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Final South Dakota Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program

EA Number: SD-20-01

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Acronyms and Abbreviations

ac	acre
a.i.	active ingredient
AChE	acetylcholinesterase
APHIS	Animal and Plant Health Inspection Service
BCF	bioconcentration factor
BLM	Bureau of Land Management
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
EA	environmental assessment
e.g.	example given (Latin, exempli gratia, "for the sake of example")
EIS	environmental impact statement
E.O.	Executive Order
FONSI	finding of no significant impact
FR	Federal Register
FS	Forest Service
g	gram
ha	hectare
HHERA	human health and ecological risk assessments
i.e.	in explanation (Latin, id est "in other words.")
IPM	integrated pest management
lb	pound
MBTA	Migratory Bird Treaty Act
MOU	memorandum of understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIH	National Institute of Health
ppm	parts per million
PPE	personal protective equipment
PPQ	Plant Protection and Quarantine
RAATs	reduced agent area treatments
S&T	Science and Technology
ULV	ultra-low volume
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Services

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Final Site-Specific Environmental Assessment

Rangeland Grasshopper and Mormon Cricket Suppression Program
Western South Dakota

I. Need for Proposed Action

A. Purpose and Need Statement

An infestation of grasshoppers or Mormon crickets may occur in western South Dakota to include the counties of Bennett, Brule, Buffalo, Butte, Charles Mix, Corson, Custer, Dewey, Fall River, Gregory, Haakon, Harding, Hughes, Jackson, Jones, Lawrence, Lyman, Meade, Mellette, Ogallala Lakota, Pennington, Perkins, Stanley, Todd, Tripp and Ziebach. The Animal and Plant Health Inspection Service (APHIS) 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 as part of the Rangeland Grasshopper and Mormon Cricket Suppression Program (program). The term "grasshopper" used in this environmental assessment (EA) refers to both grasshoppers and Mormon crickets, unless differentiation is necessary.

Populations of grasshoppers that trigger the need for a control program are normally considered on a case-by-case basis. Participation is based on potential damage such as stressing or causing the severe destruction of the forage base for livestock and wildlife, reduction of wildlife habitat, soil erosion and the threat of crop damage and yield loss from migrating grasshoppers. The benefits of treatments include the suppression of over abundant grasshopper populations resulting in protection of forage and crop yields. The goal of the proposed suppression program analyzed in this EA is to reduce grasshopper populations to economically acceptable levels in order to protect rangeland ecosystems or cropland adjacent to rangeland.

This EA analyzes potential effects of the proposed action and its alternatives. This EA applies to a proposed suppression program that would take place from May 2020 to November 2020 in South Dakota.

This EA is prepared in accordance with the requirements under the National Environmental Policy Act of 1969 (NEPA) (42 United States Code § 4321 *et. seq.*) and the NEPA procedural requirements promulgated by the Council on Environmental Quality, United States Department of Agriculture (USDA), and APHIS. A decision will be made by APHIS based on the analysis presented in this EA, the results of public involvement, and consultation with other agencies and individuals. A selection of one of the program alternatives will be made by APHIS for the 2020 control program for the EA coverage area (Appendix 1).

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B. Background Discussion

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

In rangeland ecosystem areas of the United States, grasshopper populations can build up to economic infestation levels[1] despite even the best land management and other efforts to prevent outbreaks. At such a time, a rapid and effective response may be requested and needed to reduce the destruction of rangeland vegetation. In some cases, a response is needed to prevent grasshopper migration to cropland adjacent to rangeland.

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

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

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[1] The "economic infestation level" is a measurement of the economic losses caused by a particular population level of grasshoppers to the infested rangeland. This value is determined on a case-by-case basis with knowledge of many factors including, but not limited to, the following: economic use of available forage or crops; grasshopper species, age, and density present; rangeland productivity and composition; accessibility and cost of alternative forage; and weather patterns. In decision making, the level of economic infestation is balanced against the cost of treating to determine an "economic threshold" below which there would not be an overall benefit for the treatment. Short-term economic benefits accrue during the years of treatments, but additional long-term benefit may accrue and be considered in deciding the total value gained by treatment. Additional losses to rangeland habitat and cultural and personal values (e.g., aesthetics and cultural resources), although a part of decision making, are not part of the economic values in determining the necessity of treatment.

The South Dakota legislature has passed South Dakota Codified Laws 38-24A-3 (SDCL-3) and 38-24A-4 (SDCL-4) to support control activities. SDCL-3 gives authority to the secretary of agriculture to independently, or in cooperation with other individuals and agencies, carry out operations or measures to locate, suppress, control, prevent, or retard the spread of pests. In addition SDCL-4 allows for the expenditure of funds to support grasshopper suppression, control, prevention or spread.

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 September 2016, 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, September 16, 2016). 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.

In November 2019, APHIS and the Forest Service (FS) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two groups on the suppression of grasshoppers on FS system lands (Document # 19-8100-0573-MU, November 06, 2019). This MOU clarifies that APHIS would prepare and issue to the public site-specific environmental documentations that evaluate potential impacts associated with the proposed measures to suppress economically damaging grasshopper populations. The MOU also states that these documents would be prepared under the APHIS NEPA implementation procedures with cooperation and input from the FS.

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

APHIS PPQ program managers will have current South Dakota Pesticide Applicator certification and APHIS PPQ Pesticide Applicators certification. SARA Title III Community Right to Know laws will be followed.

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. Survey data provides the best estimate of future grasshopper populations, yet environmental factors lead to certain forecasts where the specific treatment areas will be. Therefore examining specific treatment areas for environmental risk analysis under NEPA is typically not possible. At the same time, the program strives to alert the public in a timely manner to its more concrete treatment plans and avoid or minimize harm to the environment in implementing those plans.

The current EIS provides a solid analytical foundation; however, it may not be enough to satisfy NEPA completely for actual treatment proposals. The program typically prepares a Draft EA tiered to the current EIS for each of the 17 Western States, or portion of a state, that may receive a request for treatment. The Draft EA analyzes aspects of environmental quality that could be affected by treatments in the area where grasshopper outbreaks are anticipated. The Draft EA will be made available to the public for a 30-day comment period. When the program receives a treatment request and determines that treatment is necessary, the specific site within the state will be evaluated to determine if environmental factors were thoroughly evaluated in the Draft EA. If all environmental issues were accounted for in the Draft EA, the program will prepare a Final EA and finding of no significant impact (FONSI). Once the FONSI has been finalized copies of those documents will be sent to any parties that submitted comments on the Draft EA, and to other appropriate stakeholders. To allow the program to respond to comments in a timely manner, the Final EA and FONSI will be posted to the APHIS website. The program will also publish a notice of availability in the same manner used to advertise the availability of the Draft EA.

II. Alternatives

To engage in comprehensive NEPA risk analysis APHIS must frame potential agency decisions into distinct alternative actions. These program alternatives are then evaluated to determine the significance of environmental effects. The 2002 EIS presented three alternatives: (A) No Action; (B) Insecticide Applications at Conventional Rates or Reduced Agent Area Treatments (RAATs) with Adaptive Management Strategies, and (C)

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Research Treatment Alternatives. Their potential impacts were described and analyzed in detail. The 2019 EIS was tiered to, and updated the 2002 EIS. Therefore the 2019 EIS considered the environmental background or 'No Action' alternative of maintaining the program that was described in the 2002 EIS and Record of Decision. The 2019 EIS also considered an alternative where APHIS would not fund or participate in grasshopper suppression programs. The preferred alternative of the 2019 EIS allowed APHIS to update the program with new information and technologies that not were analyzed in the 2002 EIS. Copies of the complete 2002 and 2019 EIS documents are available for review at 314 South Henry, Suite 200, Pierre, SD 57501. These documents are also available at the Rangeland Grasshopper and Mormon Cricket Program web site, http://www.aphis.usda.gov/plant-health/grasshopper.

All insecticides used by APHIS for grasshopper suppression are used in accordance with applicable product label instructions and restrictions. Representative product specimen labels can be accessed at the Crop Data Management Systems, Incorporated web site at www.cdms.net/manuf/manuf.asp. Labels for actual products used in suppression programs will vary, depending on supply issues. All insecticide treatments conducted by APHIS will be implemented in accordance with APHIS' treatment guidelines and operational procedures, included as Appendix 2 to this draft EA.

This final EA analyzes the significance of environmental effects that could result from the alternatives described below. These alternatives differ from those described in the 2019 EIS because grasshopper treatments are not likely to occur in most of Western South Dakota and therefore the environmental baseline should describe a no treatment scenario.

A. No Suppression Program Alternative

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

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

Under Alternative B, the Preferred Alternative, APHIS would manage a grasshopper treatment program using techniques and tools discussed hereafter to suppress outbreaks. The insecticides available for use by APHIS include the U.S. Environmental Protection Agency (USEPA) registered chemicals carbaryl, diflubenzuron, and malathion. These chemicals have varied modes of action: carbaryl and malathion work by inhibiting acetylcholinesterase (enzymes involved in nerve impulses); and diflubenzuron is a chitin inhibitor. APHIS would make a single application per year to a treatment area, and could apply insecticide at an APHIS rate conventionally used for grasshopper suppression treatments, or more typically as reduced agent area treatments (RAATs). APHIS selects which insecticides and rates are appropriate for suppression of a grasshopper outbreak based on several biological, logistical, environmental, and economical criteria. The identification of grasshopper species and their life stage largely determines the choice of

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insecticides used among those available to the program. RAATs are the most common application method for all program insecticides, and only rarely do rangeland pest conditions warrant full coverage and higher rates.

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

- 8.0 fluid ounces (0.25 lb a.i.) of carbaryl ULV 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 width of the area not directly treated (the untreated swath) under the RAATs approach is not standardized. The proportion of land treated in a RAATs approach is a complex function of the rate of grasshopper movement, which is a function of developmental stage, population density, and weather (Narisu et al., 1999, 2000), as well as the properties of the insecticide (insecticides with longer residuals allow wider spacing between treated swaths). Foster et al. (2000) left 20 to 50% of their study plots untreated, while Lockwood et al. (2000) left 20 to 67% of their treatment areas untreated. Currently the grasshopper program typically leaves 50% of a spray block untreated for ground applications where the swath width is between 20 and 45 feet. For aerial applications, the skipped swath width is typically no more than 20 feet for Malathion, 100 feet for carbaryl and 200 feet for diflubenzuron. The selection of insecticide and the use of an associated swath widths is site dependent. Rather than suppress grasshopper populations to the greatest extent possible, the goal of this alternative is to suppress grasshopper populations to a desired level.

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

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

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

C. *Research Treatment Alternatives*

APHIS-PPQ continues to refine its methods of grasshopper and Mormon cricket management in order to improve the abilities of the program to make it more economically feasible, and environmentally acceptable. These refinements can include reduced rates of currently used pesticides, improved formulations, development of more target-specific baits, development of biological pesticide suppression alternatives, and improvements to aerial (e.g., incorporating the use of Unmanned Aircraft Systems (UAS)) and ground application equipment. A division of APHIS-PPQ, Science and Technology's (S&T) Phoenix Lab is located in Arizona and its Rangeland Grasshopper and Mormon Cricket Management Team (Rangeland Unit) conducts methods development and evaluations on behalf of the Program. The Rangeland Unit's primary mission is to comply with Section 7717 of the Plant Protection Act and protect the health of rangelands (wildlife habitats and where domestic livestock graze) against economically damaging cyclical outbreaks of grasshoppers and Mormon crickets. The Rangeland Unit tests and develops more effective, economical, and less environmentally harmful management methods for the Program and its federal, state, tribal, and private stakeholders.

APHIS will not perform research treatments in western South Dakota during 2020.

III. Affected Environment

Appendix 1 shows the environmental assessment area. Appendix 2 identifies the Treatment Guidelines and Operational Procedures which serve as guidelines for program implementation and Appendix 3 is the 2019 South Dakota Adult Grasshopper Survey map.

A. *Description of Affected Environment*

1. Location and size

The western portion of the affected environment is comprised of 22 counties west of the Missouri River. This area takes in approximately 26,422,272 acres, of which approximately 21% is cropland, 67% is pasture or rangeland and less that 1% is woodland. (U.S. Department of Commerce, 1997). In addition there are four counties that border the east side of the Missouri River that are also considered under the affected environment. The land use percentages of these four counties represent an increase in cropland with approximately 50% of the acres crop and 50% pastureland. Brule, Buffalo, Charles Mix and Hughes counties encompass approximately 1,527,558 acres.

The complete affected environment includes the counties of: Bennett, Brule, Buffalo, Butte, Charles Mix, Corson, Custer, Dewey, Fall River, Gregory, Haakon, Harding, Hughes, Jackson, Jones, Lawrence, Lyman, Meade, Mellette, Oglala Lakota, Pennington, Perkins, Stanley, Todd, Tripp and Ziebach.

2. Topography, soils and vegetation

Land and resource management can be broken down accordingly:
<u>Federal/Public lands</u>-Non Indian Lands (approximately 3,451,164 acres)
U. S. Forest Service Bureau of Land Management

U. S. Corps of Engineers	National Park Service
U. S. Fish and Wildlife Service	Bureau of Reclamation

Indian Reservation (approximately 4,934,294 acres)
(personal communication, Pat Keatts, 2005)
Lower Brule (138,916), Crow Creek (134,039), Standing Rock (569,299 in SD),
Pine Ridge (1,773,716), Cheyenne River (1,397,752), Rosebud (883,691),
Pierre School (140), Yankton (36,741)

State Lands (approximately 171,022 acres)
School and Public Lands (674,025 acres; personal communication; Jennings)
Game, Fish and Parks land (129,538 acres; personal communication; Coughlin and Nedved)

Private (approximately 16,091,372 acres; Skinner)

Topography and soils in western South Dakota can be broken down into five soil zones; (Westin and Malo, 1978).

1) Cool, Moist Forest (Typic Boralfs)
These soils have developed under a humid climate (an annual precipitation of 20 to 25 inches and an average annual air temperature between 40 to 45 F); soil composite includes limestone, sandstone, and local alluvium from igneous, sedimentary, and metamorphic rocks and a topography which is undulating to mountainous.

2) Cool, Very Dry Plain (Ardic Borolls)
These soils have developed under a cool, semi-arid climate (an annual precipitation of 12 to 16 inches and an average annual air temperature between 42 to 45 F); soil composite includes sandstones, sandy shales, shales, silty shales and siltstones; and a topography which is undulating to strongly sloping with buttes and mesas.

3) Warm, Very Dry Plain (Aridic Ustols)
These soils have developed under a warm, semi-arid climate (an annual precipitation of 14 to 17 inches and an average annual air temperature between 44 to 47 F); soil composite includes shales, siltstones and sandstones; and a topography which is gently undulating to rolling in the shale areas, and undulating to strongly sloping with buttes and plateaus in the siltstone and sandstone areas; badlands are common in areas occupying the bluffs of the large river valleys and the sides of the larger buttes.

4) Cool, Dry Plain (Typic Borolls)
These soils have developed under a cool sub humid climate (an annual precipitation of 15 to 19 inches and an average annual air temperature between 42 to 45 F); soil composite includes sandy shales, shales, sandstones and siltstones; and topography which is gently undulating to rolling with buttes and mesas; areas adjacent to the Missouri River typically have steep hilly slopes and shale breaks where the native vegetation is sparse and is primarily composed of mid to short grasses.

5) Warm, Dry Plain (Typic Ustolls)

These soils have developed under warm, dry, sub humid climate (an annual precipitation of 17 to 24 inches and an average annual air temperature between 44 to 49 F); soil composite includes sands, sandstone, siltstone, silts, shale and clays; and a topography which is gently undulating to rolling; areas adjacent to the Missouri River are steep, hilly and shale breaks where native vegetation is sparse and is composed of mid to short grasses.

Exclusive of the Black Hills, the western portion of South Dakota can be characterized as a mixed grass prairie, in which shorter grasses have tended to displace midgrasses due to decreased rainfall. Predominate short grasses include: blue grama, needle and thread, western wheat grass, prairie June grass and little blue stem (Johnson and Nichols, 1982; Westin and Malo, 1978). Wooded draws are found throughout western South Dakota in addition to the large forest component of the Black Hills and smaller forested areas in the north and southern counties.

3. Climate

The climate of western South Dakota is a semi-arid and comprised of long, cold winters and short hot summers. The average summer temperature is 80 degrees and average January winter temp is 24 degrees decreasing to less than 10 degrees. The areas first frost occurs around the early part of October and the last frost date falls in late April or early May. Precipitation is sporadic and low ranging from 13-20inches per year with 25% of that precipitation falling as snow. Extensive drought and shorter dry spells contribute to the grasshopper problems and are quite common.

4. Grasshopper population

APHIS- PPQ routinely conducts both adult and nymphal grasshopper surveys throughout western South Dakota and four counties east of the Missouri River. Due to reduced funding, USDA-APHIS did not conduct a statewide grasshopper survey in 1997. In 1998 and 1999 the SD Department of Agriculture conducted statewide surveys. In 2000 APHIS resumed those activities which will continue in 2020. These surveys are used to assess grasshopper populations during the current year as well as provide indications of future trends.

Based on 2019 grasshopper surveys, the attached map (Appendix 3) illustrates an estimate of acres infested during the current year. The adult survey map identifies areas where grasshopper populations are considered economic (generally more than eight grasshoppers per square yard) as well as populations that are sub economic.

Of the over 110 different grasshopper species found in South Dakota, approximately 12 are economic to rangeland.

5. Human population

The largest city in western South Dakota is Rapid City with a population of approximately 70,000 people. Several other cities ranging in population from 3,000-14,000 do occur as well as some that are substantially smaller, isolated and average 500 to 3,000. Outside these communities these counties are comprised of primarily rural areas with many families

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reside on ranches. These communities are largely dependent on a thriving agriculture economy for their survival.

6. Surface Waters

South Dakota's landscape is essential divided east and west in half by the Missouri River. The river has a dam system incorporating three dams at Pierre, Ft. Thompson and Pickstown. Western South Dakota's primary water sources are smaller tributary rivers such as the White, Morreau, Grand, Cheyenne and several reservoirs such as Shadehill, Angostura, Belle Fourche and Pactola. This area is dotted with miscellaneous small stock dams, intermittent creeks, ponds and wetlands however this area is considered to be in general an arid area.

7. Agriculture practices

Western South Dakota is primarily rangeland with some crop production of wheat, sunflowers, and millet/sorghum. Cattle and sheep production in western South Dakota comprises nearly 40% and 50% respectively of the overall livestock produced in the state. The effects of economic grasshopper populations on pasture and range can potentially impact a major industry in South Dakota (Cerney, 1993). Tourism also plays a major role in the economy of the area surrounding the Black Hills.

8. Forest lands

The wooded component for western South Dakota includes two National Forests (Black Hills and Custer), wooded draws and shelterbelts that cover approximately 194,890 acres (Castonguay, 1982). Forest vegetation in the Black Hills ranges from xerophytic Bur Oak *(Quercus macrocarpa)* dominated vegetation at the warmer, drier, lower elevations to the mesophytic Black Hills Spruce *(Picea glauca)* dominated vegetation at the cooler, moister, higher elevations (Hoffman and Alexander, 1987). Other forested lands include miscellaneous woody draws, shelterbelts, state parks and forested reservation lands.

9. Wildlife refuges and recreation areas

One Federal wildlife refuge and several state wildlife production areas are found throughout the assessment area. These areas are critical for the production and migration of wildlife throughout the area. State wildlife refuges can be located at http://www.sdgfp.info/Wildlife/index.htm. The eight Federal refuges in South Dakota can be found at http://www.fws.gov/refuges/.

Recreation areas and public access areas to public federal and state lands are widely distributed throughout the assessment area.

B. Site-Specific Considerations

1. Human Health

The 2002 FEIS addresses the human health risk associated with the suppression of grasshoppers. The risk assessment of each insecticide consists of identification of the hazards associated with each agent, assessment of potential human exposure to the agent, an assessment of the dose-response relationship of the agent and a characterization of the risks associated with exposure to the agent. Impacts to workers and the general public were analyzed for all possible modes of exposure (dermal, oral, inhalation).

In general western South Dakota is considered to be sparsely populated. Traditional grasshopper suppression areas are several miles away from populated areas. No cities or towns will be treated. In addition sensitive areas such as rural schools, culturally sensitive sites and other sensitive groups will be avoided or buffers will be established to prevent exposure after consultation with the appropriate agencies.

Appendix 2 identifies Operational Procedures that will be followed to insure all precautions are taken to prevent exposure to workers or the general public during suppression activities.

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

2. Nontarget Species

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 to agree on protective measures.

a. Wildlife Resources

According to annual surveys completed by the South Dakota Department of Game, Fish and Parks (GF&P), western South Dakota supports moderate to some of the highest game productions in South Dakota for selected species. In particular, gallinaceous game birds such as ringed-necked pheasant *(Phasianus colchicus)*, wild turkey (*Meleagris gallopavo)*, greater prairie chicken *(Tympanuchus cupido)*, sharp-tailed grouse *(Tympanuchus phasianellus)*, and Northern Bobwhite Quail *(Colinus virginianus)*reach some of the highest concentrations for counties bordering the Missouri River. Big game species such as white-tailed deer *(Odocoileus virginianus)*, mule deer *(Odocoileus hemionus)*, elk *(Cervus elaphus nelsoni)*, and pronghorn *(Antilocapra americana)* have relatively high population concentrations in western South Dakota. Both elk and pronghorn have large populations in the Black Hills and northwestern part of the state, respectively (Sharps and Benzon, 1984; Trautman, 1982).

Most game species reach their highest densities in the breaks and riparian zones along the Belle Fourche, Cheyenne, Grand, Moreau and White Rivers.

Resident waterfowl populations are low when compared to the remainder of South Dakota, although there are scattered pockets of relatively high concentrations of breeding pairs. Due to the lack of natural wetlands, most waterfowl reproduction occurs in conjunction with stock ponds or small dams.

Fish populations in western South Dakota are located mainly in the Missouri and Cheyenne Rivers, their tributaries, streams and lakes in the Black Hills, and select, isolated stock dams. Selected stock dams provide excellent fishing for largemouth bass *(Micropterus salmoides)*. Many of the streams and lakes throughout the Black Hills are noted for their trout *(Salmo spp.)*. The Cheyenne River does provide a fishery for catfishes *(Ictalurus spp.)*. Fish populations tend to achieve their greatest diversity and population density in the Missouri River. The tail waters and lakes below the three dams are very productive for walleye *(Stizostedion vitreum)*, sauger *(Stizostedion canadense)*, white bass *(Morone chrysops)*, salmon *(Onocorhynchus spp.)* and recently introduced smallmouth bass *(Micropterus dolomieui)*. Populations of sturgeon *(Scaphirhynchus spp.)* and paddlefish *(Polyodon spathula)* also occur in the Missouri River. As of January 1991, both the pallid sturgeon *(Scaphirhynchus albus)* and shovelnose sturgeon *(Scaphirhynchus platorynchus)* are listed as protected species.

In addition to game species, western South Dakota supports large populations of nongame species. The prairie habitat, combined with the major rivers, support a variety of different bird species.

b. Water Resources and Aquatic Species

Under no action, increased sedimentation of water resources could occur because of loss of vegetative cover (USDA, APHIS 2019).

The hazards of malathion and carbaryl estimated exposures and risks to representative species are analyzed in detail in APHIS FEIS 2019.

Current operational procedures state that all label recommendations will be followed (Appendix 2). Guidelines state no direct application to water is allowed. Reservoirs, lakes, ponds (including livestock and recreational ponds), pools left by seasonal streams, springs, wetlands (i.e., swamps, bogs, marshes, and potholes), perennial streams, and rivers are included in this definition. The no-treatment buffers will be expanded as necessary to respond to on-site (site specific) conditions.

Spraying is not allowed when rain is imminent or when winds exceed 10 miles per hour or less if state law or cooperator agreement specifies. These procedures should protect aquatic species and habitats.

In general, malathion is moderately toxic. Malathion and carbaryl have been found to exhibit a high biodegradability in soil and water and no bioaccumulation in food chains, but some uptake by aquatic organisms may occur during direct exposure. Acetyl cholinesterase (a chemical involved in carrying nerve impulses) depression could occur but is not considered significant. Some changes in fish feeding behavior have been observed in field studies. Aquatic insects are very sensitive to these chemicals, and reductions in populations could occur if water bodies receive chemicals by direct spray, spills, or runoff. Based on field studies, these population reductions are likely to be temporary, with recovery occurring in several weeks. Although migrations of terrestrial insects in avoidance of the treatment zone often result in an added food source for predators of insects, consideration should be given to this potential loss in the food chain.

Current operational procedures include a 500-foot buffer zone for chemical spray treatments around water bodies and a 200-foot buffer zone for carbaryl bait. Reservoirs, lakes, ponds (including livestock and recreational ponds), pools left by seasonal streams, springs, wetlands (i.e., swamps, bogs, marshes, and potholes), perennial streams, and rivers are included in the buffer zones. Spraying is not allowed when winds exceed 10 miles per hour or when rain is imminent. These procedures should protect non-endangered or non-threatened aquatic species from drift or runoff.

Malathion degrades rapidly in water by hydrolysis and microbial breakdown. The half-life is 36 hours at pH 8. The potential for bioaccumulation is low and the chemical is quickly excreted from fish.

Carbaryl degrades rapidly in water in one to five days. The bioaccumulation potential is low and the chemical is quickly excreted by fish.

Diflubenzuron directly entering the water on foliage in the fall (cold water temperatures) is more persistent and can result in chronic toxicity to aquatic invertebrates. Diflubenzuron is slightly too practically nontoxic to fish, aquatic snails and most bivalve species. It is very highly toxic to most aquatic insects, crustaceans, horseshoe crabs and barnacles.

c. Domestic Bees

Nationally, South Dakota ranks second in the nation for honey production with approximately 17,820,000 pounds being produced. The state is noted for its light colored, high quality clover honey (Reiners, 2018). Honey flow begins to increase in late June as the colonies increase and strengthen, and peaks during July when as much as two-thirds of the annual production will be realized. This flow is especially large during years when climatic conditions favor yellow sweet clover *(Melilotus officinalis)* growth and development. Yellow sweet clover blooms from late May through August, with peak bloom occurring from late June through mid-July.

The apiary industry in South Dakota is regulated by South Dakota Codified Law 38-18. The statute requires that all apiarists register locations of their bee yards with the South Dakota Department of Agriculture. It also provides that apiaries must not be located any closer than three miles to another registered location.

In the event of an aerial control program, all registered beekeepers in the concerned area will be alerted by the South Dakota Department of Agriculture. Beekeepers will be advised to move their bees at least two miles from the spray block boundaries. Notification will be through the U.S. mail of the possibility of a treatment and the proposed acres to be treated. Beekeepers will receive a second notification when project plans are finalized. Project maps and projected treatment dates will be included with the second notice. In all cases a two mile buffer zone will be observed around a bee yard.

d. Biological Control Insectaries

Availability of biological control alternatives to weed and insect management has greatly increased throughout South Dakota and the Western States in recent years. Biological control insectaries have become a consideration in conducting grasshopper treatment projects that use a chemical alternative.

