression in Utah. A majority of terrestrial invertebrate taxa were not significantly different pre- and post-treatment among three sites that were evaluated. There was a noted decrease in some ant genera but results were not consistent between sites and not all genera were impacted. Non-ant Hymenoptera showed

increased numbers at two of the three sites and a decrease at a third site when comparing numbers pre- and post-treatment. Impacts to aquatic invertebrates that may serve as prey would be minimal due to the implementation of Program no-application buffer zones adjacent to aquatic habitat.

Based on the qualitative risk assessment above, APHIS has determined that the Program will not jeopardize the continued existence of the northern long-eared bat foraging and in roosts in the program area.

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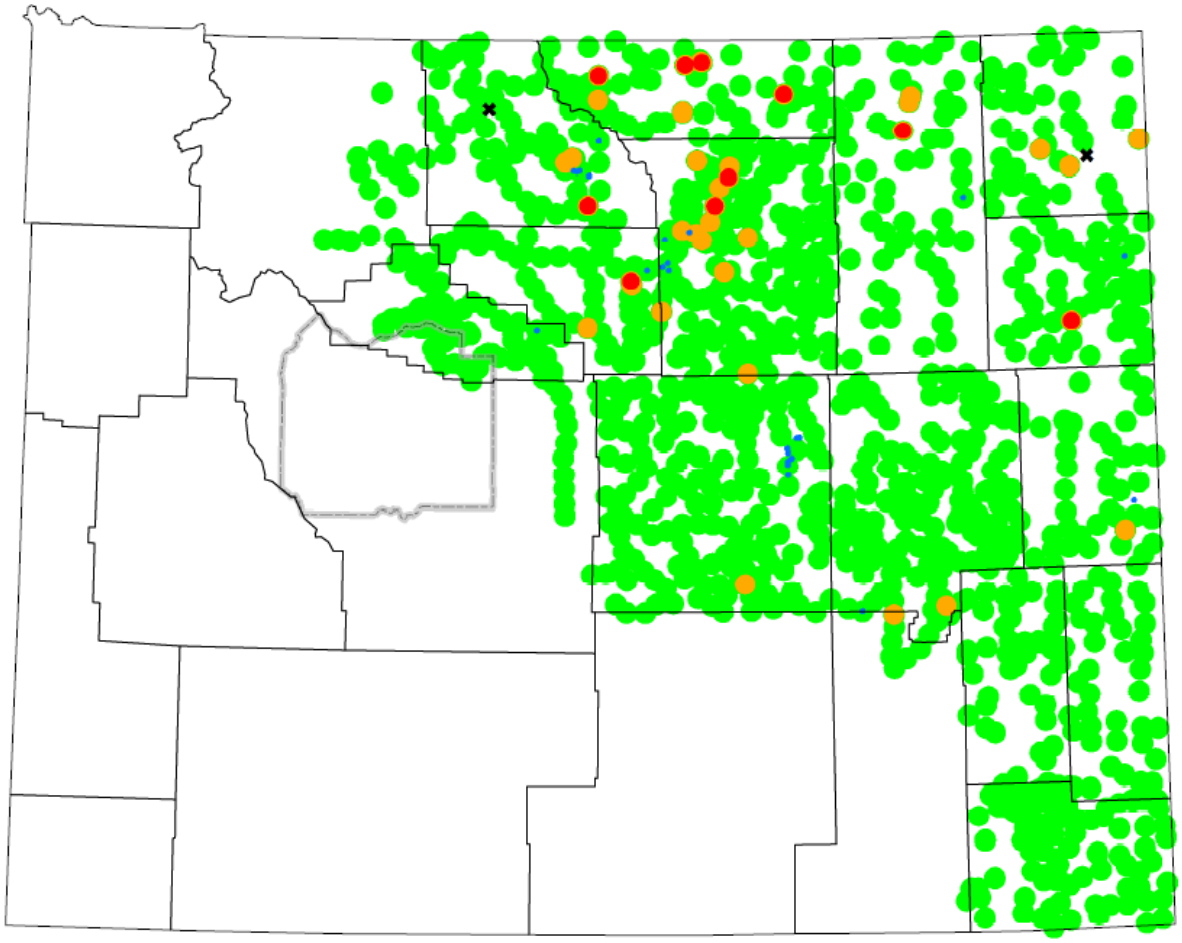
Appendix 7: Comments received during the open comment period

A response was received on April 19, 2016 from the Wyoming Game and Fish Department. This response stated that staff at the WGFD had reviewed the 2016 Environmental Assessment for the Wyoming Grasshopper and Mormon Cricket Suppression Program. This response also stated that the WGFD had no comments. See also Appendix 2 FWS/NMFS/WGFD Correspondence.

A response was received on Wednesday May 11, 2016 from the Wind River Agency of the Bureau of Indian Affairs. This response stated that the 2016 Environmental Assessment for the Wyoming Grasshopper and Mormon Cricket Suppression Program had been distributed to local and regional specialists as well as to the regional scientist. This response also stated that the Bureau of Indian Affairs had no comments at that time.

Appendix 8: 2015 Adult Grasshopper Survey Map



Grasshopper Density # / Sq Yd

- 15+
- 8 - <15
- 1 - <8
- 0
- Mormon Cricket
- Counties
- WRIR

Buffer Radius

Green	3.25 miles
Orange	3.00 miles
Red	2.50 miles
Blue	0.75 miles

GH per Sq. Yd.	8 to <15	15+	8+	MC
	Acres			
Private	292,687	92,481	385,168	12,935
BLM	71,243	9,146	80,389	6,608
State Lands	46,945	9,629	56,574	3,850
USFS	56,316	12,527	68,843	3,160
Wind River Indian Reservation	0	0	0	0
Bureau of Reclamation	0	0	0	0
DOD	0	0	0	0
USFS, Grasslands	49	32	81	0
Bankhead Jones	463	1,807	2,270	0
National Park Service	0	0	0	0
Fish and Wildlife	0	0	0	0
Total Acres Infested	467,703	125,622	593,325	26,553

This information is to be used by Land Managers and W&P Personnel in order to project possible outbreaks in spring of 2015.
State wide 1,103 stops were surveyed between 7/13/2015 and 9/11/2015.
Survey stops were collected by APHIS employees using the (18 sq. foot)/2 method.
All data was collected as point data and displayed using a fixed buffer.

Map Created by
USDA APHIS PPQ WY
5353 Yellowstone Rd. Suite 208
Cheyenne WY 82009