Throughout South Dakota, APHIS, county weed control agencies, and Federal, State, and private land managers have and continue to establish leafy spurge *Euphorbia esula* biocontrol insectaries as well as insectaries for species of insects which help control spotted knapweed *Centaurea maculosa*, purple loosestrife *Lythrum salicaria*, Canada thistle *Cirsium arvense*, salt cedar *Tamarix spp*. and Dalmatian toadflax *Linaria genistifolia ssp. dalmatica*. These groups will continue to establish insectaries throughout the assessment area. The exact number of insectaries is unknown. It will be assumed by APHIS that insectaries could occur in any treatment block.

Research conducted by APHIS Methods Development concluded that *Aphthona spp*. is susceptible to the chemical treatment alternatives including carbaryl bait. Treatments could greatly lower the current season's harvest potential depending on treatment timing. One study has been conducted to determine the effects of program insecticides on the flea beetles, *Aphthona nigriscutis and A. lacertosa.* They are used to control leafy spurge, an invasive weed that is spreading on rangeland and other ecosystems in the Western States. Because leafy spurge infestations can occur on rangeland where damaging grasshopper populations may require treatment, *Aphthona* beetles could be exposed to insecticides.

Foster *et. al*. (2001) determined the effect of grasshopper suppression programs on flea beetles addressing issues such as how much flea beetle mortality grasshopper program insecticides cause and how long it takes for flea beetles to return to pretreatment levels. In laboratory tests diflubenzuron produced no substantial flea beetle mortality; Malathion spray produced moderate (25 to 41 percent) mortality; and carbaryl spray produced 86 to 96 percent mortality. Field evaluations showed that diflubenzuron resulted in 18 percent mortality at 1-week post treatment and a full recovery to pretreatment levels 2 weeks after

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treatment. Carbaryl bait resulted in 17 percent mortality, carbaryl spray resulted in 60 to 82 percent mortality, and Malathion resulted in 21 to 44 percent mortality. In these field evaluations at 1 year after treatment, adult *Aphthona* populations in 23 of 24 plots had surpassed pretreatment levels.

Site specific conditions or views of cooperators may warrant protection measures such as no treatment buffer zones or augmentation releases of biocontrol agents. Modifications to application patterns would be made only after informal field level consultations with cooperators. RAATs application techniques would also reduce impacts because untreated areas would act as refugee for nontarget species.

All necessary program personnel will be notified of the known insectary locations via maps with sites identified by latitude/longitude and when necessary flagging and radio communications.

As per operational procedures (Appendix 2), APHIS will hold public meetings well in advance of any grasshopper treatment program to alert the public and learn the whereabouts of any insectaries that may be in the proposed treatment area. Land managers will also be informed about using the available alternatives and the various protection measures at these meetings. APHIS concludes that a grasshopper treatment program should have no adverse effects on the biological control insectaries.

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.

e. Federally Listed Species Occurring in Environmental Assessment Coverage Area

Federally Listed Specie	Scientific Name	Status	Formal Sec. 7 Consultation
Black Footed Ferret	Mussel nigripes	Endangered	Completed
Whooping Crane	Grus americana	Endangered	Completed
Least Tern	Sterna antillarum	Endangered	Completed
Piping Plover	Charadrius melodus	Endangered	Completed
Pallid Sturgeon	Scaphirhynchus albus	Endangered	Completed
American Burying Beetle	Nicrophorus americanus	Endangered	Completed
Poweshiek Skipperling	Oarisma poweshiek	Endangered	Completed
Western Praire Fringed Orchid	Plantanthera praeclara	Threatended	Completed
Dakota Skipper	Hesperia dacotae	Threatended	Completed
Rufa Red Knot	Calidris canutus rufa	Threatended	Completed
Northern Long-Eared Bat	Myotis septentrionalis	Threatended	Completed

3. Socioeconomic Issues

The control of grasshoppers in this area would have beneficial economic impacts to local landowners or permittee. The forage not utilized by grasshoppers will be available for livestock consumption and harvesting. This will mean greater livestock grazing, decreased needs for supplemental feed and increased monetary returns. Now with the availability of the RAAT's technology less chemical is being applied to fewer acres reducing programs costs and creating an affordable method of grasshopper control.

The local economics in the assessment area are driven primarily by agriculture production and tourism.

Livestock enterprises include rangeland grazing by cattle and sheep and minimal crop production. High grasshopper densities left untreated would have severe impact on the individual producer that relies on rangeland grass supplies for their livelihood. Indirectly small towns throughout the assessment area suffer economically when the individual producer is impacted because the towns are economically tied to agriculture.

The assessment area is highly dependent on tourism. Tourism is primarily focused in the Black Hills area and Badlands National Park however the impact of those tourism dollars are felt throughout western South Dakota. Esthetic values of the natural environment in the assessment area include the views, diversity of flora and fauna and the opportunity to interact with nature in an isolated setting.

4. Cultural Resources and Events

No negative impacts, directly or indirectly, should occur to any public facilities or cultural resources within the treatment areas. To ensure that historical or cultural sites, monuments, buildings or artifacts of special concern are not adversely affected by program treatments, APHIS would confer with the appropriate land management agency or cultural resource specialists on a local level to protect these areas of special concern. Quality of grasslands for grazing and wildlife habitat should improve as a result of control programs because available forage and cover will be protected.

a. Historic Sites

APHIS will adopt mitigation measures developed through informal consultation with the South Dakota Historical Society pertaining to any registered historical sites that occur in a treatment area. When historic site occur in the treatment area, maps of the proposed area will be sent for consultation to the South Dakota Historical Society Director well in advance of any project. No adverse effect would be expected to historical sites due to APHIS programs.

b. State Parks

Informal consultation with the director of the South Dakota Game, Fish and Parks Department will provide guidelines for APHIS pertaining to any proposed treatment area adjoining a state park. APHIS will adopt mitigation measures developed in consultation with the South Dakota Game, Fish and Parks Department to protect parks from adverse effects.

c. Indian Reservations

Six Indian Reservations exist within the boundaries of the assessment area. They are the Standing Rock Indian Reservation, Cheyenne River Indian Reservation, Lower Brule Indian Reservation, Crow Creek Indian Reservation, Rosebud Indian Reservation, and the Pine Ridge Indian Reservation.

If treatments are requested by any Indian Agency, the land operations departments of the agency and tribal government will be included in site-specific informal consultations. The land operations departments and tribal governments must concur with each other as to locations of sensitive areas and mitigation measures required prior to control operations and that timing and location of planned program treatments do not coincide or conflict with cultural events or observances, such as sundances, on tribal lands.

d. Recreation

Recreation is a common and growing practice throughout the assessment area. Hiking, fishing, horseback riding, mountain biking, camping, hunting, and plant and wildlife viewing are some of the recreation activities occurring in the assessment area. Disturbance to these activities could occur by aircraft flyovers but would be of short duration or temporary. Measures to minimize disturbances to areas frequented by recreationists would be developed during consultations with the land managing agency.

5. Special Considerations for Certain Populations

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

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

Minority populations of Native Americans live within the assessment area. Letters of request for treatments must be on file from the tribal government and Bureau of Indian Affairs before grasshopper control activities can begin on reservation land or areas managed for traditional Native American activities. Additionally, any protection measures for sensitive people or areas must be agreed upon before operations can begin.

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

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

The percentage of children found within the suppression area will be minimal. Control programs focus on areas of rangeland with minimal populations.

IV. Environmental Consequences

Each alternative described in this EA potentially has adverse environmental effects. The general environmental impacts of each alternative are discussed in detail in the 2002 and 2019 EIS. The specific impacts of the alternatives are highly dependent upon the particular action and location of infestation. The principal concerns associated with the alternatives are: (1) the potential effects of insecticides on human health (including subpopulations that might be at increased risk); and (2) impacts of insecticides on nontarget organisms (including threatened and endangered species).

APHIS has written human health and ecological risk assessments (HHERAs) to assess the insecticides and use patterns that are specific to the program. The risk assessments provide an in-depth technical analysis of the potential impacts of each insecticide to human health; and non-target fish and wildlife along with its environmental fate in soil, air, and water. The assessments rely on data required by the USEPA for pesticide product registrations, as well as peer-reviewed and other published literature. The HHERAs are heavily referenced in this draft EA. These Environmental Documents can be found at the following website: http://www.aphis.usda.gov/plant-health/grasshopper.

A. Environmental Consequences of the Alternatives

Site-specific environmental consequences of the alternatives are discussed in this section.

1. No Suppression Program Alternative

Under this alternative, APHIS would not conduct a program to suppress grasshoppers. If APHIS does not participate in any grasshopper suppression program, Federal land management agencies, State agriculture departments, local governments, private groups or individuals, may not effectively combat outbreaks in a coordinated effort. Without the technical assistance and coordination that APHIS provides during grasshopper outbreaks, the uncoordinated programs could use insecticides that APHIS considers too environmentally harsh. Multiple treatments and excessive amount of insecticide could be applied in efforts to suppress or even locally eradicate grasshopper populations. There are approximately 100 pesticide products registered by USEPA for use on rangelands and against grasshoppers (Purdue University, 2018). It is not possible to accurately predict the environmental consequences of the No Action alternative because the type and amount of insecticides that could be used in this scenario are unknown. However, the environmental impacts could be much greater than under the APHIS led suppression program alternative due to lack of treatment knowledge or coordination among the groups.

The potential environmental impacts from the No Action alternative, where other agencies and land managers do not control outbreaks, stem primarily from grasshoppers consuming vast amounts of vegetation in rangelands and surrounding areas. Grasshoppers are general feeders, eating grasses and forbs first and often moving to cultivated crops. High grasshopper density of one or several species and the resulting defoliation may reach an economic threshold where the damage caused by grasshoppers exceeds the cost of controlling the grasshoppers. Researchers determined that during typical grasshopper infestation years, approximately 20% of forage rangeland is removed, valued at a dollar adjusted amount of $900 million. This value represents 32 to 63% of the total value of rangeland across the western states (Rashford et al., 2012). Other market and non-market values such as carbon sequestration, general ecosystem services, and recreational use may also be impacted by pest outbreaks in rangeland.

Vegetation damage during serious grasshopper outbreaks may be so severe that all grasses and forbs are destroyed; thus, plant growth is impaired for several years. Rare plants may be consumed during critical times of development such as seed production, and loss of important plant species, or seed production may lead to reduced diversity of rangeland habitats, potentially creating opportunities for the expansion of invasive and exotic weeds (Lockwood and Latchininsky, 2000). When grasshoppers consume plant cover, soil is more susceptible to the drying effects of the sun, making plant roots less capable of holding soil in place. Soil damage results in erosion and disruption of nutrient cycling, water infiltration, seed germination, and other ecological processes which are important components of rangeland ecosystems (Latchininsky et al., 2011).

When the density of grasshoppers reaches significantly high levels, grasshoppers begin to compete with livestock for food by reducing available forage (Wakeland and Shull, 1936; Belovsky, 2000; Pfadt, 2002; Branson et al., 2006; Bradshaw et al., 2018). Ranchers could offset some of the costs by leasing rangeland in another area and relocating their livestock, finding other means to feed their animals by purchasing hay or grain, or selling their livestock. Ranchers could also incur economic losses from personal attempts to control grasshopper damage. Local communities could see adverse economic impacts to the entire area. Grasshoppers that infest rangeland could move to surrounding croplands. Farmers could incur economic losses from attempts to chemically control grasshopper populations or due to the loss of their crops. The general public could see an increase in the cost of meat, crops, and their byproducts.

2. Insecticide Applications at Conventional Rates or Reduced Agent Area Treatments with Adaptive Management Strategy

Under Alternative 2, APHIS would participate in grasshopper programs with the option of using one of the insecticides carbaryl, diflubenzuron, or Malathion, depending upon the various factors related to the grasshopper outbreak and the site-specific characteristics. The use of an insecticide would typically occur at half the conventional application rates following the RAATs strategy. APHIS would apply a single treatment to affected rangeland areas in an attempt to suppress grasshopper outbreak populations by a range of 35 to 98 percent, depending upon the insecticide used.

a) Carbaryl

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

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

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

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

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

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

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

Carbaryl can cause cholinesterase inhibition (i.e., overstimulate the nervous system) in humans resulting in nausea, headaches, dizziness, anxiety, and mental confusion, as well as convulsions, coma, and respiratory depression at high levels of exposure (NIH, 2009a; Beauvais, 2014). USEPA classifies carbaryl as “likely to be carcinogenic to humans” based on vascular tumors in mice (USEPA, 2007, 2015a, 2017a).

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

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

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

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

b) Diflubenzuron

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

USEPA considers diflubenzuron relatively non-persistent and immobile under normal use conditions and stable to hydrolysis and photolysis. The chemical is considered unlikely to contaminate ground water or surface water (USEPA, 1997). The vapor pressure of diflubenzuron is relatively low, as is the Henry's Law Constant value, suggesting the chemical will not volatilize readily into the atmosphere from soil, plants or water.

Therefore, exposure from volatilization is expected to be minimal. Due to its low solubility (0.2 mg/L) and preferential binding to organic matter, diflubenzuron seldom persists more than a few days in water (Schaefer and Dupras, 1977; Schaefer et al., 1980). Mobility and leachability of diflubenzuron in soils is low, and residues are usually not detectable after seven days (Eisler, 2000). Aerobic aquatic half-life data in water and sediment was reported as 26.0 days (USEPA, 1997). Diflubenzuron applied to foliage remains adsorbed to leaf surfaces for several weeks with little or no absorption or translocation from plant surfaces (Eisler, 1992, 2000). Diflubenzuron treatments are expected to have minimal effects on terrestrial plants. Both laboratory and field studies demonstrate no effects using diflubenzuron over a range of application rates, and the direct risk to terrestrial plants is expected to be minimal (USDA APHIS, 2018c).

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

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

Risk is low for most non-target species based on laboratory toxicity data, USEPA approved use rates and patterns, and additional mitigations such as the use of lower rates and RAATs that further reduces risk. Risk is greatest for sensitive terrestrial and aquatic invertebrates that may be exposed to diflubenzuron residues.

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

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

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

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

Diflubenzuron is moderately toxic to spiders and mites (USDA APHIS, 2018c). Deakle and Bradley (1982) measured the effects of four diflubenzuron applications on predators of *Heliothis* spp. at a rate of 0.06 lb a.i./ac and found no effects on several predator groups. This supported earlier studies by Keever et al. (1977) that demonstrated no effects on the arthropod predator community after multiple applications of diflubenzuron in cotton fields. Grasshopper integrated pest management (IPM) field studies have shown diflubenzuron to have a minimal impact on ants, spiders, predatory beetles, and scavenger beetles. There was no significant reduction in populations of these species from seven to 76 days after treatment. Although ant populations exhibited declines of up to 50 percent, these reductions were temporary, and population recovery was described as immediate (Catangui et al., 1996).

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

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

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

c) Malathion

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

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

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

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

USEPA found Malathion moderately toxic to birds on a chronic basis, slightly toxic to mammals through dietary exposure, and acutely toxic to aquatic species (including freshwater as well as estuarine and marine species) (USEPA, 2000b, 2016b). Toxicity to aquatic vertebrates such as fish and larval amphibians, and aquatic invertebrates is variable based on test species and conditions. The data available on impacts to fish from Malathion suggest effects could occur at levels above those expected from program applications. Consumption of contaminated prey is not expected to be a significant pathway of exposure for aquatic species based on expected residues and Malathion's BCF (USEPA, 2016a; USDA APHIS, 2018d). Indirect effects to fish from impacts of Malathion applications to aquatic plants are not expected (USDA APHIS, 2018d).

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

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

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

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

Available data on Malathion reptile toxicity suggest that, with the use of program measures, no lethal or sublethal impacts would be anticipated (USDA APHIS, 2015). Indirect risk to reptiles from the loss of food items is expected to be low due to the low application rates and implementation of preferred program measures such as RAATs (USDA APHIS, 2018d).

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

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

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

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

d) Reduced Area Agent Treatments (RAATs)

The use of RAATS is the most common application method for all program insecticides and would continue to be so accept in rare pest conditions that warrant full coverage and higher rates. The goal of the RAATs strategy is to suppress grasshopper populations to a desired level, rather than to reduce those populations to the greatest possible extent. This strategy has both economic and environmental benefits. APHIS would apply a single application of insecticide per year, typically using a RAATs strategy that decreases the rate of insecticide applied by either using lower insecticide concentrations, or by alternating one or more treatment swaths. Usually RAATs applications use both options. The RAATs strategy suppresses grasshoppers within treated swaths, while conserving grasshopper predators and parasites in swaths that are not treated.

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

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

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

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

B. Other Environmental Considerations

1. Cumulative Impacts

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

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

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

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

The insecticides proposed for use in the program have a variety of agricultural and non-agricultural uses. There may be an increased use of these insecticides in an area under suppression when private, State, or Federal entities make applications to control other pests. However, the vast majority of the land where program treatments occur is uncultivated rangeland and additional treatments by land owners or managers are very uncommon making possible cumulative or synergistic chemical effects extremely unlikely.

The insecticides proposed for use in the grasshopper program are not anticipated to persist in the environment or bio accumulate. Therefore, a grasshopper outbreak that occurs in an area previously treated for grasshoppers is unlikely to cause an accumulation of insecticides from previous program treatments.

Private agricultural entities could apply herbicides or insecticides to their cropland during times which could coincide with APHIS programs. APHIS' policy requires that the grasshoppers may only be treated on private rangelands, so that cumulative impacts would not result.

In some cases, unknown parties have applied treatments for grasshoppers or Mormon crickets on public and private rangeland. These treatments are easy to detect because of the presence of dead grasshoppers or Mormon crickets. However, absent visible bait or the distinctive odor of an insecticide such as malathion, acephate, or furadan, APHIS cannot determine what insecticide may have been used. In those cases, APHIS would refrain from conducting suppression programs in the immediate vicinity. Applications on federally managed rangelands by unknown parties can be minimized by proactive participation in suppression programs by APHIS, which remove the concerns of the parties who would otherwise conduct clandestine treatments. APHIS can be most proactive if logistically expedient treatment methods are available. Spray treatments are more logistically expedient than bait treatments.

Federal and private land managers may utilize various herbicides to control weeds within the proposed suppression area. APHIS would consult with land managers to determine if herbicides or insecticides have been utilized within the past year on any proposed spray block within the proposed suppression area. APHIS would not apply any insecticide in a manner that conflicts with EPA requirements regarding multiple treatments. APHIS would not apply insecticide to an area known to have been treated within one (1) year with a pesticide known to have cumulative or synergistic effects with the insecticide selected for application by APHIS.

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

Federal agencies identify and address the disproportionately high and adverse human health or environmental effects of their proposed activities, as described in E.O. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

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

Federal agencies consider a proposed action's potential effects on children to comply with E.O. 13045, "Protection of Children from Environmental Health Risks and Safety Risks." This E.O. requires each Federal agency, consistent with its mission, to identify and assess environmental health and safety risks that may disproportionately affect children and to ensure its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. APHIS has developed agency guidance for its programs to follow to ensure the protection of children (USDA APHIS, 1999).

APHIS' HHERAs evaluated the potential exposure to each insecticide used in the program and risks associated with these insecticides to residents, including children. The HHERAs for the proposed program insecticides, located at http://www.aphis.usda.gov/plant-health/grasshopper, suggest that no disproportionate risks to children, as part of the general public, are anticipated.

APHIS grasshopper insecticide treatments are conducted in rural rangeland areas, where agriculture is a primary industry. The areas consist of widely scattered, single, rural dwellings in ranching communities with low population density. The program notifies residents within treatment areas, or their designated representatives, prior to proposed operations to reduce the potential for incidental exposure to residents including children. Treatments are conducted primarily on open rangelands where children would not be expected to be present during treatment or to enter should there be any restricted entry period after treatment.

Impacts on children will be minimized by the implementation of the treatment guidelines:

Aerial Broadcast Applications (Liquid Chemical Methods)

- Notify all residents within 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, the program plans 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 Baits (Dry Chemical Methods)

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

Ultra-Low Volume Aerial Application (Liquid Chemical Methods)

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

4. Tribal Consultation

Executive Order 13175 "Consultation and Coordination with Indian Tribal Governments," calls for agency communication and collaboration with tribal officials when proposed Federal actions have potential tribal implications. The Archaeological Resources Protection

Act of 1979 (16 U.S.C. §§ 470aa-mm), secures the protection of archaeological resources and sites on public and tribal lands.

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

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

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

APHIS will support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions. Impacts are minimized as a result of buffers to water, habitat, nesting areas, riparian areas, and the use of RAATs. For any given treatment, only a portion of the environment will be treated, therefore minimizing potential impacts to migratory bird populations.

6. Endangered Species Act

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

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

APHIS submitted a programmatic biological assessment and requested consultation with USFWS on March 9, for use of carbaryl, Malathion, and diflubenzuron, and grasshopper suppression in the 17-state program area. With the incorporation and use of application buffers and other operational procedures APHIS anticipates that any impacts associated with the use and fate of program insecticides will be insignificant and discountable to listed species and their habitats. Based on an assessment of the potential exposure, response, and subsequent risk characterization of program operations, APHIS concludes the proposed action is not likely to adversely affect listed species or critical habitat in the program area. APHIS has requested concurrence from the USFWS on these determinations. Until this programmatic Section 7 consultation with USFWS is completed, APHIS will conduct consultations with USFWS field offices at the local level.

APHIS is not required to develop mitigation buffer zones for candidate or other species of concern. Species of concern receive no legal protection under the Act, but consideration of these species will be discussed with the local land managers prior to any treatment to assist in conservation efforts. Yearly local program consultation with the requesting agency would determine if mitigation measures would allow a suppression program to be conducted.

United States Fish and Wildlife Service (FWS) Section 7 consultation is completed. The USFWS correspondence and concurrence letter are included as Appendix 4 in this EA.

7. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668–668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. During the breeding season, bald eagles are sensitive to a variety of human activities. Grasshopper management activities could cause disturbance of nesting eagles, depending on the duration, noise levels, extent of the area affected by the activity, prior experiences that eagles have with humans, and tolerance of the individual nesting pair. Also, disruptive activities in or near eagle foraging areas can interfere with bald eagle feeding, reducing chances of survival. USFWS has provided recommendations for avoiding disturbance at foraging areas and communal roost sites that are applicable to grasshopper management programs (USFWS, 2007).

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

8. Additional Species of Concern

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

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

Because grasshopper numbers are so high in an outbreak year, treatments would not likely reduce the number of grasshoppers below levels present in a normal year. Should grasshoppers be unavailable in small, localized areas, sage grouse chicks may consume other insects, which sage grouse chicks likely do in years when grasshopper numbers are naturally low. By suppressing grasshoppers, rangeland vegetation is available for use by other species, including sage grouse, and rangeland areas are less susceptible to invasive plants that may be undesirable for sage grouse habitat.

Candidate species are plants and animals for which the FWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Currently South Dakota has no candidate species.

9. Fires and Human Health Hazards

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

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

The safety data sheet for each insecticide identifies these combustion products for each insecticide as well as recommendations for PPE. The PPE is similar to what typically is used in fighting wildfires. Material applied in the field will be at a much lower concentration than what would occur in a fire involving a concentrated formulation. Therefore the PPE worn by rangeland firefighters would also be protective of any additional exposure resulting from the burning of residual insecticides.

10. Cultural and Historical Resources

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

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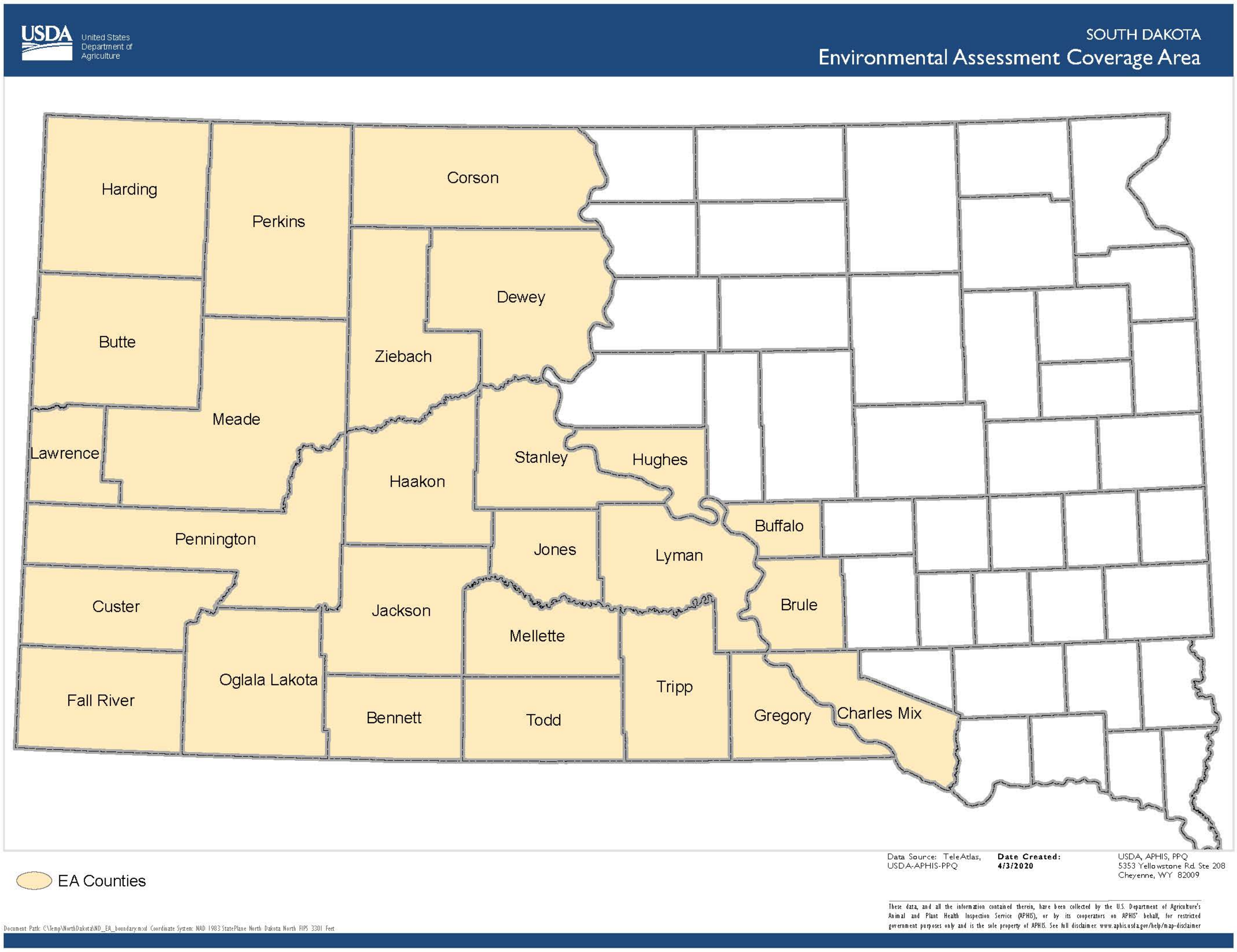
Appendix 1: Map of the Affected Environment



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Appendix 2 - APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program FY-2020 Treatment Guidelines and Operational Procedures Version 3/9/2020

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

General Guidelines for Grasshopper / Mormon Cricket Treatments

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

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

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

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

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

6. Land managers are responsible for the overall management of rangeland under their control to prevent or reduce the severity of grasshopper and Mormon cricket outbreaks. Land managers are encouraged to have implemented Integrated Pest Management Systems prior to requesting a treatment. In the absence of available funding or in the place of APHIS funding, the Federal land management agency, Tribal

authority or other party/ies may opt to reimburse APHIS for suppression treatments. Interagency agreements or reimbursement agreements must be completed prior to the start of treatments which will be charged thereto.

7. There are situations where APHIS may be requested to treat rangeland that also includes small areas where crops are being grown (typically less than 10 percent of the treatment area). In those situations, the crop owner pays the entire treatment costs on the croplands.

   NOTE: The insecticide being considered must be labeled for the included crop as well as rangeland and current Worker Protection Standards must be followed by the applicator and private landowner.

8. In some cases, rangeland treatments may be conducted by other federal agencies (e.g., Forest Service, Bureau of Land Management, or Bureau of Indian Affairs) or by non-federal entities (e.g., Grazing Association or County Pest District). APHIS may choose to assist these groups in a variety of ways, such as:
   a. loaning equipment (an agreement may be required):
   b. contributing in-kind services such as surveys to determine insect species, instars, and infestation levels;
   c. monitoring for effectiveness of the treatment;
   d. providing technical guidance.

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

Operational Procedures

GENERAL PROCEDURES FOR ALL AERIAL AND GROUND APPLICATIONS

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

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

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

4. Do not apply insecticides directly to water bodies (defined herein as reservoirs, lakes, ponds, pools left by seasonal streams, springs, wetlands, and perennial streams and rivers).

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

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- 200 foot buffer with ground liquid insecticide.
- 200-foot buffer with aerial bait.
- 50-foot buffer with ground bait.

5. Instruct program personnel in the safe use of equipment, materials and procedures; supervise to ensure safety procedures are properly followed.

6. Conduct mixing, loading, and unloading in an approved area where an accidental spill would not contaminate a water body.

7. Each aerial suppression program will have a Contracting Officer's Representative (COR) OR a Treatment Manager on site. Each State will have at least one COR available to assist the Contracting Officer (CO) in GH/MC aerial suppression programs.

   NOTE: A Treatment Manager is an individual that the COR has delegated authority to oversee the actual suppression treatment; someone who is on the treatment site and overseeing / coordinating the treatment and communicating with the COR. No specific training is required, but knowledge of the Aerial Application Manual and treatment experience is critical; attendance to the Aerial Applicators Workshop is very beneficial.

8. Each suppression program will conduct environmental monitoring as outlined in the current year's Environmental Monitoring Plan.

   APHIS will assess and monitor rangeland treatments for the efficacy of the treatment, to verify that a suppression treatment program has properly been implemented, and to assure that any environmentally sensitive sites are protected.

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

SPECIFIC PROCEDURES FOR AERIAL APPLICATIONS

1. APHIS Aerial treatment contracts will adhere to the current year's Statement of Work (SOW).

2. Minimize the potential for drift and volatilization by not using ULV sprays when the following conditions exist in the spray area:

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

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3. Weather conditions will be monitored and documented during application and treatment will be suspended when conditions could jeopardize the correct spray placement or pilot safety.

4. Application aircraft will fly at a median altitude of 1 to 1.5 times the wingspan of the aircraft whenever possible or as specified by the COR or the Treatment Manager.

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.

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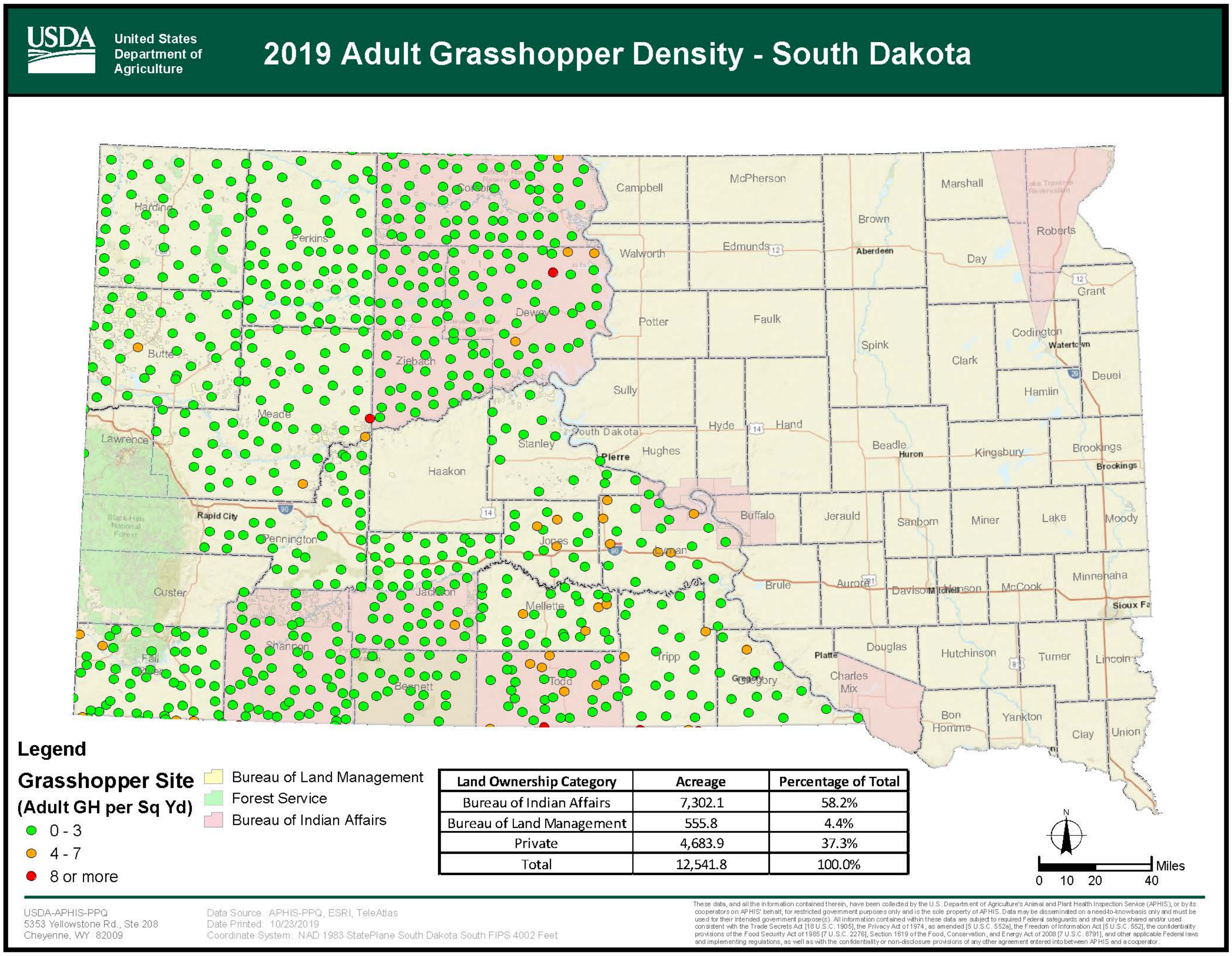
Appendix 3: 2019 South Dakota Adult Grasshopper Survey



Land Ownership Category	Acreage	Percentage of Total
Bureau of Indian Affairs	7,302.1	58.2%
Bureau of Land Management	555.8	4.4%
Private	4,683.9	37.3%
Total	12,541.8	100.0%

Appendix 4: FWS/NMFS Correspondence and Concurrence

Section 7 consultation was held in April 2019 with the local United States Fish and Wildlife Service (FWS) to discuss the potential grasshopper control activities for 2019 and potential impact(s) to listed species. APHIS forwarded the completed species assessments to FWS for review and concurrence was received and is attached below as Appendix 4.

[EXTERNAL] APHIS PPQ Request for concurrence

Mesman, Amy - APHIS <amy.mesman@usda.gov>
Fri 4/10/2020 2:38 PM
To: Gates, Natalie <natalie_gates@fws.gov>
Cc: Larson, Scott <scott_larson@fws.gov>

1 attachments (56 KB)

2020 Biological Assessment for SD TE Species.docx;

Hard Copy sent via US Postal Service.

The U.S. Fish and Wildlife Service concurs with your conclusion that the described project will not adversely affect listed species. Contact this office if changes are made or new information becomes available.

SCOTT LARSON Digitally signed by SCOTT LARSON Date: 2020.04.13 08:13:58 -05'00'

Field Supervisor

April 10, 2020

Subject: Concurrence of 2020 USDA, APHIS, PPQ South Dakota Rangeland Grasshopper Endangered Species

To: Natalie Gates
Biologist

From: Amy Mesman
State Plant Health Director North/South Dakota

We are seeking concurrence on the endangered species protection measures as described in the species assessment section of our 2020 Rangeland Grasshopper Environmental Assessment (EA).

As in the past, please consider the following when making your determination for concurrence. Grasshopper outbreaks are cyclical and we are currently in a low population cycle for South Dakota. There has been no significant increase in densities for several years across the western part of the state which is our EA coverage area. Adjacent states are beginning to see populations build. Traditionally we follow suite however yearly nymphal and adult surveys are critical to monitor building populations and will again be conducted beginning in late May.

When population levels do warrant control, programs are still infrequent. Since 1990, only 14 control programs have been conducted on a total of 165,000 acres. Our programs have ranged from 50 acres to 80,000 acres in 1990 and are geared toward rangeland forage protection. We do not treat cropland.

As we begin to plan for the 2020, rain fall amounts and snow accumulations over the winter have set up rangelands with adequate moisture and potential for good grass conditions. Based on the anticipated forage conditions, reoccurring low population levels, depressed cattle markets and discussions with many landowners, we do not anticipate any widespread economic grasshopper problems across western South Dakota during 2020.

In October of 2019 I was contacted by a private landowner in Jones County who believed his crop fields were being impacted from grasshoppers migrating off 640 acres of adjacent federal rangeland. A delimiting survey of the area verified that populations originating in Federal rangelands were impacting his crops and a crop protection program would be appropriate. At the time of survey it was too late to conduct treatments. We will be verifying that population later this spring with the potential for treatment in mid-June.

In November of 2019, APHIS issued a new Final Environmental Impact Statement (EIS) for its Grasshopper and Mormon Cricket Suppression Program, as required under the National Environmental Policy Act. The document addresses technological and scientific advances in grasshopper and Mormon cricket control that have occurred since 2002. This EIS serves as the basis for our pending environmental assessment.

The new EIS identifies four chemical control options available to us for grasshopper treatment; diflubenzeron, Malathion, chlorantraniliprole and carbaryl in both bait and liquid form. At this time due to labeling restrictions chlorantraniliprole is not available for ultra-low volume (ULV) applications on rangelands. Cost share available for PPQ programs consists of paying 100% of the costs on federal land, 50% of the costs on state land and 33% of the cost on private lands.

We continue to utilize the reduced acre/agent treatment application method known as RAATS or skip swathing when conducting a control program. This method leaves approximately 50% of the intended protected area untreated. Only in the case of a crop protection program would 100% of the area be covered. These programs involve a quarter to half mile buffer treatment on rangeland directly adjacent to agricultural lands to prevent grasshopper migration.

Diflubenzuron is always our preferred choice. Diflubenzuron is a growth regulator; a chitin inhibitor. Based on the mode of action, chemical price and available cost share, diflubenzuron continues to be our first choice when conducting grasshopper control over large areas of rangeland. Diflubenzuron in combination with RAATs, when appropriate, has the fewest non target impacts of the three products currently available for our use.

In regards to crop protection situations, Malathion or early treatments of diflubenzuron would be the preferred options. Which treatment option is selected depends on the time of year in which the program typically occurs, life stage of the grasshoppers present and the need to quickly eliminate the threat of grasshopper migration into adjacent lands.

At this time I would ask that you please review of our current draft endangered species assessments for South Dakota and provide any comments. Per our brief email discussions, I believe there are no changes from the 2019 assessments. Additionally, while there are currently no candidate species listed in South Dakota information remains in this document explaining their role in species protection. As documented in the draft EA, APHIS will provide at least five days' notice prior to any control program to address emerging issues or concerns not addressed in this EA.

We are seeking to finalize our environmental documentation and hope to receive concurrence by April 24, 2020. If you should have any questions or concerns please feel free to contact me at 605/224-1713 or via email at amy.mesman@usda.gov. Thank you.

Sincerely,

Amy Mesman
State Plant Health Director

Enclosure

Amy Mesman

State Plant Health Director North Dakota/South Dakota

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INTERNATIONAL YEAR OF PLANT HEALTH 2020
PROTECTING PLANTS, PROTECTING LIFE

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2020 Biological Assessment for Federally
Listed Threatened or Endangered Species in South Dakota

The following assessments were prepared for the listed species that may be present in a potential control block to assist in determining if the species or its habitat would be affected by program actions.

1) Black-footed ferret *(Mussel nigripes)*

Status: The black-footed ferret was determined to be an endangered species as early as 1967 (32 FR 4001, March 11, 1967; 35 FR 8491-8498, June 2, 1970).

Pertinent species information: The black-footed ferret is larger than most weasels. They are closely associated with prairie dog towns, are considered nocturnal and spend much of their time below the surface in prairie dog burrows. Food consists primarily of prairie dogs, with other small mammals making up the remainder of the diet (Chapman and Feldhamer, 1982).

The most successful reintroduction program is found in Pennington County, the Conata Basin of South Dakota. Other populations can be found in Dewey, Todd, Ziebach, southeast Lyman counties and a new introduction into Stanley County during the fall of 2017. Ferrets have also been re introduced to Wind Cave National Park in Custer County. All these populations, except the Lower Brule reintroduction effort in Lyman County, Stanley County Bad River Ranch and the Wind Cave populations, are considered as nonessential and experimental. In addition populations can be found in Canada, Mexico and U.S States of Arizona, Colorado, Kansas, Wyoming, Montana, New Mexico and Utah. The FWS reports that the black-footed ferret may also be found in Adams, Hettinger and Stark Counties of North Dakota.

Reintroduction of the black-footed ferret into the black-tailed prairie dog (*Cynomys ludovicianus*) ecosystem in the Conata Basin/Badlands area of South Dakota occurred from 1994 through 2000. A self sustaining ferret population was established from these reintroduction efforts. A multi-agency committee guides the reintroduction plan. Currently approximately 70 ferrets exist on Buffalo Gap National Grasslands, reduced from 300 due to an ongoing plague outbreak. This population is considered a nonessential experimental population established according to section 10(j) of the Endangered Species Act. The last reared introduction of kits occurred in 2000. The population is currently surviving and reproducing without reared introductions and also serves as a nursery for other populations.

The immediate one year goals were met by realizing sufficient survivorship in the breeding population to lead to recruitment of wild-born young into the population

Assessment: The black-footed ferret was analyzed in the January 1987 APHIS Biological Assessment (USDA, APHIS, 1987) for possible effects resulting from the Rangeland Grasshopper Cooperative Management Program. The APHIS/FWS ESA formal consultations concluded that the species continued existence would not be jeopardized by the proposed program if program personnel consulted with local FWS prior to any control programs. APHIS will adopt these measures and will consult at least five days prior to any treatments in South Dakota to develop adequate protection measures for documented and verified occurrences of the ferret. Based on these measures program activities will result in no effects to the ferrets or their habitats.

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2) Whooping crane *(Grus americana)*

Status: The whooping crane has been determined to be an endangered species (32FR; 48; March 11, 1967: p. 4001; 35 FR 8491-8498, June 2, 1970).

Pertinent species information: The whooping crane is one of the rarest birds in North America. Whooping cranes generally mate for life. Delayed sexual maturity may prevent breeding until cranes are four to six years old. Nesting usually occurs in potholes around bulrush *(Scirpus validus)*, cattail *(Typha sp.)*, sedge *(Carex aquatilis)*, and other plant species.

The wild breeding population of whooping cranes annually migrates between breeding grounds at Wood Buffalo National Park, Northwest Territories, Canada and primary wintering areas at Aransas National Wildlife Refuge and Matagorda Island, Texas. The southward migration from Wood Buffalo generally begins from mid to late September, and all cranes have generally arrived in the Aransas area by mid November. Spring departure from the Aransas area generally begins around early April and may extend over a period as long as 44 days, with first arrivals at Wood Buffalo occurring in late April. Rarely, a few cranes may spend the summer at the Aransas area. The Aransas/Wood Buffalo wild breeding population is the only self sustaining population of whooping cranes remaining.

A non migratory population of whooping cranes currently exists in Florida and an eastern migratory population has been established that moves between Wisconsin and Florida. Whooping cranes have also been recently reintroduced in Louisiana in an effort to establish a non-migratory population there.

Marshes, river bottoms, potholes, prairies and occasionally cropland are the habitats of the whooping crane. Depending upon seasonal availability, the whooping crane subsists on a diet of blue crabs, clams, frogs or fish. During migration, they will utilize cropland.

Assessment: Although there are reported occurrences, critical habitat has not been designated in South Dakota (50 FR; 17.95 (b). The whooping crane may occur statewide with preferred stopovers in shallow wetlands or streams with sparse vegetation and good horizontal visibility (Lewis, 1995). However, most of the Aransas/Wood Buffalo National Park population will have likely migrated to more northern latitudes in Canada during the proposed program period of mid May or later.

Based on the timing of the proposed action, label compliance and the historical information stating most of the cranes from the Wood Buffalo National Park/Aransas National Wildlife Refuge will have already reached their wintering or nesting destinations prior to any proposed treatment there will be no effect on the species from the treatment of grasshoppers in South Dakota.

3) Least tern *(Sterna antillarum)*

Status: The interior population of the least tern was determined to be endangered May 25, 1985. (50 FR, 21784-21792, May 28, 1985).

Pertinent species information: The adult least tern is one of the smaller terns, highly adapted to life on the wing. The birds forage while in flight, snatching fish, crustaceans and insects from the surface of the water. The terns annually migrate with breeding occurring in central South Dakota, typically along the Missouri River and a few may nest on the Cheyenne River.

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Nesting colonies occupy sandy sites that are relatively free of vegetation. Eggs are laid in shallow scrapes. Although nests are generally on sandbars or on beaches or spits in coastal areas, alkali flats have been used as nest sites in New Mexico. The species also nests on barren flats of saline lakes and ponds (50 FR 21784-21792, May 28, 1985). Nesting occurs from early May into early August.

The least tern exhibits a localized pattern of distribution and its breeding biology centers around three ecological factors. These include (1) the presence of bare of nearly bare alluvia islands or sandbars, (2) the existence of favorable water levels during the nesting season and (3) the availability of food (50 FR 21784-21792, May 28, 1985)

Assessment: In South Dakota the least terns begin to arrive on the breeding ground in mid April and would be expected to be present when treatments are needed.

In concurrence with the June 1, 1987, FWS Biological Opinion, a 0.25 mile aerial buffer will be maintained for 2.5 miles upstream and downstream of nesting tern colonies on each side of the rivers or other bodies of water less than 1,000 surface acres where nesting colonies are located. To further protect the tern from applications of carbaryl bait a 500 foot buffer (ground or aerial) will be used from known nesting sites. Prior to any treatment, program personnel would contact the local office of FWS at least five days prior to program treatments to determine areas to be protected.

These protection measures are in compliance with the June 1, 1987, FWS Biological Opinion. APHIS believes these measures will adequately protect the least tern and its breeding habitat from program activities and no effects will occur.

4) Piping plover *(Charadrius melodus)*

Status: The piping plover has been determined to be an endangered species in the states of Illinois, Indiana, Michigan, Minnesota, New York, Ohio and Pennsylvania, and a threatened species in other states (50 FR 50726-50733, December 11, 1985). Critical habitat has been designated for this species (67 FR 57637-57717, September 11, 2002)

Pertinent species information: The piping plover is a shorebird associated with sandy flats and river banks. Devegetative, sandy areas are generally preferred for breeding habitat. Grassy dunes that may be as small as 200 to 300 feet long may be used. The interior population favors the open shorelines of shallow lakes, especially salt-encrusted shorelines with gravel, sand or pebbly mud.

Although their food habits are not well studied, piping plover are known to prefer aquatic worms, fly larvae, beetles, crustaceans and mollusks. The birds tend to forage singly, but may arrive and depart feeding areas in flocks.

Birds arrive in nesting areas around late March and spread out over nesting beaches. The birds tend to be territorial, sometimes not allowing other birds within 100 feet of their nest. In South Dakota, piping plovers nest mainly in suitable habitat found along the Missouri River, including barren areas of the reservoirs. There are a few locations where piping plovers have nested in northeast South Dakota along saline wetlands but theses areas are inconsistent nesting areas and outside the boundaries where this APHIS action may occur. Critical habitat has been formally designated along portions of the Missouri River in South Dakota.

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Assessment: This species was addressed in the 1987 APHIS/FWS, Section 7 Consultation in which FWS determined that to avoid the potential for food contamination, it would be necessary to establish buffers around nesting areas and designated critical habitat. A 0.25 mile no-chemical spray buffer would be maintained around known nesting areas for a distance of 2.5 miles upstream and downstream. Also, where carbaryl bran bait is to be used, a 500 foot no-treatment buffer would be maintained around nesting birds. To determine specific nesting areas, program personnel would contact the local office of FWS five days prior to program activities to determine nesting areas. However, based on the buffer areas which will prevent contamination of food sources and impacts to nesting areas no effect will occur to critical habitat or the specie.

5) Pallid Sturgeon *(Scaphirhynchus albus)*

Status: The pallid sturgeon was determined to be endangered October 9, 1990. (55 FR 36641-36647, September 6, 1990)

Pertinent species information: The pallid sturgeon is a large fish known only to occur in the Missouri River, the Mississippi River downstream of the Missouri River and the lower Yellowstone River. Pallid sturgeons require large, turbid free-flowing riverline habitat with rocky or sandy substrate. They are well adapted to life on the river bottom and inhabit areas of swifter water more so than the related but smaller shovelnose sturgeon. Critical habitat has not been designated at this time. The decline of pallid sturgeons is apparently through habitat modification, lack of natural reproduction, commercial harvest and hybridization with the shovelnose sturgeon in parts of its range. In South Dakota, this fish is known to occur primarily in the Missouri River.

Assessment: In concurrence with the April 16, 1990, FWS Biological Opinion, a 0.25 mile no-aerial ULV buffer would be implemented from known habitats. Within the 0.25 mile, only carbaryl bran bait will be used. These measures are in conformance with previous FWS Biological Opinions for listed fish occurring in large rivers and should result in no effect for the Pallid Sturgeon.

6) American burying beetle *(Nicrophorus americanus)*

Status: The American burying beetle was proposed for listing as an endangered species, October 11, 1988 and listed as endangered June 12, 1989 (FR 54:29652-29655).

Pertinent species information: The American burying beetle (ABB) known also as the giant carrion beetle falls within the family Silphidae. This carrion beetle is the largest of its genus in North America and its biology is similar to other species of *Nicrophorus*. Adult American burying beetles are strongly nocturnal. It has been observed that when exposed to daylight, the adults quickly retreat underground and bury themselves under the rangeland plant litter and soil (Backlund, 2010). The adult beetles feed on carrion by smell where adults will fight other adults for the carcass (World Wildlife Fund, 1990). The carcass is then buried and a brood chamber is constructed for the eggs. Both parents remain with the eggs and tend the larvae, which do not survive without parental care. The young beetles have been observed emerging in July and August.

Prior to 1995, only four populations of the beetle were known to exist, one in eastern Oklahoma, one on a New England island, one near Valentine, Nebraska and one in Arkansas.

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A population of ABB was discovered in south central South Dakota in 1995. This population has been monitored annually and has remained stable in abundance and distribution. The population center is in southern Tripp County and extends into southwestern Gregory County and eastern Todd County with one additional find on the southeastern corner of Bennett County in 2007. A single ABB find is not indicative of an established population (Backlund, 2010). A population estimate completed in 2005 for 100 square miles of the distribution area revealed 442 beetles in June and 901 in August. It is estimated there are 800 square miles of occupied habitat in South Dakota and the actual population is large (Backlund, 2008). In August of 2008 additional surveys were conducted in Bennett County and no additional beetles were trapped. Based on surveys from 1995-present it is believed that population estimates are conservative (Backlund, 2009). The general survey conducted in the known populated areas of Tripp and Gregory County during 2009 yielded expected results with nothing significant discovered (personal communication, Backlund, 2010). The population estimate on *N. americanus* in South Dakota exceeds the minimal population size required by the American Burying Beetle Recovery Plan (Raithel, 1991).

Decline of the ABB may be the result of an interplay of several complex factors that include: artificial lighting that decreases populations of nocturnally active insects, changing sources of carrion because of habitat alterations, isolation of preferred habitat because of land use changes, increased edge effect harboring more vertebrate competitors for carrion and the possibility of reduced reproduction because of some genetic characteristic of the species. (Nebraska Game and Parks Commission, 1995)

Assessment: To date, the American burying beetle has been found in Gregory, Todd and Tripp Counties and one location in Bennett County of South Dakota. Maps provided by Doug Backlund, SD Game Fish and Parks indicate the beetle has only been found in areas of those counties that are south of Highway 18.

Malathion and carbaryl are broad spectrum insecticides which can be expected to exhibit little, if any, selective toxicity against target or nontarget insects. One study, where applications of 12 and 16 ounce applications of malathion were conducted over a four year period, revealed immediate adverse effects on ladybird beetles, sycmnus beetles, hooded beetles and soft-winged flower beetles. Malathion is also registered for use against various crops.

Carbaryl is known to have adverse effects on ladybird beetles (USDA, 1987) and is registered for use against the Japanese beetle in rangeland (Union Carbide, 1987). Direct toxic effects from the use of carbaryl bait are not expected.

Diflubenzuron is also a treatment option for program activities. Diflubenzuron is a chitin inhibitor or growth regulator that has allows for negligible impact on the adult burying beetles as diflubenzuron only impacts immature life stages. In this case where the immature stages of ABB spend their life underground and emerge only as adults. The impacts from diflubenzuron would be minimal.

In all cases RAATs will be the preferred option except in crop protection programs were 100% coverage in the ¼ to ½ mile buffer is necessary to prevent the migration of grasshoppers from federal rangeland to the private agricultural ground.

Most developmental stages of the ABB beetle occur below ground. When the overwintering adults emerge in late May to early June they maintain a strong nocturnal behavior as they search out a mate and a food source for rearing their young. Once a suitable food source has been located the beetles bury the food and move underground tending their young and feeding until they emerge as adults in late July or early August. The nocturnal activity of beetles searching for carrion peaks three hours after sunset and concludes by sunrise (Bedick et al., 1999).

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The majority of grasshopper control programs that protect forage occur in late June to mid-July when adult beetles are not typically found above ground. When above ground and exposed to daylight they quickly bury themselves under plant litter and soil (Backlund, 2010). Their nocturnal activity and underground life stages will serve as a natural protection measure if areas inhabited by ABB are inadvertently treated by program insecticides during daylight hours.

However due to the potential effects of program treatments to beetle populations, the historical trapping of beetles in Bennett, Gregory, Tripp and Todd Counties, APHIS agrees not to conduct grasshopper control treatments in areas south of Highway 18 in Gregory and Tripp Counties. Furthermore APHIS agrees to a two mile buffer around known beetle finds in Todd and Bennett Counties. Program personnel will contact the local office of FWS five days prior to program activities for consultation. When the protection measures are implemented grasshopper program activities are not likely to adversely affect the American burying beetle populations.

7) Western prairie fringed orchid *(Platanthera praeclara)*

Status: The western prairie fringed orchid was proposed for listing October 11, 1988 and listed as threatened September 28, 1989. (54 FR 187:39857-39863).

Pertinent species information: This member of the family *Orchidaceae* exists in approximately four populations in eight states west of the Mississippi River and one Canadian Province. These states include Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma and South Dakota (FWS, 1988). FWS indicated the possible occurrence of the western prairie fringed orchid in Bennett, Brookings, Clay, Hutchinson, Lake, Lincoln, McCook, Miner, Minnehaha, Moody, Roberts, Shannon, Todd, Turner, Union and Yankton in South Dakota.

The fringed orchid is a perennial herb usually found in tall grass prairies, full sunlight and calcareous silt loam or sub irrigated sand. Flowering normally begins by late June to early July and pollination by night-flying hawkmoths is required for seed production. The fringed orchid shows an adaptation to prairie fires which includes regeneration from tuber rootstock. Critical habitat has not been designated at this time.

Assessment: In response to APHIS' request for species for the 1989 Rangeland Grasshopper Program, FWS indicates that potential habitat for the plant may occur in Bennett, Shannon and Todd Counties, South Dakota of this EA's coverage area. Suitable habitat for the

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per FWS, still exists in these and other South Dakota counties despite the fact no specimens have been found in recent years.

There could be a potential effect on the pollination of this orchid through a reduction in hawkmoths resulting from the use of program pesticides. Ten hawk moths that have been identified as being potential pollinators of *P. praeclara* based on eye width and proboscis (Phillips 2003). Only four occur in South Dakota. Of the four occurring in South Dakota only one has been confirmed to be a *P. praeclara* pollen vector. *Eumorpha achemon* is a confirmed pollinator but is only documented to occur in one county within the coverage area of this EA, Fall River County, South Dakota. (Cuthrell,1994 and G. Fauske, personal communication 1993). *E.achemon* caterpillar hosts include grape (*Vitis spp.)* and *Ampelopsis spp*. (Opler et al., Butterflies and Moths of North America, 2010) These species, should they be found within the control area would be localized to drainages and higher moisture environments, such as draws, intermittent streams or drainages. Because of their proximity to water those areas would be included in an untreated buffer area that would protect the larval stages of this moth from non target impacts.

Diflubenzuron is our preferred product choice. Diflubenzuron does not impact adult Lepidoptera spp. When this product is applied at labeled rates for grasshopper control, the rate is substantially lower than labeled rates for control of Lepidopteran pests.
APHIS would contact the local office of FWS five days prior to conducting treatments in the above listed counties to determine specific habitat locations. No chemical spray applications of pesticides would be made within three miles of known occupied orchid habitat. Within the three mile buffer, only carbaryl bran bait would be used.

These measures confirm with the FWS' Biological Opinion for the 1989 APHIS Rangeland Grasshopper Program and there should be no effect to the prairie fringed orchid from APHIS activities based on the protective measures described.

8) Dakota Skipper, (*Hesperia dacotae)*

Status: The Dakota Skipper was proposed for listing as threatened on October 24, 2013 and listed as threatened on November 24, 2014. (USDOI, FWS, 2014).

Pertinent Species Information: Dakota skipper is a small to medium-sized butterfly with a wingspan of 0.9 - 1.3 inches and hooked antennae. It has a thick body and a faster, more powerful flight than most butterflies. The upper side of the male's wings range from tawny-orange to brown with a prominent mark on the forewing; the lower surface is dusty yellow-orange. The upper side of the female's wing is darker brown with tawny-orange spots and a few white spots on the forewing margin; the lower side is gray-brown with a faint white spot band across the middle. Like other Hesperiidae species, Dakota skippers have a faster and more powerful flight than most butterflies because of a thick, well-muscled thorax.

The annual, single generation of adult Dakota skippers emerges from mid-June to early July, depending on the weather, with flights starting earlier farther west in the range. Males emerge as adults about five days earlier than females. The flight period in a locality lasts two to four weeks and mating occurs throughout this period. Dakota skippers lay approximately 250 eggs on broadleaf plants and grasses although larvae feed only grasses. Females lay eggs daily in diminishing numbers as they age. Dakota skipper eggs hatch after incubating for 7–20 days; therefore, hatching is likely completed before the end of July. Dakota skippers overwinter as larvae. Potential adult life span at three weeks and average life span (or residence on site before death or emigration) at

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three to 10 days on one Minnesota prairie. Dakota skipper are not known to disperse widely; the dispersal of Dakota skipper is very limited due in part to its short adult life span and single annual flight.

Soil types typical of Dakota skipper sites were described as sandy loams, loamy sand, or loams. Additional soil features, such as soil moisture, compaction, surface temperature, pH, and humidity, may be contributing factors in larval survival and, thus, important limiting factors for Dakota skipper populations.

Dakota skippers are obligate residents of remnant (untilled) high-quality prairie—habitats that are dominated by native grasses and that contain a high diversity of native forbs (flowering herbaceous plants). Dakota skipper habitat has been categorized into two main types: Type A habitat is described as high-quality, low (wet-mesic) prairie with little topographic relief that occurs on near-shore glacial lake deposits, dominated by little bluestem grass (*Schizachyrium scoparium*), with the likely presence of wood lily (*Lilium philadelphicum*), bluebell bellflower (*Campanula rotundifolia*), and mountain deathcamas (smooth camas; *Zigadenus elegans*). Type B habitat is described as rolling native-prairie terrain over gravelly glacial moraine deposits and is dominated by bluestems and needlegrasses (*e.g., Hesperostipa spartea*) with the likely presence of bluebell bellflower, wood lily, purple coneflower (*Echinacea angustifolia*), upright prairie coneflower (*Ratibida columnifera*), and common gaillardia (*Gaillardia aristata*). Therefore, based on the information above, we identify high-quality Type A or Type B native remnant (untilled) prairie, as described above, containing a mosaic of native grasses and flowering forbs and sparse shrub and tree cover to be a physical or biological feature essential to the conservation of the Dakota skipper.

Assessment: The Dakota skipper is listed as threatened based on habitat loss and degradation of native prairies and prairie fens, resulting from conversion to agriculture or other development; ecological succession and encroachment of invasive species and woody vegetation primarily due to lack of management; past and present fire, haying, or grazing management that degrades or eliminates native prairie grasses and flowering forbs; flooding; and groundwater depletion, alteration, and contamination. Other natural or manmade factors, including loss of genetic diversity, small size and isolation of sites, indiscriminate use of herbicides such that it reduces or eliminates nectar sources, climate conditions such as drought, and other unknown stressors. Finally existing regulatory mechanisms are inadequate to mitigate this species.

This EA coverage area includes the counties of western South Dakota and the four southern counties that border the eastern shores of the Missouri River. Grasshopper control rarely occurs east of the Missouri river due to the percentage of cropland and lack of rangeland habitat. Dakota Skipper critical habitat was designated in October of 2015 in the far eastern counties of Brookings, Day, Deuel, Grant, Marshall, and Roberts of South Dakota. APHIS does not conduct grasshopper control in these counties that are outside the coverage area of this EA. Based on the location of critical habitat in regards to grasshopper control areas identified in this EA it is determined that program activities will have no effect on the Dakota skipper

9) Poweshiek Skipperling (*Oarisma poweshiek*)

Status: The Poweshiek skipperling was proposed for listing as endangered in October 24, 2013 and was listed as endangered on November 24, 2014. (USDOI, FWS, 2014).

Pertinent Species Information: Poweshiek skipperlings are small and slender-bodied, with a wingspan generally ranging from 0.9 to 1.2 in. It is dark brown above with some light orange along the wing margins and a lighter orange head. The underside of the wings, which can be seen when it's at rest, are dark to light brown with very prominent white veins that may make the wing look striped

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Poweshiek skipperling larvae hibernate over winter on the ground; they emerge in spring and early summer to continue developing until they pupate and emerge as adult butterflies. Adults have a short lifespan of only one to two weeks and can be seen between mid-June and mid-July. During that time they mate and lay eggs. Larvae hatch during late summer; they feed and develop through early fall and then overwinter to continue development the following spring.

Adult butterflies feed on nectar from prairie flowers such as purple coneflower (*Echinacea angustifolia*), blackeyed susan (*Rudbeckia hirta*), and palespike lobelia (*Lobelia spicata*). They select native, finestemmed grasses and sedges such as little bluestem (*Schizachyrium scoparium*) and slender spike rush (*Eleocharis elliptica*).

Poweshiek skipperlings live in tallgrass prairie in both high, dry areas as well as low, moist areas. Poweshiek skipperlings are also not known to disperse widely; the species, however, will not likely disperse across habitat that is not structurally similar to native prairies, such as certain types of row crops or anywhere not dominated by grasses

Assessment: The Poweshiek skipperling is listed as endangered based on habitat loss and degradation of native prairies and prairie fens, resulting from conversion to agriculture or other development; ecological succession and encroachment of invasive species and woody vegetation primarily due to lack of management; past and present fire, haying, or grazing management that degrades or eliminates native prairie grasses and flowering forbs; flooding; and groundwater depletion, alteration, and contamination. Other natural or manmade factors, including loss of genetic diversity, small size and isolation of sites, indiscriminate use of herbicides such that it reduces or eliminates nectar sources, climate conditions such as drought, and other unknown stressors. Finally existing regulatory mechanisms are inadequate to mitigate this species.

This EA coverage area includes the counties of western South Dakota and the four southern counties that border the eastern shores of the Missouri River. Grasshopper control rarely occurs east of the Missouri river due to the percentage of cropland and lack of rangeland habitat. Dakota Skipper critical habitat was designated in October of 2015 in the far eastern counties of Brookings, Day, Deuel, Grant, Marshall, and Roberts of South Dakota. APHIS does not conduct grasshopper control in these counties that are outside the coverage area of this EA. Based on the location of critical habitat in regards to grasshopper control areas identified in this EA it is determined that program activities will have no effect on the Poweshiek skipperling.

10) Rufa Red Knot *(Calidris canutus rufa)*

Status: The rufa red knot was listed as threatened on December 11, 2014. (USDOI, FWS, 2014).

Pertinent Species Information: (From USDOI, FWS 2014) The rufa red knot is a medium-sized shorebird about 9 to 11 inches (in) (23 to 28 centimeters (cm)) in length.

The red knot migrates long distances annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the Southeast United States, the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South America. During both the spring and fall migrations, red knots use key staging and stopover areas to rest and feed.

Wintering areas for the red knot include the Atlantic coasts of Argentina and Chile, the north coast of Brazil, the Northwest Gulf of Mexico from the Mexican State of Tamaulipas through Texas to Louisiana, and the Southeast United States from Florida to North Carolina. This species that winter exclusively in coastal habitats

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are more likely than interior wintering birds to make long flights to specific regions of North America during spring migration. Red Knots overfly the central plains as they proceed northward. During migration, Red Knots occur in large numbers along the shores of large lakes of Saskatchewan but are rare elsewhere in the interior.

Habitats used by red knots in migration and wintering areas are similar in character, generally coastal marine and estuarine (partially enclosed tidal area where fresh and salt water mixes) habitats with large areas of exposed intertidal sediments. In North America, red knots are commonly found along sandy, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments and lagoons, and peat banks. In many wintering and stopover areas, quality high-tide roosting habitat (i.e., close to feeding areas, protected from predators, with sufficient space during the highest tides, free from excessive human disturbance) is limited. The supra-tidal (above the high tide) sandy habitats of inlets provide important areas for roosting, especially at higher tides when intertidal habitats are inundated.

The primary prey of the rufa red knot in non-breeding habitats include blue mussel (*Mytilus edulis*) spat (juveniles); *Donax* and *Darina* clams; snails (*Littorina* spp.), and other mollusks, with polycheate worms, insect larvae, and crustaceans also eaten in some locations. A prominent departure from typical prey items occurs each spring when red knots feed on the eggs of horseshoe crabs, particularly during the key migration stopover within the Delaware Bay of New Jersey and Delaware. Delaware Bay serves as the principal spring migration staging area for the red knot because of the availability of horseshoe crab eggs.

Assessment: A primary threat to the red knot is destruction and modification of its habitat and forage, particularly the decline of key food resources resulting from reductions in horseshoe crabs. Competition with other species for limited food resources, coastal wind turbine farms, and climate change are also threats.

Based on the biology of the species, specifically its migration patterns, prey diet and habitat requirements there is a low probability that a rufa red knot would be found in South Dakota or in program areas. In addition because diflubenzuron, our preferred treatment choice, 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. Subsequently this leads to a no effect determination for the rufa red knot.

11) Northern long-eared bat, (*Myotis septentrionalis)*

Status: The northern long-eared bat was listed as threatened effective on February 16, 2016 with the publication of the final rule (USDOI, FWS, 2016).

Pertinent Species Information: A medium-sized bat species, the northern long-eared bat adult body weight averages five to eight grams (0.2 to 0.3 ounces), with females tending to be slightly larger than males (Caceres and Pybus, 1997). Average body length ranges from 77 to 95 millimeters (mm) (3.0 to 3.7 inches (in)), tail length between 35 and 42 mm (1.3 to 1.6 in), forearm length between 34 and 38 mm (1.3 to 1.5 in), and wingspread between 228 and 258 mm (8.9 to 10.2 in) (Caceres and Barclay, 2000; Barbour and Davis, 1969). Pelage colors include medium to dark brown on its back, dark brown, but not black, ears and wing membranes, and tawny to pale-brown fur on the ventral side (Nagorsen and Brigham, 1993; Whitaker and Mumford, 2009). As indicated by its common name, the northern long-eared bat is distinguished from other *Myotis* species by its long ears (average 0.7 in).

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The northern long-eared bat ranges reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to the Florida panhandle (Whitaker and Hamilton, 1998; Caceres and Barclay, 2000; Amelon and Burhans, 2006).

However, throughout the majority of the species' range it is patchily distributed, and historically was less common in the southern and western portions of the range than in the northern portion of the range (Amelon and Burhans, 2006).

In the Midwest, the northern long-eared bat is commonly encountered in summer mist-net surveys throughout the majority of the Midwest and is considered fairly common throughout much of the region.

Northern long-eared bats predominantly overwinter in hibernacula that include caves and abandoned mines. Hibernacula used by northern long-eared bats are typically large, with large passages and entrances (Raesly and Gates, 1987), relatively constant, cooler temperatures (0 to 9 °C (32 to 48 °F) (Raesly and Gates, 1987; Caceres and Pybus, 1997; Brack, 2007), and with high humidity and no air currents (Fitch and Shump, 1979; Van Zyll de Jong, 1985; Raesly and Gates, 1987; Caceres and Pybus, 1997). This habitat is present in the Black Hills region of South Dakota.

During the summer, northern long-eared bats typically roost singly or in colonies underneath bark or in cavities or crevices of both live trees and snags. Males and non-reproductive females' summer roost sites may also include cooler locations, including caves and mines (Barbour and Davis, 1969; Amelon and Burhans, 2006). Northern long-eared bats have also been observed roosting in colonies in human made structures, such as buildings, barns, a park pavilion, sheds, cabins, under eaves of buildings, behind window shutters, and in bat houses (Mumford and Cope, 1964; Barbour and Davis, 1969; Cope and Humphrey, 1972; Amelon and Burhans, 2006; Whitaker and Mumford, 2009; Timpone et al., 2010; Joe Kath, 2013, pers. comm.).

The northern long-eared bat appears to be somewhat opportunistic in tree roost selection, selecting varying roost tree species and types of roosts throughout its range, including tree species such as black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), silver maple (*Acer saccharinum*), black locust (*Robinia pseudoacacia*), American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), sourwood (*Oxydendrum arboreum*), and shortleaf pine (*Pinus echinata*) (e.g., Mumford and Cope, 1964; Clark et al., 1987; Sasse and Perkins, 1996; Foster and Kurta, 1999; Lacki and Schwierjohann, 2001; Owen et al., 2002; Carter and Feldhamer, 2005; Perry and Thill, 2007; Timpone et al., 2010). Northern long-eared bats most likely are not dependent on a certain species of trees for roosts throughout their range; rather, certain tree species will form suitable cavities or retain bark and the bats will use them opportunistically (Foster and Kurta, 1999). Carter and Felhamer (2005) speculated that structural complexity of habitat or available roosting resources are more important factors than the actual tree species. Many studies have documented the northern long-eared bat's selection of live trees and snags, with a range of 10 to 53 percent selection of live roosts found (Sasse and Perkins, 1996; Foster and Kurta, 1999; Lacki and Schwierjohann, 2001; Menzel et al., 2002; Carter and Feldhamer, 2005; Perry and Thill, 2007; Timpone et al., 2010).

In tree roosts, northern long-eared bats are typically found beneath loose bark or within cavities and have been found to use both exfoliating bark and crevices to a similar degree for summer roosting habitat (Foster and Kurta 1999; Lacki and Schwierjohann, 2001; Menzel et al., 2002; Owen et al., 2002; Perry and Thill, 2007; Timpone et al., 2010).

Females tend to roost in more open areas than males, likely due to the increased solar radiation, which aids pup development (Perry and Thill, 2007). Fewer trees surrounding maternity roosts may also benefit juvenile bats that are starting to learn to fly (Perry and Thill, 2007)

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Northern long-eared bats hibernate during the winter months to conserve energy from increased thermoregulatory demands and reduced food resources. In general, northern long-eared bats arrive at hibernacula in August or September, enter hibernation in October and November, and leave the hibernacula in March or April (Caire et al., 1979; Whitaker and Hamilton, 1998; Amelon and Burhans, 2006). However, hibernation may begin as early as August (Whitaker and Rissler, 1992).

While the northern long-eared bat is not considered a long-distance migratory species, short migratory movements between summer roost and winter hibernacula between 35 miles 55 miles have been documented (Nagorsen and Brigham,1993; Griffin, 1945).

Northern long-eared bats switch summer roosts often (Sasse and Perkins, 1996), typically every two to three days (Foster and Kurta, 1999; Owen et al., 2002; Carter and Feldhamer, 2005; Timpone et al., 2010). Bats switch roosts for a variety of reasons, including, temperature, precipitation, predation, parasitism, and ephemeral roost sites (Carter and Feldhamer, 2005).

Breeding begins in late summer or early fall when males begin swarming near hibernacula. After copulation, females store sperm during hibernation until spring, when they emerge from their hibernacula, ovulate, and the stored sperm fertilizes an egg. This strategy is called delayed fertilization. After fertilization, pregnant females migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies, with young, generally have 30 to 60 bats, although larger maternity colonies have been observed. Most females within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth.

Most mortality for northern long-eared and many other species of bats occurs during the juvenile stage (Caceres and Pybus, 1997). Adult northern long-eared bats can live up to 19 years.

The northern long-eared bat has a diverse diet including moths, flies, leafhoppers, caddisflies, and beetles (Nagorsen and Brigham, 1993; Brack and Whitaker, 2001; Griffith and Gates, 1985), with diet composition differing geographically and seasonally. The most common insects found in the diets of northern long-eared bats are lepidopterans (moths) and coleopterans (beetles) (Feldhamer et al., 2009; (Brack and Whitaker, 2001)) with arachnids (spiders) also being a common prey item (Feldhamer et al., 2009).

Foraging techniques include catching insects in flight and gleaning in conjunction with passive acoustic cues (Nagorsen and Brigham, 1993; Ratcliffe and Dawson, 2003). Observations of northern long-eared bats foraging on arachnids (Feldhamer et al., 2009), presence of green plant material in their feces (Griffith and Gates, 1985), and non-flying prey in their stomach contents (Brack and Whitaker, 2001) suggest considerable gleaning behavior. Northern long-eared bats have the highest frequency call of any bat species in the Great Lakes area (Kurta, 1995). Gleaning allows this species to gain a foraging advantage for preying upon moths because moths are less able to detect these high frequency echolocation calls (Faure et al., 1993). Emerging at dusk, most hunting occurs above the understory, 3 to 10 feet 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).

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No other threat is as severe and immediate to the northern long-eared bat's persistence as the fungal disease, white-nose syndrome (WNS). This disease was first observed in New York in 2006 and has spread quickly from there. Throughout the Northeast, the northern long-eared bat has disappeared completely from many hibernation sites. Experts agree where it spreads, WNS will have the same impact on the northern long-eared bat as seen in the Northeast and populations will decline.

Some habitat has been lost, degraded, or fragmented, primarily through the disturbance of hibernacula and land development. Mortality caused by wind turbines is expected to increase.

Assessment: During our summer program months, northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines. These areas are primarily found in the Black Hills of South Dakota. Because of the minimal rangeland component associated with the Black Hills, program activities in this area are unlikely and have not occurred to date.

The Northern long eared bat has been also been recorded in northwest South Dakota as well as along the Missouri River. All program activities require a .25 mile buffer along the Missouri River. Again, program activities in these areas are unlikely to do the increase in cropland and reduction of rangeland.

Diflubenzuron is always our preferred choice. Because it 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.

Program personnel will contact the local office of FWS five days prior to program activities for consultation. Based on information presented it appears that the probability is extremely low that the northern long eared bats would be encountered in areas potentially affected by the rangeland grasshopper program But even in areas in which the grasshopper program and the bat's reported distribution overlap, the species reported reliance on intact interior forests and harborages such as cave or mines describes a habitat that is not present in the rangeland portions of the grasshopper survey area in which suppression might actually be conducted. When the protection measures are implemented grasshopper program activities are not likely to adversely affect or jeopardize the northern long eared bat.

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Appendix 5: APHIS response to public comments on South Dakota's draft EA (EA Number: SD-20-1).

USDA APHIS received two public responses to the publication of the Draft Environmental Assessments (EAs) (EA Number: SD-10-01). Public comments were received from the Xerces Society and from the Center for Biological Diversity Center. Comments similar in nature were grouped under one response. Comments that were editorial in nature or requested additional citations are not addressed in the appendix but were incorporated into the final EAs, where appropriate. The Grasshopper Program has decided not to use chlorantraniliprole in South Dakota during 2020. All references to this chemical was removed from the final EAs. Any exposure scenarios that could result from use of this insecticide which the commenters are concerned about are not relevant to the remaining risk analysis.

Comment 1
USDA APHIS received one comment about the EA providing little in the way of solid information about where, how, and when the treatments may actually occur within the counties covered under the EAs, during the year 2020, which makes it impossible to determine if effects would actually be significant or not.

APHIS described the purpose and need for grasshopper suppression treatments, potential treatment options, the affected environment within the state, and an analysis of the potential environmental consequences in the Draft EA that were made available for public comment. These documents become programmatic because APHIS cannot precisely predict where an outbreak will occur each year; we only know that outbreaks will occur, and treatments in a timely manner will be absolutely necessary. The grasshopper program strives to alert the public in a timely manner it its more concrete treatment plans and avoid or minimize harm to the environment in implanting those plans.

During February of 2020, APHIS prepared a Draft EA tiered to the current EIS for the counties in South Dakota where grasshopper suppression treatment could occur. The Draft EA analyzed aspects of environmental quality that could be affected by treatments in the area where grasshopper outbreaks may be anticipated. On March , 2020 APHIS published a notice information the public the draft EA was available for a 30 day comment period. When the program receives a treatment request and determines that the treatment is necessary, the specific site within the state will be evaluated to determine if environmental factors were thoroughly evaluated in the Draft EA. Since all environmental issues were accounted for in the Draft EA, the program will prepare a final EA and finding of no significant impact (FONSI). Once the FONSI has been finalized, copies of those documents will be sent to any parties that submitted comments on the Draft EA, and to other appropriate stakeholders. To allow the program to response to comments in a timely manner, the Final EA and FONSI will be posted to the APHIS website. The program will also publish a notice of availability in the same manner used to advertise the availability of the Draft EA. APHIS has received a treatment request, APHIS examined the environmental issues in the treatment area, and APHIS has finalized the EA and written a FONSI. All these steps are part of the procedure to finish NEPA for treatments during this Final EA period.

Comment 2
USDA APHIS received one comment concerning the lack of transparency about the location of actual treatment areas, particularly on public lands, being a disservice to the public that prevents the public from reviewing sufficient information to be able to gauge justification for and the risks involved in the suppression effort.

APHIS did not withhold the location of actual treatment areas while preparing the Draft EA, but rather those facts were not known at that time because economically damaging grasshopper populations had not become

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apparent. See previous comment concerning the prevention of the commenter's ability to gauge the justification and risks of treatments within the proposed action areas.

Comment 3
APHIS received one comment urging APHIS to provide the public with maps of specific treatment areas and proposed treatment strategies (including proposed date of application and chemical and rate to be used), immediately after approving any treatment and at least 14 days prior to implementation of any treatment. This comment suggested that this specific information be posted at the APHIS website as soon as it is available, sent to interested parties, and made available for public comment.

In most circumstances, APHIS is not able to accurately predict specific treatment areas and treatment strategies months or even weeks before grasshopper populations reach economic infestation levels. The need for rapid and effective response when an outbreak occurs limits the options available to APHIS to inform the public other than those stakeholders who could be directly affected by the actual application. APHIS typically does not have 14 days between planning a treatment and the actual application because of the rapid population growth and potential damage of grasshopper infestations.

Comment 4
APHIS received one comment that mentioned "APHIS' procedure to approve or disapprove treatments based on a cost-benefit analysis performed using the "Hopper" model. "What values will APHIS rely default to if the data that the model relies on are not available?"

The "Hopper" program is an older model, and South Dakota never found it useful in predicting economic loss from orthopteran infestation depredation.

In South Dakota, site specific data is used to determine the need for and type of treatments. It is gathered at the time of actual surveys and cannot be included in the Draft EAs. The data include: grasshopper and/or Mormon cricket densities, species complex, dominant species, dominant life stage, terrain, soil types, range conditions, local weather patterns (wind, temp., precipitation), slope and aspect for hatching beds, grazing status and number of livestock grazing the site/allotment and forage damage estimates. These are all factors taken into consideration during the survey season.

Comment 5
APHIS received one comment concerning how analysis of projected economic injury levels and ultimately, treatment decisions, might be determined in the absence of site-specific data (specifically rangeland productivity and composition, precipitation and soil moisture, accessibility and cost of alternative forage, effectiveness of treatment, cost of treatment, timing of treatment, and grasshopper population density, life stage, and species composition).

See comment 4 above. In South Dakota, general site specific data, which is used to determine treatments in real time and gathered at time of actual surveys are used to make treatment decisions. This decision making process is a cooperative effort between the requesting land owners and land managers and APHIS.

Comment 6
APHIS received one comment related to disclosing its analysis for each of the seven variables mentioned in comment 5.

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The site specific data that is used to determine treatments in real-time is gathered at the time of actual surveys. This data is not available at the time that the environmental assessments are prepared. See comment 4 for an example of general site specific data used to determine treatments.

Please be aware that as per conversations with BIA may preclude disclosure of Tribal information to the public or outside of APHIS without the consent of BIA or the Tribes. Individuals may request information on the specific treatment areas on Tribal Lands from the individual Tribal Nations or the Bureau of Indian Affairs.

Comment 7
APHIS received one comment about providing the public with a more precise definition of when the threshold for spraying has been met**.**

Economic thresholds are variable based on the value of protected resources and management objectives. Baseline thresholds for Mormon crickets are 2 per sq. yd. and grasshoppers are 8 per sq. yd., though neither of those thresholds guarantees justification for treatment alone. All of the site-specific data mentioned in comment 4 above are also considered for South Dakota.

Comment 8
APHIS received one comment urging APHIS to delay the publication of EA and FONSI until after treatment requests are received and all treatment areas have been delineated and are identified to the public.

See Response to Comment 1. Delaying the publication of the Final EA and FONSI until after the publication of the site specific maps would make responding to requests from land owners and land managers unreasonable. Cooperating agency's need a reasonable amount of time before or at the start of the field season to tier their NEPA documents to APHIS. The time between publication of the FONSI and treatments is further shortened because specific treatment decisions are made during the nymphal survey which, due to grasshopper biology, and need to be timely in order to use APHIS' preferred chemical and most ecologically sound treatment strategies.

Comment 9
APHIS received one comment regarding the EA's list three insecticide options (diflubenzuron, carbaryl, and malathion), and states that the choice of which to use will be site-specific, without being clear about how that choice of insecticide is made.

Letters of Request in previous years from land managers may be specific to use a particular insecticide and not treat during specific times of the day or on weekends and may include special sites to be buffered out of the treatment. These requests are adhered to in South Dakota. The letters of request come from the individual land managers. The decision to use diflubenzuron is determined by the life stage of the dominant species within the outbreak population. In the case of early instars, diflubenzuron, the preferred insecticide, can produce 90 to 97% mortality. If the window for the use of diflubenzuron closes, as a result of treatment delays, then the only other option would be the use of carbaryl 2% or 5% bait. There are certain species which are susceptible to carbaryl bait. If the species complex present in the outbreak is not susceptible to bait and the diflubenzuron window is closed, then no treatments will occur. This is discussed with the requesting land managers.

Comment 10
APHIS received one comment concerning BeeREX calculating the expected environmental concentration (EEC) of diflubenzuron in pollen and nectar from foliar overspray as 1.76 mg/kg, which is equivalent to 1760 ppb.

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Nectar and pollen values in BeeREX are based on residues that would be expected to occur from direct pesticide applications to long grass which is a food source EPA estimates in its T-REX model. These assumptions may overestimate expected residues of diflubenzuron in pollen and nectar. Available data for diflubenzuron pollen residues in crops show a low frequency of occurrence and low concentrations. The concentration in pollen will depend on application rates and when applications are made relative to flower bloom. Program applications of diflubenzuron are at the lower end of labeled use rates for Dimilin due to the sensitivity of Orthoptera. In addition, the Program uses rates less than the current labeled rates for grasshoppers and other labeled crops and makes only one application.

Comment 11

APHIS received one comment regarding chitin synthesis and its importance in the early life stages of insects, as they molt and form a new exoskeleton in various growth stages. The specific concern was that aquatic guideline tests, (or terrestrial invertebrate acute tests), which typically run for 48 hours, may not capture a molting stage, and thus underrepresent acute toxicity. Single doses may cause mortality, if received at a vulnerable time, and consequently, conclusions from RQs based on acute toxicity studies for invertebrates may not fully represent actual risk.

APHIS agrees that chitin synthesis is a critical function for terrestrial and aquatic invertebrates. APHIS in its risk assessments prepared for each Program insecticide summarized available acute and chronic toxicity data. This would include studies of short duration such as 48 to 96 hours as well as much longer term studies that would evaluate continuous exposures during critical life stages and development.

Comment 12

APHIS received the following comment, "For honey bees (the surrogate species for risk assessment in the absence of other data), USEPA (2018) reported a chronic 21-day ED50 and NOAEL of 0.012 and <0.0064 µg a.i./larva, respectively. Utilizing these values in BeeREX (EPA's model that calculates risk quotients for bees) and assuming an application rate of 0.016 lb. a.i./ac, BeeREX calculates an acute dietary risk quotient of 18.13 and a chronic dietary risk quotient of 33.99. (A threshold value is 1.0). Risk quotients this high above 1.0 indicate a high concern for exposed bees."

BeeREX is a tier one screening level model used by EPA to assess potential risk to pollinators. Estimates of risk quotients are used to determine if there is a presumption of risk that requires additional evaluation. APHIS also relies on available field data to further characterize the risks of Program insecticides to terrestrial and aquatic invertebrates, where available. A limitation of BeeREX is it does not account for pesticide degradation that would normally occur in Program treatments.

Nectar and pollen values in BeeREX are based on residues that would be expected to occur from direct pesticide applications to long grass which is a food source EPA estimates in its T-REX model. These assumptions may overestimate expected residues of diflubenzuron in pollen and nectar. Available data for diflubenzuron pollen residues in crops with higher use rates show a low frequency of occurrence and low concentrations. The concentration in pollen will depend on application rates and when applications are made relative to flower blooming. Diflubenzuron Program applications are at the lower end of labeled use rates for Dimilin due to the sensitivity of Orthoptera. In addition, the Program uses rates less than the current labeled rates and makes one application.

Comment 13

APHIS received one comment, "EIS discloses that under some circumstances, Dimilin may be quite persistent; field dissipation studies in California citrus and Oregon apple orchards reported half-live values of 68.2 to 78

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days. Rangeland persistence is unfortunately not available, but diflubenzuron applied to plants remains adsorbed to leaf surfaces for several weeks."

Diflubenzuron persistence varies depending on site conditions. Diflubenzuron degradation is microbially mediated with soil aerobic half-lives much less than dissipation half-lives. While dissipation half-lives may extend up to 78 days, they have also been shown to be much less under other use patterns.

Comment 14
APHIS received the following comment, "APHIS discounted the pollinator risk by claiming that studies finding significant effects to pollinators utilized doses far above levels that would be used in grasshopper control. Unfortunately, this does not appear to be true for all studies cited. Mommaerts et al. (2006) conducted dose-response assays and found that exposure to diflubenzuron resulted in reproductive effects in *Bombus terrestris*, with only the doses at 0.001 of maximum field recommended concentrations (MFRC) in pollen and 0.0001 in sugar water resulting in effects statistically similar to controls. The MFRC for diflubenzuron is listed in the study as 288 mg/L (equivalent to 288,000 ppb). At 1/10,000 of this level, diflubenzuron effects would be similar to controls only at levels at or below 28.8 ppb while at 1/1000 of this level, diflubenzuron "no effect" concentrations would be equivalent to 288 ppb. This analysis thus shows the opposite of what APHIS claims – that the effective dose for reproductive effects is actually far below the EEC expected for diflubenzuron at RAATS rates used in grasshopper suppression. This raises concern that the application of diflubenzuron at the specified RAATS rates may cause severe impacts to bee reproduction within treated areas."

APHIS relied on available laboratory and field collected data for each Program insecticide to summarize risks to terrestrial invertebrates. In evaluating studies, APHIS also evaluated likely routes of exposure for Program treatments. Estimates of exposure using the EPA tier one screening model likely overestimate potential residues in pollen and nectar.

Comment 15
APHIS received six comments about chlorantraniliprole.

Chlorantraniliprole is not proposed for use in South Dakota in 2020. Appendix 2: APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program FY-2020 Treatment Guidelines are updated for the national grasshopper program for all 17 western states. The final EA has been updated to reflect the changes in the program.

Comment 16
APHIS received one comment concerning malathion being found to cause jeopardy in 1,284 endangered species according to recent nationwide Biological Opinions

APHIS recognizes that EPA and the Services are continuing to develop updated national level consultations. APHIS currently consults with the Services at the State level for the Grasshopper program to ensure program activities <u>do not adversely affect</u> protected species or their critical habitat.

See response to comment 9 for use of Malathion in South Dakota.

Comment 17
APHIS received one comment regarding the EPA determined that carbaryl is likely to adversely affect 1,542 species.

The Endangered Species Act section 7 pesticide consultation process between the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services, collectively) and the EPA specifically concerns FIFRA

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pesticide registration and reregistration in the United States, including all registered uses of a pesticide. The state-level Biological Assessments for APHIS invasive species programs are separate from any consultations conducted in association with pesticide registration and reregistration process. The Agricultural Improvement Act of 2018 (Farm Bill) created a partnership between USDA, EPA, the Services, and the Council on Environmental Quality to improve the consultation process for pesticide registration and reregistration. USDA is committed to working to ensure consultations are conducted in a timely, transparent manner and based on the best available science. The Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides provides a directionally improved path to ensuring that pesticides can continue to be used safely for agricultural production with minimal impacts to threatened and endangered species.

APHIS provided information about use of carbaryl to EPA for the FIFRA consultation for carbaryl. The Grasshopper Program use of carbaryl has in the past comprised substantially less than 1% of the percent crop treated (PCT) for rangeland use of carbaryl. This is the case for the reasonably foreseeable future. For rangeland, in the EPA BE, the Grasshopper Program's very low usage was rounded up to <1% PCT, which gives an overestimate of rangeland acres treated and thus endangered species risk. APHIS use of carbaryl is even smaller compared to all uses of carbaryl nationwide. Further, the Grasshopper Program consults directly with the Services to ensure program activities do not adversely affect protected species or their critical habitat.

Comment 18
APHIS received the following comment: The jeopardy and LAA calls for malathion and carbaryl should be included in the EAs and should preclude the use of these chemicals.

APHIS consults directly with the U.S. Fish and Wildlife Service on treatments and methods. The U.S. Environmental Protection Agency's consultation on pesticide registration across all nationwide uses of program pesticides does not provide sufficiently detailed analysis or conclusions relevant to the Grasshopper Program consultations to comply with the Endangered Species Act.

Comment 19
APHIS received one comment that it should take into account the risk to native bees and butterflies from these treatments, especially those designated species of greatest conservation need. APHIS should constrain its treatments to take into account pollinator conservation needs, and improve its monitoring capability to try to understand what non-target effects actually occur as a result of the different treatments.

APHIS reduces the risk to native bees and pollinators through monitoring grasshopper and Mormon cricket populations and making pesticide applications in a manner that reduces the risk to this group of non-target invertebrates. Monitoring grasshopper and Mormon cricket populations allows APHIS to determine if populations require treatment and to make treatments in a timely manner reducing pesticide use and emphasizing the use of Program insecticides that are not broad spectrum. Historical use of Program insecticides demonstrate that diflubenzuron is the preferred insecticide for use. Over 90% of the acreage treated by the Program has been with diflubenzuron. Diflubenzuron poses a reduced risk to native bees and pollinators compared to liquid carbaryl and malathion applications. In addition APHIS used RAATs to treat approximately 99% of the acres historically treated by the Program. APHIS also uses RAATs that are typically below the labeled RAAT rates further reducing the amount of insecticide used by the program. APHIS also emphasizes the use of carbaryl bait, where applicable, as a means to suppress pest populations while protecting native bees and pollinators. These methods of applications have been shown to be protective of non-target invertebrates. These studies are referenced and summarized in the EIS.

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Comment 20
APHIS received the following comment, This EA and the EIS claim that the use of untreated swaths will mitigate impacts to natural enemies, bees, and other wildlife. However, the width of the skipped swaths is not designated in advance in the EA, and there is no minimum width specified.

APHIS assumes that the reduced amount of pesticide that would occur using untreated swaths over a given treatment block will result in reduced risk to non-target organisms by reducing exposure. The swath width can vary based on site specific conditions, however, the end result is reduced pesticide exposure over a treatment area. The EIS cites studies that demonstrate that the use of RAATs result in higher non-target invertebrate populations compared to treatment blocks that did not use RAATs.

Comment 21
APHIS received two comments/recommendations about minimum swath widths, "Without knowing minimum (rather than maximum) swath widths that will be applied under this EA, it is hard to compare results from this study (Lockwood et al. 2000) to the results on non-targets expected under RAATS in this EA. 2). APHIS should commit to science-based methodologies to assess actual risk from the proposed treatments and institute minimum untreated swath widths wide enough to meaningfully minimize exposure to bees and other beneficials."

Typically, APHIS employs 50% skip swaths when using RAATs. Swath widths and skips are determined by the type of plane doing the aerial application, the smallest being 75 feet, but the minimum skip swath is typically 100 feet because larger planes are often contracted.

The commenter references the work of Lockwood et al. 2000, this study looked at RAAT's increasing swath widths in some instances by double skipping the untreated area. They also used ATV's in their study which only have a minimum effect swath width of 30 feet. Using modifications presently being done in Arizona with the UTV's ability to adjust the hopper height, using the same ATV spreader, the minimum effective swath width can be increased to 40 feet, thus also increasing the untreated swath to 40 feet. APHIS uses science based methodologies to assess treatment related benefits or risks. APHIS has for decades funded the Science and Technology Research Lab in Phoenix, Arizona, which is specific to Rangeland Grasshopper and Mormon Cricket Program research and development. It is the only one of its kind in the U.S. The S&T Lab in cooperation with ASU researchers have evaluated non-target invertebrate impacts in the past and have made recommendations to the Program side of APHIS.

Comment 22
APHIS received the following comment, "Although the EIS included a quantitative analysis of drift anticipated from ULV aerial applications to estimate deposition into aquatic areas, an analysis is not presented or available to back up the assumption that untreated areas (skipped swath widths) will act as refugee for natural enemies, bees, and other wildlife."

The EIS cites studies that demonstrate that the use of RAATs result in higher non-target invertebrate populations compared to treatment blocks that did not use RAATs.

Comment 23
APHIS received three comments about the drift analysis described in the EA, 1)"The drift analysis described in the EA assumed a droplet spectra size of fine to very fine (median diameter = 137.5 µm). However, labels do not require a minimum droplet size for ULV applications over rangeland, and other uses of ULV technology for pest control assume much smaller droplet sizes. EPA's (2018) Ecological Risk Assessment for diflubenzuron uses AgDrift to estimate the drift fraction from aerial LV applications, although it is unclear whether AgDrift is

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validated for the purposes of predicting deposition of insecticides applied using ULV technology. EPA assumed a volume mean diameter (VMD) of 90 µm [note that this is approximately 2/3 of the VMD used in the APHIS analysis]. Under EPA's analysis, the drift fraction comprises 19% at 150 ft.", 2) "APHIS should disclose its quantitative analysis and the percent drift it expects--by distance-- into untreated swaths for each application method it proposes", and 3) "APHIS must also specify in its operational procedures the use of nozzles that will result in droplet spectra that accord with its analysis".

The VMD used by APHIS for diflubenzuron is the preferred median diameter used by the Program. APHIS recognizes that the range of droplet sizes can vary under a ULV application.

Comment 24
APHIS received a comment that it is "unrealistic that APHIS can comply with mitigation measures designed to protect bees on pesticide labels "(e.g., bumble bees fly earlier and later in the day, diflubenzuron is toxic to developing forms, if plants are flowering, bees are active, etc.).

APHIS utilizes diflubenzuron at far lower levels than allowed by the label, thereby minimizing risks to non-targets, such as bees. There have been several studies on diflubenzuron effects on bees, such as Schroeder et al., 1980 and insect growth regulator effects reviewed in Tasei, 2001, which support the idea that the diflubenzuron levels APHIS uses for grasshoppers and Mormon crickets are a minimal risk to bees. APHIS also complies with any label requirements designed to minimize impacts to pollinators.

Comment 25
APHIS received the following comment, "Except for untreated swath widths, the EA is silent on how it will avoid impact to pollinators. It has already been shown that within sprayed areas, risk quotients at expected application rates would be well above 1.0. Leaving skipped widths is also not a full solution at expected widths since, due to drift, untreated swaths are highly likely to be exposed to levels above risk quotients".

More previously stated, APHIS utilizes diflubenzuron at far lower levels than allowed by the label, thereby minimizing risks to non-targets. Additionally, APHIS commonly incorporates untreated swaths into its treatment programs, which have consistently demonstrated reduced impacts on non-target arthropods (Lockwood et al., 1999, 2001; Norelius and Lockwood, 1999).

Comment 26
APHIS received one comment regarding that APHIS must not ignore requirements listed on pesticide labels, nor make assumptions about its compliance with these when RAATS measures that will actually be taken are vague and unspecified.

APHIS complies with all applicable Federal and State pesticide label language when making pesticide treatments.

Comment 27
APHIS received the following comment: "While flexibility with these may have been appropriate at the EIS stage, it is not appropriate at the EA stage. APHIS must fully disclose its RAATS plan for each treatment in the EA, including specifying application method, chemical to be used, rate, and width of untreated swaths."

RAATs are a dynamic treatment method based on size of the treatment area, species complex and density of target species. Specific details regarding RAATs cannot be determined until site-specific data is collected during the 2020 survey season and an appropriate chemical is identified. Once a treatment is determined necessary, application method, untreated swath widths, chemical choice and application rate are included in the bid for contracting.

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Comment 28
APHIS received one comment about to be consistent with the Pollinator-Friendly BMPs for Federal Lands (see Comment 7), APHIS must go beyond the general statements on the pesticide labels and specify more exactly how its spray plan will further reduce exposure and risk to bees.

See response to comments 24 and 25

Comment 29
APHIS received one comment, "According to the EAs, programmatic consultation with the US Fish and Wildlife Service on species listed under the Endangered Species Act was initiated in 2015, but is not yet complete. The backup is for NMFS to consult at the local level. The EAs state that APHIS has concluded No Effect or Not Likely to Adversely Affect for all of the federally listed species within the project area, but contains no information about the rationale for these calls, nor information about any mitigations or buffers to protected species."

In South Dakota, consultation with USFWS is completed as mandated by the Endangered Species Act (ESA). The EA includes a section that discusses APHIS compliance with the ESA and the Final EA includes the concurrence letter in Appendix 4.

Comment 30

APHIS received two comments concerning operationally, how will listed species' protected locations be identified for ground and aerial applicators? How will such locations, buffer widths listed in the protective measures, and any specific instructions (i.e. use of carbaryl bait only) for some species be mapped and communicated to applicators? For each species to be protected within the project area, APHIS must provide to applicators a set of clear set of directions, maps, and GPS coordinates that clearly show intent to implement protective measures for the listed and proposed species found within this project area.

In South Dakota, after request letters are received and potential treatment areas are delineated, cooperative decision making begins which involves many cooperators. If additional consultation from USFWS is needed it is conducted prior to finalizing maps and shapefiles.

See comment 32 and 34.

Comment 31
APHIS received one comment about pesticide specific conservation measures for each listed species, where appropriate, should be explicitly addressed and adopted.

Agreed upon mitigation measures address specific chemicals when conservation measures are warranted. These measures are agreed upon during the consultation process with the USFWS, incorporated into the treatment planning process and documents and are applied in the field during application.

Comment 32
APHIS received a comment that, "the letter included in Appendix 4 contains an apparent contradiction, stating that we do not treat cropland, but following this two paragraphs later with a potential treatment [on cropland] per a request received from a private landowner."

APHIS does not treat cropland. The submitter is misreading the provided information. The paragraph states that the grasshoppers were on federal rangeland migrating into cropland and a crop protection program was

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warranted. In a crop protection situation the cropland is not treated, the rangeland is treated to prevent migration of grasshoppers; hence protecting the crop.

Comment 33

APHIS received one comment that APHIS should adopt the following operational guideline across all site-specific EAs: "provide to applicators a set of clear set of directions, maps, and GPS coordinates that clearly show intent to implement protective measures for the listed and proposed species found within this project area."

In South Dakota, treatment boundaries, water bodies, sensitive sites, listed and proposed species habitat, etc., are initially identified by data from land managers and land owners. These are further confirmed during nymphal surveys and any additional sensitive sites are identified to the GIS specialist. Finalized maps are shared with applicators in the form of shapefiles. These shapefiles clearly show treatment boundaries, water buffers as per program guidelines, and other sensitive site exclusions to be treated from areas to be excluded from treatment. Communications with applicators are extensive before, during and after treatments. Applicators participate in daily briefings with APHIS personnel to review all sensitive sites. During treatments, APHIS personnel conduct environmental monitoring in excluded areas. Furthermore, applicators provide APHIS track-files to APHIS as required in the statement of work.

Comment 34

APHIS received one comment that, " The essential role that pollinators play in the conservation of listed plant species is not addressed in the EAs and makes no mention of the fact that there are affirmative obligations incumbent on federal agencies with regard to protection of pollinators, regardless of whether they are federally listed including the 2014 Presidential Memorandum, the National Strategy to Promote the Health or Honey Bees and Other Pollinators, the Pollinator Friendly BMPs for Federal Land, and the Pollinator Research Action Item."

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

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

Comment 35

APHIS received one comment, "The EA does not disclose which, if any, invertebrates within the geographic area are listed as sensitive by federal land management agencies or as Species of Conservation Concern, or whether the state of South Dakota designates any invertebrates as species of greatest conservation need."

Species of greatest conservation need in South Dakota are discussed during cooperative decision making processes.

Comment 36

APHIS received one comment regarding, the EAs protections for at risk species, including the monarch butterfly which is currently being assessed for listing under the Endangered Species Act, are practically non-existent.

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Under USFWS Section 7 Act there is no requirement to consult on proposed or candidate species. (See USFWS letter of concurrence in Appendix 4.) However, in South Dakota when there is concern by land management agencies, federal, state, etc. it is discussed in this cooperative process between APHIS and landowners and land management agencies and mitigation measures are decided upon prior to treatment.

Comment 37
APHIS received one comment, "In the face of declining pollinator populations and the existence of federal directives for agencies to support and conserve pollinators and their habitat, APHIS must not conduct business as usual. APHIS should identify the at-risk pollinator species potentially present in the geographic area of the EAs and map their ranges prior to approving any treatment requests. Prior to treatment, APHIS should survey for presence of host plants and ensure that it has identified specific, actionable measures it will take to protect monarch habitat and the habitat of at-risk butterfly species from contamination that may occur as a result of exposure to treatment, such as designating a 125-ft buffer around identified habitat. Some ways to enact protections for at-risk species above and beyond those included in the EAs include:
● Survey for butterfly host plants and avoid any applications to host plants.
● Time pesticide applications to avoid exposure to at risk species.
● Do not apply pesticides (especially insecticides) when monarchs (adult and immature) are present or expected to be present.
● Avoid aerial applications.
● Avoid using malathion and liquid carbaryl.
● Include large buffers around all water sources, including intermittent and ephemeral streams, wetlands, and permanent streams and rivers, as well as threatened and endangered species habitat, honey bee hives, and any human-inhabited area. For example, Tepedino (2000) recommends a three-mile buffer around rare plant populations, as many of these are pollinated by solitary bees that are susceptible to grasshopper control chemicals."

APHIS includes many of the proposed measures to minimize risks to non-target organisms and human health. These are summarized in the recent EIS. For example, no treatment buffers are applied to all water bodies and to areas where the public may potentially be exposed to Program applications. APHIS also minimizes aerial insecticide use, where possible, however site conditions may dictate the need for aerial treatments. APHIS minimizes use of liquid carbaryl and malathion which is reflected in the historical use for both insecticides. Diflubenzuron has been the preferred insecticide for making Program suppression treatments. In addition APHIS has incorporated the use of RAATS in the Program as a means to reduce insecticide use providing reduced risk while meeting the goal of suppression. APHIS continues to research and develop new techniques for management of grasshopper and Mormon cricket populations.

Comment 38
APHIS received the following comment, "APHIS should include monitoring for the presence and health of mussels in streams that traverse or are adjacent to treatment areas as part of its monitoring strategy."

APHIS conducts environmental monitoring related to Program treatments. Monitoring is typically done adjacent to sensitive habitats, including aquatic habitats, to determine pesticide residues. These data can be used to determine risk to non-target organisms based on available toxicity data.

Comment 39
APHIS received the following comment, "To protect freshwater mussels, APHIS should use the same buffers agreed to in the national consultation with NMFS to protect listed salmon to protect freshwater mussels."

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APHIS agrees that freshwater mussels should be protected, as well as other aquatic organisms, and uses ground and aerial application no treatment buffers adjacent to all aquatic habitats. In addition, APHIS uses reduced rates of Program insecticides compared to current labeled rates. These mitigation measures are beyond label requirements for protection of aquatic habitats. The intent of these buffers is to reduce off-site drift and runoff of Program insecticides to aquatic habitats.

Comment 40
APHIS received the following comment, "The EAs do not discuss water bodies of anthropogenic origin, such as stock tanks or stock ponds, nor any buffers that will be observed to prevent pesticide overspray or drift into these habitats."

In South Dakota all stock tanks and stock ponds are buffered for applications.

Comment 41
APHIS received the following comment, "APHIS should recognize the potential for stock pond/tanks to contribute significantly to the diversity of aquatic invertebrates in rangelands."

See previous response. All bodies of water are buffered according to the APHIS Guidelines in Appendix 2 of the EA.

Comment 42
APHIS received the following comment, "APHIS should identify and map all stock tanks/ponds and specify a buffer around stock ponds/tanks from chemical treatment at least equivalent to that specified for wetlands, in order to protect aquatic diversity."

All bodies of water are buffered according to APHIS Guidelines in Appendix 2 of the EA. In South Dakota, locations of stock tanks are provided to APHIS by land owners and land managers to be used in the field during delimiting surveys and treatment planning. Tribal stock tank locations are provided to APHIS but are not to the public. Tribal maps can be provided from the BIA.

Comment 43
APHIS received one comment, "APHIS' reactive strategy includes no mention of what is most sorely needed: cooperation and planning with land managers to take appropriate steps to prevent the types of grasshopper and cricket outbreaks that are now dealt with by chemical controls."

APHIS is not a land management agency, but encourages IPM through past and current research and will continue to do so.

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

In addition to providing technical assistance, APHIS completed the Grasshopper Integrated Pest Management (GIPM) project, which is discussed in more detail on page 21 of this EIS. One of the goals of the GIPM is to develop new methods of suppressing grasshopper and Mormon cricket populations that will reduce non-target effects. RAATs are one of the methods that has been developed to reduce the amount of pesticide used in

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suppression activities, and is a component of IPM. APHIS continues to evaluate new suppression tools and methods for grasshopper and Mormon cricket populations, including biological control, and as stated in the EIS, will implement those methods once proven effective and approved for use in the United States.

Comment 44
APHIS received one comment: "Emphasizing cultural techniques through appropriate grazing management could help to minimize pesticide application and allow natural enemies to regulate grasshopper and Mormon cricket populations to the greatest extent possible. While more research is needed to develop species- and region-specific management treatments that use alternatives to pesticides (Vermeire et al. 2004), there is likely enough data to employ cultural techniques now."

APHIS supports the use of IPM in the management of grasshoppers and Mormon Crickets. APHIS provides technical assistance to Federal, Tribal, State and private land managers including the use of IPM, including cultural techniques. However, implementation of on-the-ground IPM activities is limited to land management agencies and Tribes, as well as private land owners. In addition, APHIS' authority under the Plant Protection Act is to treat Federal, State and private lands for grasshoppers and Mormon cricket populations.

Comment 45
APHIS received one comment that, "APHIS must elevate the expectation of preventative approaches in its cooperative agreements with other land management agencies. APHIS can collaborate with agencies (such as the Natural Resource Conservation Service (NRCS), the Farm Service Agency (FSA), and State Extension program) to facilitate discussion and disseminate information to ranchers about preventative measures that can be taken and alternatives to pesticide use."

APHIS supports the use of IPM in the management of grasshoppers and Mormon Crickets. APHIS provides technical assistance to Federal, Tribal, State and private land managers including the use of IPM, including cultural techniques. However, implementation of on-the-ground IPM activities is limited to land management agencies and Tribes, as well as private land owners. In addition, APHIS' authority under the Plant Protection Act is to treat Federal, State and private lands for grasshoppers and Mormon cricket populations.

APHIS has maintained cooperative relationships with state and federal land managers as well as private landowners and Indian tribes for decades. Those relationships have allowed APHIS to provide consistent and continual recommendations on land management practices designed to mitigate the damage from orthopteran infestations.

Comment 46
APHIS received on comment that, "APHIS and/or collaborating agencies should investigate and implement opportunities to incentivize healthy range management practices."

As part of its ongoing IPM strategy to manage grasshoppers and Mormon cricket outbreaks, APHIS collaborates with scientists and land managers focused on rangeland health.

Comment 47
APHIS received one comment that, "APHIS and its partners should be approaching the problem by keeping a focus on the potential to reduce grasshopper carrying capacity by making the rangeland environment less hospitable for the pests. APHIS must not take a limited view of its role and responsibilities, and should utilize any available mechanism to require land management agencies to diminish the severity, frequency and duration of grasshopper outbreaks by utilizing cultural management actions. Memoranda of Understanding (MOUs)

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should be examined and updated to ensure that land management agencies are accountable in utilizing cultural techniques to diminish the carrying capacity of pest species.

APHIS supports the use of IPM in the management of grasshoppers and Mormon Crickets. APHIS provides technical assistance to Federal, Tribal, State and private land managers including the use of IPM. However, implementation of on-the-ground IPM activities is limited to land management agencies and Tribes, as well as private land owners. In addition, APHIS' authority under the Plant Protection Act is to treat Federal, State and private lands for grasshoppers and Mormon cricket populations.

Comment 48
APHIS received a comment, "Longer-term strategic thinking should include:
●Prevent conditions that allow pest populations to survive and reproduce.
● Employ diverse management techniques (e.g., biological, physical, and cultural).
● Select pesticides to minimize risks to non-target organisms.
● Implement frequent and intense monitoring to identify populations that can be controlled with small ground-based pesticide application equipment.
● Monitor sites before and after application of any insecticide to determine the efficacy of the pest management technique as well as if there is an impact on water quality or non-target species."

APHIS currently monitors for grasshopper and Mormon cricket populations. These measures are employed to allow APHIS to respond with treatment, where warranted, treating the smallest area possible and if practical using ground-based equipment. APHIS, due to its monitoring efforts, has been able to rely on diflubenzuron as the primary insecticide used in the Program. Diflubenzuron is a more selective insecticide compared to carbaryl and malathion posing less risk to non-target organisms. APHIS also uses environmental monitoring to assess application success and to determine if Program insecticides are reaching sensitive habitats, including aquatic habitats. APHIS supports the use of IPM in the management of grasshoppers and Mormon Crickets. APHIS provides technical assistance to Federal, Tribal, State and private land managers including the use of IPM. However, implementation of on-the-ground IPM activities is limited to land management agencies and Tribes, as well as private land owners. In addition, APHIS' authority under the Plant Protection Act is to treat Federal, State and private lands for grasshoppers and Mormon cricket populations. APHIS continues to research and develop new methods for assessing and controlling grasshopper and Mormon cricket populations that can be incorporated into IPM practices.

Comment 49
APHIS received one comment that, "The EAs do not make mention of any specific protections to be accorded to special status lands such as Wilderness areas, Wilderness study areas, Research Natural Areas, National Wildlife Refuges, and designated or proposed Areas of Critical Environmental Concern. These special status areas have been designated for specific purposes and generally discourage human intervention with the natural ecosystem. Grasshopper suppression should not be undertaken in such areas."

APHIS does not make treatments on lands of special status without a request from that agency and an evaluation of the whether treatments are necessary. Additional protection measures for these types of lands are established by the agency requesting treatment and are followed by APHIS.

Comment 50
APHIS received the following comment "We appreciate that public notice of this site-specific EA and its comment period was posted at the APHIS website. It does not appear to have been the practice to post the Draft EAs in the last several years, but limiting public notice is contrary to the spirit of the NEPA process. Grasshopper suppression efforts are of more than local concern and as federal actions, should be noticed properly, i.e. beyond local stakeholder audiences, local newspapers, etc. We recommend that, in the

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future, notice of open public comment periods for all site-specific EAs for grasshopper suppression be posted in the Federal Register, and documents made available for review at regulations.gov and at the APHIS grasshopper website."

Public involvement under the CEQ Regulations for Implementing the Procedural Provisions of NEPA distinguishes federal actions with effects of national concern from those with effects primarily of local concern (40 CFR 1506.6). Our EIS process for the grasshopper and Mormon cricket suppression program was published in the Federal Register (APHIS-2016-0045), and met all applicable notice and comment requirements for a federal action with effects of national concern. This process provided individuals and national groups the ability to participate in the development of alternatives and provide comment. Our subsequent state-based actions have the potential for effects of local concern, and we publish them according to the provisions that apply to federal actions with effects primarily of local concern. This includes the USDA APHIS NEPA Implementation Procedures, which allows for EAs and FONSIs where the effects of an action are primarily of regional or local concern to normally provide publication in a local or area newspaper of general circulation (7 CFR 372.7(b)(3)). Notification for the EAs was published in the Rapid City Journal on April 17, 2020 and again on April 24, 2020. In years past, it was also published in the Native Sun News but they were unable to accommodate the publishing dates. These publications provide potentially locally-affected individuals an additional opportunity to provide input into the decision-making process.

Comment 51

APHIS received the following comments: "The Draft Environmental Assessments Frustrate Public Participation." and "APHIS frustrated public participation by failing to inform interested parties of the existence of the EAs."

"Scoping" is the process APHIS uses through which the agency and the public identify alternatives and issues to be considered during the development of a grasshopper or Mormon cricket suppression program. Scoping was helpful in the preparation of the draft Environmental Assessments (EAs). The process can occur formally and informally through meetings, conversations, or written comments from individuals and groups.

In addition, APHIS notified Federal, State and Tribal land managers and private landowners of the potential for grasshopper and Mormon cricket outbreaks on their lands wen relevant.

Notice of public comment was published in local newspapers (see comment 50). The comment period opened April 17, 2020 and expired May 18, 2020.

Comment 52

APHIS received the following comment, "APHIS did not provide information for the submission of public comments including where and when to submit comments by."

APHIS works to inform all interested parties about draft EA's for comment. When an interested party asks to be informed, APHIS ensures contact information is added to the list of interested stakeholders. Each local office works to inform interested parties of the availability of an EA for comment. Any omission of an interested party is not intentional.

Comment 53

APHIS received the following comments, "APHIS limited public notice to local papers." and "This local notice is insufficient as it excludes countless other interested parties. In sum, APHIS has failed to meet NEPAs requirements for public involvement in these EAs."

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See comment 51.

Comment 54

APHIS received the following comments, "APHIS provided a short public comment period during this COVID-19 pandemic." "The 30 day comment deadline for the Draft EAs is wholly inappropriate during the current COVID-19 pandemic, where both staff and members of the concerned public have limited capacity, given the challenges associated with a global pandemic including but not limited to increased childcare demands, illness, etc."

Public involvement under the CEQ Regulations for Implementing the Procedural Provisions of NEPA distinguishes federal actions with effects of national concern from those with effects primarily of local concern (40 CFR 1506.6). Our EIS process for the GMC program was published in the Federal Register (APHIS-2016-0045), and met all applicable notice and comment requirements for a federal action with effects of national concern. This process provided individuals and national groups the ability to participate in the development of alternatives and provide comment. Our subsequent state-based actions have the potential for effects of local concern, and we publish them according to the provisions that apply to federal actions with effects primarily of local concern. This includes the USDA APHIS NEPA Implementation Procedures, which allows for EAs and FONSIs where the effects of an action are primarily of regional or local concern to normally provide publication in a local or area newspaper of general circulation (7 CFR 372.7(b)(3)). These publications provide potentially locally-affected individuals an additional opportunity to provide input into the decision-making process.

Comment 55

APHIS received the following comment, "the proposal in question is controversial and deals with issues of significant public interest."

The USDA became involved in grasshopper control on Federal rangeland in the 1930s. During that decade, grasshopper infestations covered millions of acres in 17 Western States. Unsuccessful efforts to control grasshopper outbreaks on a local basis proved that grasshoppers needed to be dealt with on a broader basis. In 1934, Congress charged USDA with controlling grasshopper infestations on Federal rangeland. Thereafter, USDA was the lead agency in cooperative efforts among Federal agencies, State agriculture agencies and private ranchers to control grasshopper outbreaks.

APHIS is not aware of any controversy in the program. Every year APHIS works with local stakeholders to gather information and discuss the grasshopper program. The grasshopper program requires a written request to treat on any land and discussions with the land owner or manager determine the course of the final action. APHIS acts in partnership with stakeholders through agreements and Memorandum of Understanding on all activities in the program.

APHIS operates under an act of congress and is mandated to provide support to communities affected by grasshopper and Mormon cricket outbreaks as funding is available. The grasshopper program in South Dakota has not raised concerns about pesticide use but rather concerns about NOT suppressing damaging infestations of grasshoppers that significantly reduce range forage for wildlife and livestock. APHIS' failure to act in a timely manner threatens the livelihood of farmers and ranchers who depend upon the land for subsistence as well as threatens wildlife forage and habitat essential to the maintenance of adequate range resources for native species.

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Comment 56
APHIS received the following comment, "The Draft EAs also limit public participation by failing to provide contact information for the submission of written or electronic comments."

See response to comment 52.

Comment 57
APHIS received the following comment, "Nowhere on the webpage for the Draft Environmental Assessment Rangeland Grasshopper and Mormon Cricket Suppression Program is there any information on where to submit comments."

See previous responses to comments. The local offices send out public notice to a list of stakeholders that they have collected over the years and they also announced the open comment period in the local media. Those notices have the link for the EA's for comment and the point of contact. In an attempt to be more transparent, APHIS has placed Program EA's on to the website for people to access. When an interested party asks to be informed, APHIS ensures there contact information is added to the list of interested stakeholders. Each local office works to inform interested parties of the availability of an EA for comment. Any omission of an interested party is not intentional.

Comment 58
APHIS received the following comment, "there is no information on when the comment period opened or closed on the EAs provided on the webpage."

See previous comment responses.

Comment 59
APHIS received the following comment, "APHIS has failed to comport with NEPA's threshold requirements."

APHIS did not fail to perform NEPA's threshold requirements for public outreach and engagement, but rather exceeded them. See previous comments concerning how APHIS informed interested parties of the availability of EAs for public comment, where to send comments, and the closing date for the comment period.

Comment 60
APHIS received the following comment, "The Draft EAs further limit public participation by failing to post notices in the Federal Register or on regulations.gov, unlike earlier versions of the environmental review."

APHIS further involves the public in the scoping process by the publication of notices of availability for EAs and a Findings of No Significant Impact (FONSIs). When an individual State level EA is written, a notice is published in the legal section of the local newspaper, advertising the availability of the EA during an open comment period. The notices published in local newspapers was conducted in accordance with APHIS' NEPA Implementation Procedures, 372.7 (b)(3), Notification of the availability of environmental assessments and findings of no significant impact for proposed activities will be published in the FEDERAL REGISTER, unless it is determined that the effects of the action are primarily of regional or local concern. Where the effects of the action are primarily of regional or local concern, notice will normally be provided through publication in a local or area newspaper of general circulation and/or the procedures implementing Executive Order 12372, "Intergovernmental Review of Federal Programs."

Public involvement under the CEQ Regulations for Implementing the Procedural Provisions of NEPA distinguishes federal actions with effects of national concern from those with effects primarily of local concern

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(40 CFR 1506.6). Our EIS process for the GMC program was published in the Federal Register (APHIS-2016-0045), and met all applicable notice and comment requirements for a federal action with effects of national concern. This process provided individuals and national groups the ability to participate in the development of alternatives and provide comment. Our subsequent state-based actions have the potential for effects of local concern, and we publish them according to the provisions that apply to federal actions with effects primarily of local concern. This includes the USDA APHIS NEPA Implementation Procedures, which allows for EAs and FONSIs where the effects of an action are primarily of regional or local concern to normally provide publication in a local or area newspaper of general circulation (7 CFR 372.7(b)(3)). These publications provide potentially locally-affected individuals an additional opportunity to provide input into the decision-making process. Some states also provide additional opportunities for local public involvement, such as public meetings.

Comment 61
APHIS received the following comment, "[The Center for Biological Diversity] have been informed that there was notice in local newspapers. This local notice is insufficient as it excludes countless other interested parties."

See previous response.

Comment 62
APHIS received the following comment, "APHIS has failed to meet NEPAs requirements for public involvement in these EAs."

APHIS also notes CEQ guidance for public involvement in the NEPA process of agencies, "A Citizen's 12 Guide to the NEPA" states: "When preparing an EA, the agency has discretion as to the level of public involvement. The CEQ regulations state that the agency shall involve environmental agencies, applicants, and the public, to the extent practicable, in preparing EAs. Sometimes agencies will choose to mirror the scoping and public comment periods that are found in the EIS process. In other situations, agencies make the EA and a draft FONSI available to interested members of the public".

Comment 63
APHIS received the following comment, "the range of alternatives offered by APHIS is wholly inadequate."

APHIS structured and analyzed the risk of the substantial program alternatives available to the agency.

Comment 64
APHIS received the following comment, "[The alternatives] are, "No Action," and "Insecticide Applications at Conventional Rates or Reduced Agent Area Treatments with Adaptive Management Strategy" (preferred alternative). While the RAATs are an improvement over conventional approval rates, this alternative should actually be two, one, Insecticide Applications at Conventional Rates and two, Reduced Agent Area Treatments with Adaptive Management Strategy. Lumping the two together means that supporting this alternative could mean pesticide application at conventional rates without RAATs. APHIS must break these into different alternatives."

The EA states "Under Alternative A, the No Action alternative, APHIS would not conduct a program to suppress grasshopper infestations. Under this alternative, APHIS may opt to provide limited technical assistance, but any suppression program would be implemented by a Federal land management agency, a State agriculture department, a local government, or a private group or individual."

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Under Alternative B, the Preferred Alternative, APHIS would manage a grasshopper treatment program using potentially any of pesticides and application methods described in the EA Alternative B to suppress outbreaks. The grouping of conventional methods and pesticide rates with the more commonly used RAATs procedures reflects the variety of approaches that the agency may need depending on treatment specific circumstances.

Comment 65

APHIS received the following comment, "APHIS does not include an alternative that explicitly adopts and utilizes Integrated Pest Management."

APHIS technical guidance is part of each alternative proposed, and is not unique to any one alternative. An example of APHIS technical guidance is the agency's work on integrated pest management (IPM) for the grasshopper program. IPM for grasshoppers includes biological control, chemical control, rangeland and population dynamics, and decision support tools.

APHIS has funded the investigation of various integrated pest management (IPM) strategies for the grasshopper program. Congress established the Grasshopper Integrated Pest Management (GIPM) to study the feasibility of using IPM for managing grasshoppers.

The major objectives of the APHIS GIPM program were to: 1) manage grasshopper populations in study areas, 2) compare the effectiveness of an IPM program for rangeland grasshoppers with the effectiveness of a standard chemical control program on a regional scale, 3) determine the effectiveness of early sampling in detecting developing grasshopper infestations, 4) quantify short- and long-term responses of grasshopper populations to treatments, and 5) develop and evaluate new grasshopper suppression techniques that have minimal effects on non-target species (Quinn, 2000).

The results for the GIPM program have been provided to managers of public and private rangeland including ways to manage grasshopper populations in the long-term, such as livestock grazing methods and cultural control by farmers.

APHIS issued the GIPM User Handbook describing biological control, chemical control, environmental monitoring and evaluating, modeling and population dynamics, rangeland management, decision support tools, and future directions.

Federal and State land management agencies, State agriculture departments, and private groups or individuals may carry out a variety of preventative IPM strategies that may reduce the potential for grasshopper outbreaks. Some of these activities include grazing management practices, cultural and mechanical methods, and prescribe-burning of rangeland areas. These techniques have been tried with varying success in rangeland management, and some have been associated with the prevention, control and or suppression of harmful grasshopper populations on rangeland.

Regardless of the various IPM strategies taken, the primary focus of the risk analysis contained in the EAs is on the potential impacts from chemical treatments needed during an outbreak of economic importance. While APHIS provides technical expertise regarding grasshopper management actions, the responsibility for implementing most land management practices lies with other Federal (i.e., BIA, BLM and USDA's FS), State and private land managers.

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Comment 66
APHIS received the following comment, "Given that much of APHIS's work on grasshopper and Mormon cricket suppression is on federal public lands it only makes sense that APHIS employ a method that is well known by these land managers."

See previous response. APHIS supports the use of IPM to prevent grasshopper outbreaks on or near Federal lands. These actions are and should continue to be considered by agencies as part of proper land management. APHIS treatments are a component of the IPM strategies that may be employed by Federal land management agencies. APHIS also adheres to any restrictions proposed by Federal land management agencies that may be part of their IPM strategies.

Comment 67
APHIS received the following comment, "APHIS must adopt an alternative that harmonizes its mandates in regard to grasshoppers and Mormon crickets with the IPM mandates of the federal lands that it operates on."

See previous response. A Memorandum of Understanding between land management agencies, i.e., the Department of Interior's Bureau of Indian Affairs and Bureau of Land Management, and USDA's Forest Service, indicates that while APHIS provides technical expertise, namely advice, regarding grasshopper management actions, the responsibility for implementing most land management practices, including IPM measures, lies with other Federal (i.e., BIA, BLM, and USDA's FS), State, and private land managers (page 32 of the 2019 EIS).

Comment 68
APHIS received the following comment, "APHIS must enlist IPM experts to craft an alternative that is land-use and pest-specific, using the minimum level of pest suppression necessary, relying on prevention, avoidance, monitoring, and suppression techniques in order to decrease pest pressure with the least harmful controls possible."

See previous response to comment 67.

Comment 69
APHIS received the following comment, "APHIS must conduct an adequate analysis of human health effects."

The risk analysis in the EA is tiered to the two Environmental Impact Statements (2002 and 2019) and the four Human Health and Ecological Risk Assessments as described in sections I.C. About this Process, II.A. Alternatives (where an internet link to the more in-depth risk analysis documents is provided on page 7), in the second paragraph of section IV. Environmental Consequences (a link is also provided there), and many other locations in the EA.

Comment 70
APHIS received the following comment, "APHIS's failure conduct any analysis of their impacts to human health is a far cry from the level of analysis demanded by NEPA and basic due care for public health."

See responses to comment 69. APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019). These documents were incorporated by reference into the draft EA.

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Comment 71
APHIS received the following comment, " APHIS must consider the impacts to the humans to who pass through treated areas, whether they be ranchers or ranch hands, OHV riders, local residents or people who for whatever reason decided to take a walk or otherwise spend some time in the natural beauty of South Dakota's open spaces. Especially during this COVID-19 crisis, people may well seek to spend time outdoors in South Dakota's rangelands, and APHIS must consider the impacts of the proposed action on these individuals.".

The grasshopper program is a rangeland program and normally conducted in a mixture of federal lands, state lands and private lands where people are not likely to congregate or recreate. Open communications between applicators and APHIS personnel about treatment occur throughout the treatment to avoid any unforeseen bystanders. Landowners and land managers whose lands fall within the treatment area are aware of the treatment activities. Our operational procedures include USDA personnel near the control block to ensure bystanders and the public are not within the control area.

Comment 72
APHIS received the following comment, "APHIS's failure conduct any analysis of their impacts to human health is a far cry from the level of analysis demanded by NEPA and basic due care for public health."

See responses to comment 71. APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019). These documents were incorporated by reference into the draft EA.

Comment 73
APHIS received the following comment, "APHIS fails to look at the effects of the proposed action on migratory birds."

Executive Order 13186 directs Federal agencies taking actions with a measurable negative effect on migratory bird populations to develop and implement a Memorandum of Understanding with the USFWS that promotes the conservation of migratory bird populations. On August 2, 2012, a Memorandum of Understanding between APHIS and the USFWS was signed to facilitate the implementation of this Executive Order.

Specifically to the grasshopper and Mormon cricket program, APHIS evaluated potential impacts to birds in the final EIS and associated human health and ecological risk assessments. These documents are incorporated by reference into the final EA.

Comment 74
APHIS received the following comment, "APHIS needs to take a hard look at the impacts of the proposed action, including direct and indirect effects."

The EA incorporated the analysis from the EIS and associated human health and ecological risk assessments into the analysis. The EIS, and in particular, the risk assessments evaluated potential indirect effects to non-target organisms, relying on available toxicity data and estimates of risk.

Comment 75
APHIS received the following comment, "A direct effect of not spraying insecticides is abundant food for migratory birds. Conversely, a direct effect of spraying is reduced abundance of food for insectivorous migratory birds. Another potential direct effect of insecticide spraying is poisoning. An example of an indirect effect is the cumulative effect of continuous low level pesticide exposure from numerous sites over many years. APHIS must take a hard look at all these impacts" and APHIS needs to explain how it will actually support the conservation intent, what it plans in terms of buffers,

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etc." and "APHIS fails to comply with the Migratory Bird Treaty Act and NEPA. APHIS must take a hard look at the potential impacts to migratory birds."

The routine use of Reduced Area Agent Treatment (RAAT) procedures results in the temporary reduction of insects that birds prey upon within the treated swaths. This indirect effect is mitigated by the unchanged abundance of prey in nearby untreated swaths. The EIS analyzes the toxicological effects of Grasshopper applied insecticides on birds (carbaryl p. 42-43, diflubenzuron p.50-52, malathion p.61-63, and chlorantraniliprole p.75). The EIS also describes the potential effects on birds caused by loss of prey (diflubenzuron p. 52, malathion p. 63, generally p. 88-89).

Comment 76
APHIS received the following comment, "APHIS's handling of impacts to non-target species and species of concern wholly fails to meet NEPA's requirement that the agency take a hard look at the impacts of its proposed action."

The U.S. FWS defines "Species of concern" is an informal term that refers to those species which may require some conservation actions but which are not threatened with extinction. The conservation actions needed will vary depending on the health of the populations and types and degree of threats. At one extreme, there may only need to be periodic monitoring of populations and threats to the species and its habitat. At the other extreme, a species eventually may require listing as a Federal threatened or endangered species and become the subject of a Federal recovery program. Species of concern receive are not provided legal protection under the Endangered Species Act, and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species. Based on U.S. FWS funding and staffing levels discussions with APHIS about species of concern may occur during broader ESA consultations and result in specific protections measures observed by the Grasshopper Program.

Comment 77
APHIS received the following comment, "the EA cannot be finalized until APHIS actually takes a hard look at the impacts on non-target and species of concern."

See previous response to similar comments. Under FWS Section 7 Act there is no requirement to consult on sensitive species. See USFWS letter of concurrence in Appendix 4.

Comment 78
APHIS received the following comment, "APHIS doesn't even consider many sensitive or culturally important species. For example, monarch butterflies fly through South Dakota."

APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019). The risk assessments and EIS considered available field and laboratory data regarding impacts to Lepidoptera, including moths and butterflies.

Comment 79
APHIS received the following comment, "APHIS also doesn't consider the impacts of spraying on the thousands of native bee species that reside in South Dakota, including many that are exceedingly rare, existing nowhere else on earth."

APHIS works with Tribal, Federal and State land managers and their local biologists, natural resource specialists, and range conservationists to implement measures that reduce risks of Program treatments to native bees. These measures may include reduced insecticide applications associated with RAATS, avoidance

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measures and use of carbaryl bait, where applicable. APHIS also prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019). The risk assessments summarized available effects data for non-target species including pollinators.

Comment 80
APHIS received the following comment, "The EAs have not adequately analyzed the cumulative impacts of the program with other governmental or private entity actions."

APHIS discussed the potential of overlapping chemical treatments in the areas where outbreaks of grasshoppers have occurred or could occur in the future in the cumulative impacts section of the draft EIS, from page 79 to 83. It is unlikely there would be significant overlap between APHIS programs and the grasshopper program and coordinated treatments would mitigate impacts if there is ever overlap; current label and mitigations minimize significant exposure of soil, water and air to Program insecticides; grasshopper chemical treatments are not expected to persist or bioaccumulate in the environment; and, there is a lack of significant routes of exposure (page 82 to 83 of draft EIS).

APHIS consults with all its land managers within treatment blocks prior to project commencement and insures that any planned herbicide treatments are in harmony with the objectives of the project.

Comment 81
APHIS received the following comment, "The EA does not take into account the background level of exposure to humans and animals from pesticides and other pollutant sources that exist in the environment from other actions or the synergistic effects of the enhanced toxicity that many mixtures exhibit."

The commenter assumes that the rangeland in South Dakota which is covered by the Draft EAs has been exposed to pesticides and pollutants and that there is a synergistic effect which enhances toxicity to the environment. The land managers that manage the areas covered in the EAs, document all pesticide applications. If these remote areas were at risk, the land manager would not request APHIS's services. The activities, or lack thereof, are discussed in the cumulative impacts section of the final EA.

Comment 82
APHIS received the following comment, "[the EA] does not account for the range of cumulative exposures that would be anticipated. There was no mention of widespread mosquito spraying that takes place in many areas."

The South Dakota Draft EAs do not account for the commenter's remarks due to the fact that there is no widespread mosquito abatement in the State of South Dakota. APHIS follows program guidelines and treatment strategies listed in the EIS and only treat an area once per year. Treatments rarely occur in the same locations year to year.

Comment 83
APHIS received the following comment, "as cattle are grazing these pesticides will be washed off their bodies or excreted through waste and contaminate surrounding land and water bodies."

The labels for Dimilin 2L and Carbaryl 2% bait specify that there is no grazing restrictions. Any pesticide residues that may be present on forage in treated areas after treatment is typically metabolized and excreted as metabolites that have lower toxicity than the parent compound. In addition, the low application rates employed by APHIS relative to the current maximum labelled rates for each Program insecticide would result in very low residues in livestock waste.

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Comment 84
APHIS received the following comment, “A substantial acreage of rangeland is adjacent to lands used for plant agriculture, and the EAs state that they also aim to protect these agricultural lands. These areas generally have a high potential for crossover contamination through drift or runoff of pesticides. Large quantities of pesticides, including insecticides and fungicides that may be synergistic with the insecticides included in the EAs, may be used on these lands. In addition, herbicide use on crops already significantly impacts insects by destroying habitat and food sources in agricultural lands”.

The grasshopper program is a rangeland program and only rangeland is treated. Treatments on rangeland that is adjacent to agriculture lands also provide some protection from grasshoppers moving into crops. APHIS strictly adheres to pesticide labels which clearly state where their use is allowed or prohibited.

Comment 85
APHIS received the following comment, “None of these issues were disclosed or analyzed in the Draft EIS and add to the already large cumulative exposures from pesticides used in 1) the boll weevil eradication program, 2) fruit fly cooperative eradication program, 3) the gypsy moth cooperative eradication program, and 4) invasive plant control”.

The commenter refers to the Draft EIS. The EIS has been finalized and the ROD has been signed. The final EIS does address the cumulative exposures from other APHIS programs on a programmatic level. The documents in question are the Draft EAs. The first three programs mentioned by the commenter are not relevant to the Rangeland Grasshopper and Mormon Cricket Suppression Program in South Dakota. APHIS follows program guidelines and treatment strategies listed in the EIS and only treat an area once per year. Treatments rarely occur in the same locations. All grasshopper treatments are coordinated with the land managers and other non-grasshopper programs are discussed if the land managers are concerned about an overlap with other programs.

Comment 86
APHIS received the following comment, “These cumulative exposures cannot only adversely affect human and environmental health but can also negatively impact biological control programs that try to manage insect and weed pests with natural predators”.

APHIS follows program guidelines and treatment strategies listed in the EIS and only treat an area once per year. Treatments rarely occur in the same locations. All grasshopper treatments are coordinated with the land managers and other non-grasshopper programs are discussed if the land managers are concerned about an overlap with other programs. APHIS’s preferred treatment chemicals and strategies are the most ecologically sound for non-targets such as biological control.

In South Dakota, APHIS is heavily involved with biocontrol collections, releases, and monitoring, and would take consideration before performing any grasshopper treatments in areas where biocontrol agents have previously been released. Before any grasshopper treatment takes place, APHIS conducts extensive consultation with land managers so that established biological control agents are not adversely impacted.

Comment 87
APHIS received the following comment, “How these pesticides act in conjunction with one another to additively or synergistically increase toxicity is not discussed and no mitigation measures were proposed. Therefore, APHIS must fully analyze the impacts from cumulative exposures and identify ways in which risk can be mitigated or prohibited”.

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The Grasshopper Program does not apply treatments more than once per year to any rangeland area. Cumulative exposures from pesticides applied by external parties are not anticipated in most cases due to coordination between APHIS, land managers and other cooperators, on rangeland that may be receive grasshopper or Mormon cricket treatments. The EA details many procedures APHIS employs to mitigate risk.

Comment 88
APHIS received the following comment, "The project is vague and ill-defined, it improperly precludes the disclosure of environmental effects because the information on the project and its impacts is incomplete".

The proposed Grasshopper treatment program described in the EA could occur within a specific area, using a limited number of insecticides and application methods. The environmental consequences of suppressing or not suppressing grasshopper infestations are analyzed in the EA and other programmatic risk analysis documents.

Comment 89
APHIS received the following comment, "APHIS's explanation of a "level of economic infestation," which is the trigger for insecticide spraying, does not give the public any sense whatsoever of when that threshold is met. The definition is too vague and ill-defined to meet NEPA's purposes and mandates. The agency could spray with minimal infestation levels if it saw fit whenever it decided to do so. There must be a more concrete definition that identifies specific thresholds that must be met for the agency to determine an economic level of infestation has been met".

APHIS utilizes and provides links to extensive resources for determining when a grasshopper outbreak is exceeding IPM thresholds including, "a level of economic infestation". The Purpose and Needs section of the EA and supporting documents adequately define the multiple factors that must be evaluated before APHIS decides a treatment is necessary.

The "economic infestation level" is a measurement of the economic losses caused by a particular population level of grasshoppers to the infested rangeland. This value is determined on a case-by-case basis with knowledge of many factors including, but not limited to, the following: economic use of available forage or crops; grasshopper species, age, and density present; rangeland productivity and composition; accessibility and cost of alternative forage; and weather patterns. In decision-making, the level of economic infestation is balanced against the cost of treating to determine an "economic threshold" below which there would not be an overall benefit for the treatment. Short-term economic benefits accrue during the years of treatments, but additional long-term benefit may accrue and be considered in deciding the total value gained by treatment. Additional losses to rangeland habitat and cultural and personal values (e.g., aesthetics and cultural resources), although a part of decision-making, are not part of the economic values in determining the necessity of treatment.

Comment 90
APHIS received the following comment, "The EA's description of the preferred alternative that includes "reduced agent area treatments" ("RAATs") is similarly vague and ill defined".

RAATs has long been in use, is public knowledge, and one of APHIS's preferred IPM strategies, supported by decades of research. Skipping swaths are the most common RAATs choice, leaving 50% of the treated area untreated to maximize refugia for non-target arthropods while simultaneously inducing target Orthoptera mortality at desired levels. RAATs are also described in detail in the final EIS that is incorporated by reference in the EA.

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Comment 91
APHIS received the following comment, “It is unclear whether RAATs will even be used and how they will be used in the site specific area”.

APHIS’ preferred method of treatment is to use RAATs as a means to reduce program costs and potential environmental effects. However the program could decide to apply insecticides at conventional rates and total area coverage if a damaging grasshopper infestation warrants that level of suppression. These instances are rare due to monitoring and other technical assistance provided by APHIS. An explanation of the uncertainties involved with predicting grasshopper populations before they emerge is provided in section I.C. About this Process.

Comment 92
APHIS received the following comment, “APHIS could use the pesticide at 95% of the labelled rate and still call the application a RAAT.”

RAAT’s is defined as Reduced Agent and/or Area Treatments. The current pesticide labels for use in the Program do not allow applications at 95% of the labeled rate to be called RAATs. This information was also summarized in the final EIS. EPA has approved the RAAT verbiage for each pesticide label. The labels clearly state which rates are allowed to meet a RAAT rate. In the case of Dimilin 2L label, which clearly states the application rates for RAAT’s is 0.75 - 1 ounce per acre. “Use on rangeland only, in a RAAT’s application on early instars. A RAAT’s application is an IPM strategy that takes advantage of grasshopper movement and conservation biological control to allow Dimilin 2L to be applied on rangeland on a reduced treated area and at reduced rates, while sustaining acceptable control.”

The applicator can only use the RAAT’s rate of .75 or 1 ounce per acre. The label rate, if not using RAAT’s is 2 ounces/acre. The RAAT’s rate would be 50% of the label rate not 95% of labeled rate.

In the case of using Carbaryl 5% bait the label rate is 20-40 lbs. per acre. APHIS uses the RAAT’s rate of 10lbs/acre. In the case of Carbaryl 2% bait, the label clearly states for ground applications 25 pounds/acre. It clearly states for U.S. Federal Government and State affiliated Grasshopper/Mormon Cricket Suppression Programs using aerial applications the rate of application is 10 pounds/acre. So clearly the RAAT’s applications are 50% or less than the labeled rates.

In the case of a full coverage treatment, the total acreage is treated. In the case of reduced area portion of RAAT’s the treatment area would be 50% less than a full coverage treatment. The reduced area is achieved through alternating the treated and untreated swath widths. The RAAT’s application rates are described in detail in the Draft EA’s and depending on the pesticide used in a treatment, the label will also specify or clarify what the RAAT’s rate. The reduced area is achieved by skipping a treated swath. For example, if the swath width of the treatment equipment is 40 feet, then the treated swath would be 40 feet. Then the adjacent swath would be skipped or untreated. The next treated swath would then be applied. So across the treatment block would be treated and untreated swaths. Thus the reduced area of actual treated ground, instead of a conventional broadcast treatment.

The RAAT procedures used by the program are flexible to allow for a reduction of pesticide use. Typically the RAAT procedures will result in half the amount of pesticide being applied to a treatment block than conventional rates and total coverage. Program managers may reduce the rate at which the pesticide is sprayed from the aircraft or increase the distance between swaths that are sprayed based on factors specific to grasshopper populations being suppressed. It should be noted that APHIS average RAAT rates are lower than the labeled RAAT rates further reducing pesticide loading into the environment.

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Comment 93
APHIS received the following comment, "The agency must give the public a more precise definition of when the threshold for spraying has been met (i.e. number of grasshoppers or crickets/acre and a full description of the economic interests at stake)."

The commenter is asking for survey data to be submitted to the public. This data is accumulated during the nymphal survey season and is not available when compiling the EA's. APHIS utilizes and provides links to extensive resources for determining when a grasshopper outbreak is exceeding IPM thresholds including, "a level of economic infestation". The Purpose and Needs section of the EA and supporting documents adequately define the multiple factors that must be evaluated before APHIS decides a treatment is necessary. Establishing a treatment threshold based on the number of grasshoppers ignores a variety of factors that must be considered by program managers before treatments. Some examples include how voracious the individual species are that compose a grasshopper infestation and the hardiness of rangeland vegetation within a proposed treatment block. These factors are also discussed in the recently published final EIS and are incorporated by reference in the final EA.

See previous responses for economic thresholds.

Comment 94
APHIS received the following comment, "APHIS must also convey what metrics will be used to determine the area that will be sprayed in any given outbreak".

The size and exact configuration of a treatment block cannot be forecast prior to the emergence of the grasshoppers, requests from land managers and other cooperators, and other environmental considerations such as buffers from water and sensitive species. The program procedures and mitigation measures are adequately described in the EA and supporting documents.

APHIS is unable to predict exactly what areas will be treated before conducting surveys and completing the EA. For ground applications, the terrain is key to be able to treat safely. If the terrain is too rough to safely drive a UTV, then the area is not treated even though other factors warrant a treatment. There are many variables taken into account before an area is treated. Another factor that must be considered is the movement of populations. If for any number of reasons, a treatment can be delayed there is a risk that, depending on species, the boundaries will have to be readjusted to account for the movement of populations.

For example, it is documented that Melanoplus sanguinipes, the Migratory Grasshopper can swarm and fly up to 5-10 miles normally. The longest migrations recorded in 1938 were made by swarms that traveled from northeastern South Dakota to the southwestern corner of Saskatchewan, a distance of 575 miles (Pfadt, 1994). This is why it is critical to have a rapid response to outbreaks. Population dynamics of grasshoppers and Mormon crickets are fluid and responses have to be adaptable to the most current assessments to ensure successful suppression treatments while minimizing environmental impacts.

Comment 95
APHIS received the following comments, "The agency must accurately and comprehensively disclose and analyze the range of rare, sensitive, threatened, and endangered species, ecological areas, communities, Native American gathering grounds and sensitive receptors that could potentially be significantly affected by the proposed project" and "Without this baseline data the EA cannot disclose the environmental effects of the project".

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APHIS works in cooperation with Federal and State land managing agencies to protect sensitive resources managed on their lands. In South Dakota, Native American sacred places or special sites are only made available to APHIS when necessary. These places are not published or disclosed to the public as per conversations with BIA. They are addressed in general terms when published in the EA. Specific details are addressed during meetings with BIA. Sensitive or special BLM sites are not published or disclosed to the public as per conversations with BLM. These sites are also in general terms when published in the EA. Specific details are addressed during meetings with BLM. T&E species are analyzed during the USFWS Section 7 consultations. APHIS adheres to protective measures which have been agreed upon with USFWS and addressed in the letters of concurrence. See USFWS concurrence letter in Appendix 4.

APHIS adequately summarized available data for current baseline conditions in the draft EA. This includes cultural resources as well as the potential for any overlap of federally listed species with the proposed areas of treatment.

Comment 96
APHIS received the following comment, "APHIS's description of the environmental effects of the pesticides at issue failed to properly capture many of their environmental effects".

APHIS prepared and published separate Final Human Health and Ecological Risk Assessments for all the pesticides used by the Grasshopper Programs (November 2019: https://www.aphis.usda.gov/plant_health/ea/downloads/2019/carbaryl-hhera-final.pdf). These documents and the associated final EIS are incorporated by reference.

Comment 97
APHIS received the following comment, "Long-term exposure to carbaryl is associated with decreased egg production and fertility in birds".

APHIS would make a single application per year to a treatment area, and could apply insecticide at an APHIS rate conventionally used for grasshopper suppression treatments, or more typically as reduced agent area treatments (RAATs). Carbaryl has a reported half-life on vegetation of three to ten days, therefore, long-term exposure to birds is not anticipated.

The study cited by the commenter noted. Carbaryl is practically nontoxic to birds on both an acute oral exposure (LD50 >2,000 mg/kg) and subacute dietary exposure basis (LC50 >5,000 mg/kg of diet). In addition, no chronic effects were observed at a dietary exposure of 300 mg/kg of diet.

Comment 98
APHIS received the following comment, "Carbaryl is considered moderately toxic to mammals with decreased pup survival being the most sensitive effect".

APHIS would make a single application per year to a treatment area, and could apply insecticide at an APHIS rate conventionally used for grasshopper suppression treatments, or more typically as reduced agent area treatments (RAATs). Carbaryl has a reported half-life on vegetation of three to ten days, therefore the chronic exposure to mammals that resulted in decreased pup survival is not anticipated.

Comment 99
APHIS received the following comment, "EPA has designated carbaryl as "highly toxic" to bees on a short-term exposure basis and ranged from moderately to highly toxic to other insects, mites and spiders".

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Although the Grasshopper Program has used the liquid formulation of carbaryl in the past, nearly all carbaryl applications this year and for the foreseeable future are likely to be a bait. The potential exposures of bees and other pollinators to carbaryl bait are minimal. The risks of carbaryl to bees and other non-target organisms are summarized in the human health and ecological risk assessment that was prepared to support the final EIS. This analysis is incorporated by reference into the final EA.

Comment 100
APHIS received the following comment, "Carbaryl is considered "highly toxic" to certain species of fish when exposed to short-term bursts and can reduce the number of eggs spawned when fish are exposed to lower levels over a longer period of time".

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Carbaryl Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. Comparison of the distribution of acute, sublethal and chronic effects data for fish to the residues estimated using ground and aerial ultra-low volume spray and bait applications show that the range of residues do not overlap with acute toxicity values, suggesting there is no acute risk to fish species. APHIS determined there is some overlap with chronic and sublethal effect values and estimated residues. However, carbaryl half-lives in water are typically short and with the proposed one time application chronic exposure and risk to fish is not anticipated. Effects from consumption of contaminated prey are also not expected to be a significant pathway of exposure, based on the low residues and low bioconcentration factor values reported for carbaryl.

APHIS program guidelines describe buffers to bodies of water, streams and rivers are addressed in Appendix 2 of the Draft EAs and the USFWS Section 7 consultations and USFWS letters of concurrence (Appendix 4). All reduce the exposure to fish species.

Comment 101
APHIS received the following comments, "Carbaryl has been designated "very highly toxic" to aquatic invertebrates on an acute exposure basis by the EPA and mesocosm studies that analyze how the pesticide affects aquatic community structure have found significant negative effects at low levels".

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Carbaryl Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. The risk assessment summarizes the available laboratory and field effects data for aquatic invertebrates and carbaryl. The risk assessment also summarized the potential exposure and risk to aquatic invertebrates. The EIS and carbaryl risk assessment are incorporated by reference into the EAs.

Comment 102
APHIS received the following comment, "The EPA identified potential interactions between carbaryl and the androgen pathway in fish, indicating that carbaryl is an endocrine disruptor in male aquatic vertebrates".

Carbaryl half-lives in water are typically short and with the proposed one time application chronic exposure and endocrine disruption risk to fish is not anticipated. Effects from consumption of contaminated prey are also not expected to be a significant pathway of exposure, based on the low residues and low bioconcentration factor values reported for carbaryl. Chronic risk is also a conservative estimate because chronic toxicity data is based on long-term exposures that what would not be expected to occur from a single application, based on the environmental fate of carbaryl in aquatic environments. The final EIS and human health and ecological risk assessment for carbaryl provides additional information regarding the effects of carbaryl to fish. APHIS program guidelines describe buffers to bodies of water, streams and rivers are addressed in Appendix 2 of the

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Draft EAs and the USFWS Section 7 consultations and USFWS letters of concurrence (Appendix 4). All reduce the exposure to fish species.

Comment 103
APHIS received the following comment, "On March 12, 2020, the EPA released a draft biological opinion finding that carbaryl is likely to adversely affect 1542 out of 1745, or 86% percent of all listed species in the U.S. and 713 out of 776 designated critical species' habitats across the U.S.".

The Endangered Species Act section 7 pesticide consultation process between the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services, collectively) and the EPA specifically concerns FIFRA pesticide registration and reregistration in the United States, including all registered uses of a pesticide. The state-level Biological Assessments for APHIS invasive species programs are separate from any consultations conducted in association with pesticide registration and reregistration process.

The Agricultural Improvement Act of 2018 (Farm Bill) created a partnership between USDA, EPA, the Services, and the Council on Environmental Quality to improve the consultation process for pesticide registration and reregistration. USDA is committed to working to ensure consultations are conducted in a timely, transparent manner and based on the best available science. The Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides provides a directionally improved path to ensuring that pesticides can continue to be used safely for agricultural production with minimal impacts to threatened and endangered species.

APHIS provided information about use of carbaryl to EPA for the FIFRA consultation for carbaryl. The Grasshopper Program use of carbaryl has in the past comprised substantially less than 1% of the percent crop treated (PCT) for rangeland use of carbaryl. This is the case for the reasonably foreseeable future. For rangeland, in the EPA BE, the Grasshopper Program's very low usage was rounded up to <1% PCT, which gives an overestimate of rangeland acres treated and thus endangered species risk. APHIS use of carbaryl is even smaller compared to all uses of carbaryl nationwide. Further, the Grasshopper Program consults directly with the Services to ensure program activities do not adversely affect protected species or their critical habitat.

Comment 104
APHIS received the following comment, "EPA found many South Dakota species were likely to be adversely affected. This is a chemical far too toxic for APHIS to consider using across wide swaths of land in South Dakota."

Carbaryl is presently approved by the EPA and registered in South Dakota. It should be noted that the current labeled uses for carbaryl grasshopper treatments are at much higher rates and can be applied with more frequency than what APHIS is proposing for use in South Dakota. In addition carbaryl use by the Program is minor compared to the preferred alternative diflubenzuron. APHIS has evaluated the risk of carbaryl use in the Program and in general the conclusions are consistent with other risk assessments demonstrating low risk when adhering to label requirements. Additional mitigation measures used by APHIS further reduces the risk to human health and the environment.

APHIS submitted a programmatic biological assessment to the USFWS in 2015. APHIS is currently working with the USFWS to update and complete the biological assessment and receive concurrence. The intent of the programmatic biological assessment is to provide consistent mitigation measures for listed species that may co-occur with Program treatments. Consultation with the USFWS is still being completed at the local level prior to any treatments. <u>No APHIS treatments are made in States without prior concurrence from the USFWS regarding federally-listed species.</u> This information is also summarized in the final EIS.

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APHIS consulted with the USFWS on federally-listed species that may occur within the county or areas where grasshopper and Mormon cricket treatments may be required. APHIS works closely with the USFWS to determine the application of protection measures and where those measures should be applied prior to any treatments. APHIS also evaluated the potential direct and indirect impacts to non-target species which is summarized in the final human health and ecological risk assessments for each insecticide.

Comment 105
APHIS received the following comment, "The European Union banned carbaryl in 2007 due to, among other things, "…a high long-term risk for insectivorous birds and a high acute risk to herbivorous mammals, a high acute and long-term risk to aquatic organisms and a high risk for beneficial arthropods".

APHIS summarizes the risk of carbaryl to non-target organisms in final human health and ecological risk assessment that was part of the recently published final EIS. Available effects data and the exposures that would be expected from proposed use in the grasshopper and Mormon cricket program are reduced based on mitigation measures (ex. RAATS, aquatic buffers) application methods and formulation types which further reduce risk.

Comment 106
APHIS received the following comments, "Carbaryl is classified as "likely to be carcinogenic to humans" based on treatment-related hemangiosarcoma development in mice".

The levels of carbaryl that caused the above-mentioned effects to mice are above exposure concentrations that would be expected to occur for the public as well as workers and applicators in the APHIS grasshopper and Mormon cricket suppression program. The risk to human health from carbaryl use, including the proposed APHIS use, have been evaluated by APHIS and are discussed in the final human health and ecological risk assessment for carbaryl. It should be noted that other agencies have evaluated the risk to carbaryl at much higher application rates than those used in the grasshopper and Mormon cricket program.

Comment 107
APHIS received the following comments, "EPA has determined that humans can be exposed to more than 4 times the amount of carbaryl known to cause neurotoxicity from some legal uses of the pesticide. EPA also found that the current labelled uses of carbaryl may result in neurotoxic harms to mixers, loaders and applicators" and "use of this dangerous old pesticide must be discontinued and should not be considered for use in grasshopper and Mormon cricket eradication in South Dakota".

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Carbaryl Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. APHIS evaluated the potential human health risks from the proposed use of carbaryl ULV sprays and carbaryl bait applications and determined that the risks to human health are low. The lack of risk to human health is based on the low probability of human exposure and the favorable environmental fate and effects data.

APHIS treatments are conducted in rural rangeland areas where agriculture is a primary economic factor. Rural rangeland areas consist of widely scattered, single dwellings in ranching communities with low population density. Risk to the general public from carbaryl ground or aerial applications is also expected to be minimal due to the low-population areas proposed for treatment, adherence to label requirements, and additional Program measures designed to reduce exposure to the public. APHIS is not obligated to analyze the

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risk posed by all legal uses of carbaryl, but rather the Grasshopper Program formulations and application rates.

The proposed use of carbaryl as a ULV spray, or a bait, and adherence to label requirements substantially reduces the potential for exposure to humans. APHIS does not expect adverse health risks to workers because of the low potential for exposure to carbaryl when applied according to label directions and use of personal protective equipment. APHIS quantified the potential risks associated with accidental exposure of carbaryl for workers during mixing, loading, and application. The quantitative risk evaluation results indicate no concerns for adverse health risk for Program workers from carbaryl applications in accordance with program standard operating procedures for safety.

As stated in the EA, 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. At no time does APHIS ever strive to eradicate grasshoppers.

Comment 108
APHIS received the following comment, "EPA has found that all use scenarios of chlorantraniliprole can result in direct or indirect effects to all listed species".

The EPA risk assessment is a screening level ecological risk assessment that evaluated risk under a variety of application rates with most being well above use rates proposed in the APHIS Grasshopper Program. APHIS prepared a final human health and ecological risk assessment that assesses the risk of APHIS Program treatments. The state-level Biological Assessments for APHIS invasive species programs are separate from any consultations conducted in association with pesticide registration and reregistration process.

As previously stated, the Grasshopper Program will not be using chlorantraniliprole in South Dakota during 2020. Therefore any chlorantraniliprole exposure scenarios which the commenter is concerned about are not relevant at this time.

Comment 109
APHIS received the following comment, "EPA has found that all use scenarios of chlorantraniliprole can result in direct or indirect effects to all listed species. Chlorantraniliprole is considered "very highly toxic" to freshwater invertebrates and EPA found that many uses of it can result in acute and chronic harms to aquatic invertebrates. This was the case for both aerial and ground spray applications. Sublethal doses can impair locomotion in bees more than seven days post exposure. A 2013 European Food Safety Authority analysis of chlorantraniliprople found that the use of the pesticide poses a high risk to soil macro-organisms, aquatic invertebrates and sediment dwelling organisms." and "APHIS must consider chlorantraniliprole substantial environmental impacts, including population level effects".

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Chlorantraniliprole Rangeland Grasshopper and Mormon Cricket Suppression Applications is published. The document summarizes available effects data and characterizes risk to human health and non-target organisms based on the use pattern proposed by the Program. Results from the risk assessment suggest low risk of chlorantraniliprole to non-target aquatic organisms and most terrestrial invertebrates.

As previously stated, the Grasshopper Program will not be using chlorantraniliprole in South Dakota during 2020. Therefore any chlorantraniliprole exposure scenarios which the commenter is concerned about are not relevant at this time.

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Comment 110
APHIS received the following comments, "Diflubenzuron is considered "highly" to "very highly toxic" to aquatic invertebrates. In a 2018 analysis, EPA found that the registered, labeled uses of diflubenzuron may result in freshwater invertebrate exposure at up to 550 times the level known to cause harm. Diflubenzuron exposure to honeybees and other pollinators at the larval stage was estimated to be more than 500 times the level known to cause harm. Although arthropods are not a part of EPA's ecological risk assessment, the European Food Safety Authority found that "Juvenile non-target arthropods were very sensitive to diflubenzuron. Very large in-field no-spray buffer zones would be needed to protect non-target arthropods. There is no reason for APHIS to exclude consideration of impacts to arthropods in its analysis of this pesticide." and "APHIS also acknowledges the pollinator impacts but attempts to diminish them without providing evidence on how or why they are not significant".

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Diflubenzuron Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. The EPA risk assessment evaluated risk to aquatic organisms and pollinators based on application rates, methods of application and use patterns that would result in greater exposure and risk to aquatic and terrestrial invertebrates. APHIS evaluated risks to these groups of non-target organisms based on methods of application consistent with Program applications and other mitigation measures for diflubenzuron. The exposure potential is reduced compared to label uses due to many factors. This includes but is not limited to reduced application rates, one application per season, use of RAATs and buffers from aquatic habitats. APHIS relied on laboratory and field collected data regarding diflubenzuron effects to aquatic and terrestrial invertebrates to show that risk is low for most non-target invertebrates.

Characterization of risk to aquatic species from Program-specific diflubenzuron applications was made by comparing the residue values in the exposure analysis from ground and aerial applications to the distribution of available acute and chronic fish toxicity data. Residue values were below the distribution of acute and chronic response data, suggesting that direct risk to aquatic species is not expected from diflubenzuron applications. More specifically, the distribution of aquatic invertebrate toxicity data is above the residues estimated from spray drift models for Grasshopper Program ground and aerial applications of diflubenzuron.
The Endangered Species Act section 7 pesticide consultation process between the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services, collectively) and the EPA specifically concerns FIFRA pesticide registration and reregistration in the United States, including all registered uses of a pesticide. The Grasshopper Program treatments employ methods and diflubenzuron application rates that result in substantially lower freshwater invertebrate exposures than the rate cited by the EPA and the commenter.

The EPA Preliminary Risk Assessment to Support Re-registration Review examines all legal uses of diflubenzuron, of which the Grasshopper Program constitutes a small fraction. APHIS is not obligated to examine all legal uses of the pesticide, but rather those contemplated by the program. The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Diflubenzuron Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. Characterization of risk to aquatic species from diflubenzuron applications was made by comparing the residue values in the exposure analysis from ground and aerial applications to the distribution of available acute and chronic fish toxicity data. Residue values were below the distribution of acute and chronic response data, suggesting that direct risk to aquatic species is not expected from diflubenzuron applications. More specifically, the distribution of aquatic invertebrate toxicity data is above the residues estimated from spray drift models for Grasshopper Program ground and aerial applications of diflubenzuron.

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Diflubenzuron Rangeland Grasshopper and Mormon Cricket Suppression

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Applications are published. The APHIS analysis noted Diflubenzuron has low toxicity and risk to some non-target terrestrial invertebrates, including pollinators such as honey bees.

Comment 111
APHIS received the following comment, "APHIS also acknowledges the pollinator impacts but attempts to diminish them without providing evidence on how or why they are not significant. It does not mention that South Dakota is home to an amazing abundance of native bees and pollinators, and improperly uses honeybees as a surrogate for pollinators, when native pollinators are far more sensitive due to the lack of hive buffering effects. This is not a pesticide that should be applied to broad swaths of land. It is highly toxic to far too many species of importance in South Dakota."

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%, 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 one 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).

Comment 112
APHIS received the following comment, "Diflubenzuron is commonly fed to ranging cattle as a way to control flies. This pesticide is present in the excreted manure and urine of cattle where they range. Therefore, any decision on whether to use diflubenzuron in these areas must consider that listed or non-listed species can be exposed to other sources of the pesticide. It is that cumulative exposure that must be considered in this decision – and is compelled by the ESA and NEPA's mandate that an action agency take into account the environmental baseline".

APHIS recognizes that some diflubenzuron resides may be present in urine and feces from cattle that feed on forage immediately after diflubenzuron treatment; however this pathway of exposure is expected to be minor based on the proposed use pattern of diflubenzuron in the Program. Low application rates applied only once per season will reduce the amount of diflubenzuron present in manure and urine. In addition some metabolism of diflubenzuron occurs in animals, and there will be further environmental degradation once excreted.

Comment 113
APHIS received the following comment, "Malathion is considered "very highly toxic" to all aquatic and terrestrial invertebrates, as well as aquatic vertebrates such as fish. In addition indirect effects to taxa should be considered."

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Malathion Rangeland Grasshopper and Mormon Cricket Suppression Applications are published. The risk assessment summarizes available laboratory and field collected aquatic and terrestrial effects data for malathion and then estimated risk based on conservative estimates of exposure. APHIS recognizes in the risk assessment that malathion can be toxic to sensitive non-target species however the effects have to be considered in relation to the potential for exposure to estimate risk, as well as historical use in the Program which is negligible.

Comment 114
APHIS received the following comment, "When exposed to malathion for longer periods of time, female birds displayed regressed ovaries, reduced number of hatched eggs and enlarged gizzards".

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The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Malathion Rangeland Grasshopper and Mormon Cricket Suppression Applications are published.

Several reproductive and developmental studies have been conducted with birds. The lowest median lethal dose to chicken embryos (eggs) was 3.99 mg per egg for 4-day embryos (Greenberg and LaHam, 1969). The median lethal concentration for field applications of malathion to mallard duck eggs was found to be 4.7 lbs. a.i./acre (Hoffman and Eastin, 1981). This is approximately five times greater than the maximum rate for rangeland grasshopper (0.928 lbs. a.i./acre), 7.6 times greater than the maximum APHIS application rate (0.619 lbs. a.i./acre), and nearly 19 times greater than the average RAATs rate applied by APHIS.

No effect on reproductive capacity of chickens was found at dietary concentrations as high as 500 ppm in feed (Lillie, 1973). Based on the results from chronic reproduction studies using the bobwhite quail and mallard duck, the NOEC values were 110 and 1,200 ppm, respectively. The most sensitive endpoint in the quail study was regressed ovaries and reduced egg hatch at the next highest test concentration (350 ppm). The effect endpoint in the mallard study was growth and egg viability at the 2,400 ppm level Lowest Observed Effect Concentration (LOEC).

APHIS expects that direct avian chronic effects would be minimal for most species. The preferred use of RAATs during application reduces these risks by reducing residues on treated food items and reducing the probability that they will only feed on contaminated food items. In addition, malathion degrades quickly in the environment and residues on food items are not expected to persist.

Comment 115

APHIS received the following comments, "Malathion degrades into maloxon, which has been shown to be at least 22 times more toxic than the parent molecule".

Similar to other organophosphate pesticides, malathion inhibits the enzyme AChE in the central and/or peripheral nervous system. Malathion is metabolized to malaoxon, which is the active AChE inhibiting metabolite. AChE inhibition is through phosphorylation of the serine residue at the active site of the enzyme, and leads to accumulation of acetylcholine and ultimately neurotoxicity. Malaoxon goes through detoxification with subsequent metabolism. Absorption and distribution of malathion and malaoxon are rapid with extensive metabolism and no accumulation in tissues.

Carboxylesterase detoxifies malathion and malaoxon to polar and water-soluble compounds for excretion. A rat metabolism study showed 80 to 90% of malathion excretion in the urine in the first 24 hours of exposure. Mammals are less sensitive to the effects of malathion than insects due to greater carboxylesterase activity resulting in less accumulation of malaoxon.

Available aquatic toxicity data show that malaoxon is approximately 1.5 to 6 times more toxic to fish and 1.8 to 93 times more toxic to amphibians. FMC, in their 2019 public response to the Grasshopper Program EIS, reported that malaoxon is 0.80 to 2.58 times more toxic to fish than malathion based on data that were determined to meet their criteria for acceptability (FMC, 2014). The conversion of malathion to malaoxon in aquatic environments can range from approximately 1.8 to 10% (CDPR, 1993; Bavcon et al., 2005; USEPA, 2012).

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While APHIS assumed that malaoxon is most likely more toxic to aquatic invertebrates than the parent; however, due to its low percentage of occurrence in aquatic systems and its rapid breakdown, malaoxon is not anticipated to pose a greater aquatic risk when compared to malathion.

Comment 116
APHIS received the following comment, "A 2017 EPA biological evaluation also found that the use of malathion is likely to adversely affect 1778 out of 1835 listed species in the U.S. and 784 out of 794 critical species' habitats across the U.S. These findings were based on methodology recommended by the National Academy of Sciences. EPA found many South Dakota species were likely to be adversely affected, such as the yellow billed cuckoo. The U.S. Fish and Wildlife Service later drafted a biological opinion finding that malathion is likely to jeopardize the continued existence of 1284 threatened and endangered species. This is an astounding number of jeopardy calls for a single pesticide, and makes it even more astounding that APHIS would continue to consider using it for grasshopper and cricket control."

The Endangered Species Act section 7 pesticide consultation process between EPA and the Services specifically concerns FIFRA pesticide registration and reregistration in the United States, including all registered uses of the pesticide. The Grasshopper Program use of malathion comprised nearly none of the percent crop treated for rangeland in the past, and this remains APHIS' expectation for the foreseeable future. Further, the Grasshopper Program consults directly with the Services to ensure program activities do not adversely affect protected species or their critical habitat.

Comment 117
APHIS received the following comment, "California's Proposition 65 list of chemicals known to cause cancer and has been designated as having suggestive evidence of carcinogenicity by the EPA for instances of liver, oral palate mucosa and nasal respiratory epithelium tumor formation in mice."

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and Final Human Health and Ecological Risk Assessment for Malathion Rangeland Grasshopper and Mormon Cricket Suppression Applications are published.

Comment 118
APHIS received a comment that, "EPA has determined that humans can be exposed to more than 6 times the amount of malathion known to cause neurotoxicity from some legal uses of the pesticide. EPA also found that the current labelled uses of malathion may result in neurotoxic harms to those exposed to pesticide drift from aerial applications at labelled rates". The commenter also pointed out that occupational applicators, mixers and loaders can be exposed to malathion through inhalation and dermal absorption at levels above what the EPA considers safe – even when using required personal protective equipment."

APHIS evaluated the risk to human health, including neurotoxicity data in its finale human health and ecological risk assessment. The risk assessment was prepared based on APHIS use patterns and Program mitigations that reduce risk to human health. APHIS is not obligated to ensure the EA and supporting documents analyze the risk posed by all legal uses of malathion, but rather the Grasshopper Program methods and application rates.

Malathion exposure to the general public is not expected from the program use based on label requirements and program standard operating procedures that prevent potential exposure. Only protected handlers may be in the area during application, and entry of the general public into the treated area is not allowed during the re-entry interval period. APHIS treatments are conducted on rural rangelands, where agriculture is a primary economic factor and widely scattered dwellings in low population density ranching communities are found. The

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program requires pilots avoiding flights over congested areas, water bodies, and other sensitive areas. Aerial applications are not allowed while school buses are operating in the treatment area; within 500 feet of schools or recreational facilities; when wind velocity exceeds 10 miles per hour (mph) (unless a lower wind speed is required under State law); when air turbulence could seriously affect the normal spray pattern; and/or temperature inversions could lead to off-site movement of spray. The Grasshopper Program also notifies residents within treatment areas, or their designated representatives, prior to application to reduce the potential for incidental exposure.

APHIS acknowledges workers in the program are the most likely human population segment to be exposed to malathion during grasshopper treatments. Occupational exposure to malathion may occur through inhalation and dermal contact during ground and aerial applications. Direct contact exposure from the application of a malathion ULV spray will be minimal with adherence to label requirements, the use of personal protective equipment (PPE), general safety hygiene practices, and restricted entry intervals into treated areas after application. EPA estimates of risk to workers is based on use patterns and rates that result in greater exposure to malathion than would occur in the APHIS program. APHIS evaluated the risk from program specific uses of malathion and demonstrated low risk to applicators. It should also be noted that historical malathion use in the Program is negligible further reducing the potential for any types of human health risk.

Comment 119
APHIS received the following comment, "APHIS touts EPA-approval as an indication that the pesticides that the agency proposes to use are safe. However, under our nation's pesticide laws, EPA-approval is an indication that use of the pesticide won the agency's cost-benefit analysis, and should not be misconstrued as a finding of safety."

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and human health and ecological risk assessments for pesticides used by the Grasshopper Program are published. APHIS does not assert the FIFRA registration of the pesticides by the EPA demonstrates that the Grasshopper Program uses are safe. Instead the extensive risk analysis published by APHIS considered whether the suppression of grasshopper population will have significant environmental impacts, in accordance with NEPA.

Comment 120
APHIS received the following comment, "APHIS does not discuss or account for how pesticides impact overall soil health or the health of any organisms that reside in soil."

The EA provided links to APHIS' Grasshopper Program webpage where the 2019 EIS and HHERA for pesticides used by the Grasshopper Program are published. The HHERA contain extensive analysis of pesticide effects on terrestrial vertebrates, many of which reside in soil.

Comment 121
APHIS received the following comment, "Impacts on soil health can impact listed and non-listed plants by impacting nutrient cycling, soil oxygenation and soil water retention, as well as listed and non-listed animals that rely on plants or soil organisms for their survival."

The Grasshopper Program applies pesticides in accordance with current label restrictions and program operational procedures that are mitigations to minimize significant exposure of soil, water, and air to insecticides; grasshopper chemical treatments are not expected to persist or bioaccumulate in the environment. APHIS evaluated these effects in human health and ecological risk assessments that were prepared along with the final EIS for the grasshopper and Mormon cricket suppression program.

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Comment 122
APHIS received the following comment, “Carbaryl was ranked as extremely toxic to earthworms in a lab test rating pesticide toxicity from relatively nontoxic, moderately toxic, very toxic, extremely toxic, and super toxic.”

The study was a comparison of the toxicology of 45 pesticide to determine the LC50. These studies exposed earthworms to varying concentrations of carbaryl to determine toxicological endpoints. Based on the extremely high doses, the impact to the survival of earthworms was not only unsurprising, but the object of the studies. APHIS would like to note this laboratory dosing procedure is not comparable to any exposure levels resulting from the use of carbaryl ultra-low volume sprays by the Grasshopper Program.

Comment 123
APHIS received the following comment, “A single application of carbaryl in a field study caused a 38% reduction in survival of total Lumbricidae, and a 78% reduction in total earthworms for at least 5 weeks.”

APHIS would like to note the "single application" involved applying carbaryl 6 times on a weekly interval to its assigned plots at the highest recommended dose (i.e. Sevin at 9.12 mg/m2), a rate that is greater than 16 times the Grasshopper ultra-low volume liquid rate (0.56 mg/m2). The Grasshopper program only makes one application per year, rather than six weekly treatments. Also, the field study found carbaryl significantly inhibited earthworm feeding activity for at least three weeks <u>without leading to any earthworm death</u>.

In addition, the 78% reduction in earthworm casts noted in the comment resulted from an application of a combination of clothianidin and bifenthrin pesticides.

Comment 124
APHIS received the following comment, “Carbaryl significantly impacted the survival or population abundance of E. fetida, E. andrei, Lumbricus terrestris, and Lumbricus rubellus, Aporrectodea caliginosa, and Allolobophora chlorotica.”

These studies exposed earthworms to varying concentrations of carbaryl to determine toxicological endpoints (NOEC, LC50). Based on the extremely high doses, the impact to the survival of earthworms was not only unsurprising, but the object of the studies. For example in Lima et al. 2011, ten adult worms with individual fresh weight between 300 and 600 mg, were exposed to different carbaryl concentrations (20, 40, 60, 80, 100 mg/kg). APHIS would like to clarify the Grasshopper Program applies carbaryl ultra-low volume spray at a rate of half a pound active ingredient per acre.

Comparison of the results of paper contact test with those obtained in soils clearly demonstrates that the contact test has no predictive values for the toxicity of an insecticide in soils, though it is important for the initial screening of the environmental chemicals. The differences between lowest and highest LC50 values of insecticides for M. posthuma and E. fetida in paper contact method were only 6.9 and 2.5-fold respectively while in soil they were over 38 and 26-fold. These data demonstrated that worms could tolerate higher concentrations in soil than on moist filter paper. This difference in the behavior of the insecticide may probably due to the rate of diffusion/uptake of insecticide from the medium into the body of the earthworm. It is well reported in the literature that insecticides are adsorbed on soil medium through strong binding by organic matter contents in soils (Davis, 1971, Van Gestel and Van Dis, 1988). Hence, the availability of insecticide for diffusion will be less from the soil than the impregnated filter paper. Contact filter paper test can be used as an initial screening technique to assess the relative toxicity of chemicals; however it fails to represent the situation in the soil ecosystem. Artificial soil test is more representative of the natural environment of earthworms and acute toxicity data on several insecticides can be used in the ecological risk assessment on soil ecosystems.

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Comment 125

APHIS received the following comment, "In another study, carbaryl induced an avoidance response in *E. fetida*. Soil structure changes were observed between the control and carbaryl treated sites, with higher treatments of carbaryl causing significantly more lumps in the soil due to earthworm inactivity."

The commenter cited a study where worms were rinsed in tap water and transferred to the flasks containing 2 ml solution per worm. The flasks were gently tilted every 5 min and the exposure was terminated after 30 min. The worms were removed, rinsed in cold tap water and transferred to Petri dishes (five worms in each) containing soil but no pesticide. The worms were inspected at intervals during 80 days or until all the worms were dead or had recovered. The structure of the soil in the Petri dishes was observed in order to get an idea about the ability to work the soil after pesticide treatment. APHIS would like to note this laboratory dosing procedure is not comparable to any exposure scenario resulting from the use of carbaryl ultra-low volume sprays by the Grasshopper Program.

Notably, E. foetida could tolerate high concentrations of carbaryl without dying, although low concentrations severely affected its ability to work the soil or to disappear from the soil surface. The researchers believe the solutions were equivalent to 64, 32, 16, 8 and 4 mg/kg of pesticide, and found that carbaryl did not kill E. foetida in concentrations up to 64 mg/kg, from the 800 mg/l solution.

The avoidance test is a behavioral test with several advantages (simple, quick and cheap) but one drawback: this is not a measure of toxicity but rather a measure of repellence (Capowiez and Bérard, 2006), and thus is termed 'measure of habitat modification'. As there is not always a direct relationship between avoidance and toxicity, an improvement of this test was recently proposed by Sanchez-Hernandez (2006).

APHIS would like to clarify the Grasshopper Program applies carbaryl ultra-low volume spray at a rate of half a pound active ingredient per acre. If a cubic foot of rangeland soil weighs 75 pounds, 1 acre (43,560 ft.2) of soil two inches deep would weigh 544,500 pounds, or 246,981 kilograms. The maximum rate used by the Grasshopper Program to apply carbaryl as an ultra-low volume spray is half a pound (226796 mg) active ingredient per acre. Therefore, the maximum concentration of 0.92 mg carbaryl spray per kg of soil could result from program applications. However, this analysis assumes none of the foliar spray settled on vegetation, and all of the carbaryl is instantaneously absorbed into the top two inches of soil. In addition, this maximum concentration was less than the lowest concentration which the researchers determined has significant effects on the reduction of the P. excavatus hatching rate (1.51 mg carbaryl per kg of soil).

Comment 126

APHIS received the following comment, "Carbaryl negatively affected the biomass of *E. andrei*, *Perionyx* excavates, total earthworms, and *Lumbricus terrestris* at a tenth of the recommended dose."

The carbaryl concentrations used for each test species was chosen based on the LC50/EC50 previously carried out and reported by Lima et al. (2011). This was also a toxicological endpoint study where the acute toxicity was determined by exposing the worms to a nominal concentration range of 20 to 100 mg/kg of technical grade carbaryl. The application rate was 850 grams per hectare of Sevin L85 which is equal to 1.12 pounds active ingredient carbaryl per acre, compared with Sevin XLR which is 44.1 % applied at half a pound active ingredient per acre by the Grasshopper Program.

This study was primarily designed to validate the production of casts by earthworms as a biomarker for behavioral effects. While the significant effects in earthworm weight observed at low concentrations of carbaryl

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are concerning, Grasshopper program applications of foliar sprays are unlikely to result in the subsurface soil becoming saturated at the concentrations created in the laboratory.

Comment 127

APHIS received the following comment, "A 60-99% reduction in earthworm biomass and density due to carbaryl treatment lasted 20 weeks. Burial of organic matter was also negatively affected. Casting activity of earthworms was reduced by 90%, and 71% and 81% after 3 and 5 weeks, respectively."

The researchers made two applications of carbaryl at a rate of 8 lbs. a.i./acre, 16 times greater than the maximum spray rate employed by the Grasshopper Program. The Grasshopper Program only makes one application per year. In addition, the foliar spray of ultra-low volume carbaryl over rangeland is unlikely to result in subsurface soil concentrations comparable to the direct turfgrass application made in this study.

Comment 128

APHIS received the following comment, "Carbaryl negatively affected growth in *E. fetida*, and the feeding rate of Diplocardia spp. Total cast production of *L. terrestris* was significantly impacted at one-tenth of the recommended field rate."

The lowest test concentration that effected E. fetida resulted from saturation of the test media with 25 mg/kg of carbaryl. Another field study found a single application of carbaryl significantly inhibited earthworm (Diplocardia spp.) feeding activity for at least three weeks <u>without leading to any earthworm death</u>. APHIS would like to note the "single application" involved applying carbaryl 6 times on a weekly interval to its assigned plots at the highest recommended dose (i.e. Sevin at 9.12 mg/m2), a rate that is greater than 16 times the Grasshopper ultra-low volume liquid rate (0.5 lbs. a.i./acre). The Grasshopper program only makes one application per year, rather than six weekly treatments.

Comment 129

APHIS received the following comment, "Reproduction of *E. fetida*, and *Perionyx excavatus* was negatively affected, with the hatching rate of *P. excavatus* reduced by 87% at sublethal concentrations lower than the recommended field rate. A total loss of burrowing was observed at 4 and 8 mg/kg after 40 minutes and at 1 and 2 mg/kg after 80 minutes."

The lowest test concentration that effected E. fetida resulted from saturation of the test media with 25 mg/kg of carbaryl. In another study the reduction of the P. excavatus hatching rate was observed at a concentration of 1.51 mg carbaryl per kg of soil.

APHIS would like to clarify the Grasshopper Program applies carbaryl ultra-low volume spray at a rate of half a pound active ingredient per acre. If a cubic foot of rangeland soil weighs 75 pounds, 1 acre (43,560 ft.2) of soil two inches deep would weigh 544,500 pounds, or 246,981 kilograms. The maximum rate used by the Grasshopper Program to apply carbaryl as an ultra-low volume spray is half a pound (226796 mg) active ingredient per acre. Therefore, the maximum concentration of 0.92 mg carbaryl spray per kg of soil could result from program applications (0.92 mg/kg). However, this analysis assumes none of the foliar spray settled on vegetation, and the carbaryl instantly absorbed into the top two inches of soil, thus mirroring the laboratory conditions. In addition, this maximum concentration was less than the lowest concentration which the researchers determined has significant effects on the reduction of the P. excavatus hatching rate (1.51 mg/kg).

Comment 130

APHIS received the following comment, "Morphological abnormalities and histological changes in *E. andrei* and *M. posthuma* were observed at very low, sublethal doses ranging from 0.24-1.20 mg/kg and 0.5-1.20 mg/kg, respectively."

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The cited study did not test E. andrei but rather E. fetida a closely related species. The sublethal doses were derived from anecdotal observations during filter paper tests where concentrations were measured in µg/cm2 not mg/kg. APHIS would also like to note the researcher's skepticism about toxicity tests where the worms are dosed on saturate filter paper. They wrote: Comparison of the results of paper contact test with those obtained in soils clearly demonstrates that the contact test has no predictive values for the toxicity of an insecticide in soils, though it is important for the initial screening of the environmental chemicals. The differences between lowest and highest LC50 values of insecticides for M. posthuma and E. fetida in paper contact method were only 6.9 and 2.5-fold respectively while in soil they were over 38 and 26-fold. These data demonstrated that worms could tolerate higher concentrations in soil than on moist filter paper. This difference in the behavior of the insecticide may probably due to the rate of diffusion/uptake of insecticide from the medium into the body of the earthworm. It is well reported in the literature that insecticides are adsorbed on soil medium through strong binding by organic matter contents in soils (Davis, 1971, Van Gestel and Van Dis, 1988). Hence, the availability of insecticide for diffusion will be less from the soil than the impregnated filter paper. Contact filter paper test can be used as an initial screening technique to assess the relative toxicity of chemicals; however it fails to represent the situation in the soil ecosystem. Artificial soil test is more representative of natural environment of earthworms and acute toxicity data on several insecticides can be used in the ecological risk assessment on soil ecosystem.

Comment 131

APHIS received the following comment, "Carbaryl impacted multiple biochemical biomarkers in E. andrei, including Acetylcholinesterase (AChE), methoxyresorufin-O-deethylase (MROD), and NADH and NADPH red cytochrome reductase."

This study exposed earthworms to carbaryl in artificial soil at concentrations of 12, 25 and 50 mg/kg. The research showed that carbaryl inhibited biotransformation enzyme activities but did not induce oxidative stress. Since carbaryl is a cholinesterases inhibitor, changes detected in acetylcholinesterase activities were not surprising. The acetylcholinesterase activity reduction was not complete and the residual activity was stable whatever the dose or the exposure duration because of the presence in E. andrei of a non-inhibited, non-specific cholinesterases.

APHIS would like to note the lowest tested soil concentration of carbaryl that caused these effects (12 mg/kg) is approximately 12 times greater than the hypothetical concentrations that could result from Grasshopper Program treatments where none of the foliar ultra-low volume spray settles on vegetation, and the chemical is instantly and uniformly mixed into the top two inches of soil.

Comment 132

APHIS received the following comment, "AChE activity was inhibited in *E. fetida* in two studies, one of which resulted in muscular paralysis that directly impacted earthworm burrowing capabilities."

In the first study, carbaryl stock solution was prepared in acetone and water to yield final concentrations of 1, 2, 4 and 8 parts per million. Five earthworms were individually exposed for 5, 10, 20, 40 and 80 minute intervals in a 50ml beaker containing 2.0ml of various concentrations of test solution. The researchers asserted the test concentrations used in the study were close to expected residues in the soil without any evidence or analysis as proof. They also used higher concentrations to exert significant inhibition of AChE activity and loss of burrowing in earthworms for establishing a dose effect "correlationship". These higher exposures occurred after the individual worms were rinsed in tap water, their borrowing rate was measured, they were rinsed again, and then placed back into the solution. Needless to say this systematic dosing in a pesticide solution does not match any exposure levels that could result from the application of ultra-low volume sprays.

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While the significant reduction in the ability of worms to burrow in soil was clearly evident at the lowest test concentration (1 ppm) and the earliest period of exposure (5 min), all worms were alive and fully recovered to normal behavior (no tremors, efficient burrowing) 18 hrs.
post-exposure to 1 ppm carbaryl.

The second study cited by the commenter measured AChE responses in earthworms exposed to carbaryl on filter paper and in a soil media. APHIS has previously noted the difficultly extrapolating between filter paper toxicological tests to actual exposure scenarios relevant to the Grasshopper Program treatments. While the AChE inhibition reached significance after one day of exposure to 0.48 mg/kg carbaryl, the researchers did not conclude there was a reduction of burrowing capacity. Pure carbaryl was used as a liquid solution, while Zoril 5 was applied as a powder spread on the soil. Zoril 5 was thus more abundant on the superficial soil fraction, and was immediately in contact with the animals, whereas pure carbaryl penetrated into the soil and probably became bioavailable later. APHIS would also like to note the tested application rate of 17.8 pounds per acre carbaryl 5% powder formulation (Zoril 5), that was estimated to result in a concentration of 4.29 mg/kg was nearly twice the maximum Grasshopper Program carbaryl bait rate and had no effect on earthworm AChE activity or the lysosomal membrane stability of E. andrei.

Comment 133
APHIS received the following comment, "In addition to earthworms, carbaryl negatively affected collembola population abundance and reproduction."

The first and second studies cited by the commenter did not investigate carbaryl or collembola (Panda and Sahu, 2004, and Stepić, et al., 2013). The third paper cited used carbaryl as a toxic standard for comparison of the effects of other pesticides (Larson et al., 2012). The researchers applied carbaryl at a rate of 8.17 lbs. a.i./acre. Researchers conducting the fourth study cited by the commenters (Potter et al., 1990) made two applications of carbaryl at the same rate of 8.17 lbs. a.i./acre, 16 times the maximum rate used by the Grasshopper Program in ultra-low volume sprays. The Grasshopper Program only makes one application per year. Therefore this study used 32 times the carbaryl rate as the program. In addition, the foliar spray of ultra-low volume carbaryl over rangeland is unlikely to result in subsurface soil concentrations comparable to the direct turfgrass application made in this study.

The next study cited by the commenters (Joy and Chakravorty, 1991) investigated carbaryl toxicity to collembola. Adult specimens of Cyphoderus sp. and Xenylla sp. and Lancetoppia sp. were exposed to soils saturated with solutions ranging from 0.5 to 10 ml/l. Although they noted the standard agricultural doses of carbaryl 50 WP was 6.25 ml/l, the researchers did not provide a sufficient description of their methods for APHIS to make a valuable comparison of the exposure rates of the collembola in the experiment to potential exposure levels resulting from Grasshopper Program treatments.

The commenters cited another study to suggest carbaryl effected collembola reproduction. Three nominal concentrations of carbaryl (1, 4 and 7 mg/kg) in soil chemical behavior and toxicity were investigated at different temperatures. After 15 days from soil spiking, it was observed that carbaryl concentration in soil decreased to 30% and 33% of the initial concentration at the temperature extremes of 8 °C and 28 °C, respectively, and 22.8% of the initial concentration under a 20 °C temperature regime. The collembola survival and reproduction were significantly affected at 4 and 7 mg/kg concentrations, approximately 4 and 7 times greater than hypothetical soil concentrations resulting from Grasshopper Program ultra-low volume sprays (see previous comments for estimations parameters).

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Comment 134
APHIS received the following comments, “Carbaryl also negatively impacted Prostigmata mites, and *Tiphia vernalis*, a wasp that feeds on scarab beetle larvae in the soil.”

In the first study cited carbaryl applied at a rate of 8.18 lbs. a.i./acre, greater than 16 times the Grasshopper Program’s maximum rate, as a toxic standard for comparison of various pesticide control efficacy. The effects on oribatid and mesostigmatid mites was not surprising or comparable to exposure levels resulting from applications of carbaryl ultra-low volume sprays.

The commenters are mistaken, in that the research cited did not find effects on Tiphia vernalis (Helson et al., 1994).

Comment 135
APHIS received the following comment, “Carbaryl can be particularly toxic to ground-nesting bees, like *Andrena erythronii*, *Bombus terrestris*, and *Bombus terricola*.”

The commenters cited a toxicology study where carbaryl was applied topically to the thorax of the bees to investigate lethal doses and determine the concentration values in units of µg a.i./g body weight and of µg a.i./bee. This dosing method is not comparable to any exposure scenario resulting from the Grasshopper Program treatments using ultra-low volume sprays. APHIS would like to note that of the six insecticides tested, carbaryl had the second lowest relative toxicity, rather than as the commenter characterized being particularly toxic to ground-nesting bees. The researchers noted their study does not suggest an inherent, physiological relationship between size and pesticide susceptibility, and they further suggested that bumble bees may be at relatively little risk from carbaryl, contrary to the commenter’s suggestion of particular toxicity to Bombus terricola. The researcher’s elaborated carbaryl previously was not found to have significant effects on bumble bees, citing Hansen and Osgood (1984).

The acute effects of carbaryl on B. terrestris were investigated for ingestion and topical contact in another cited study. The researchers found the calculated hazard ratio for oral exposures of carbaryl (309) was below the mean (1399) and the median (381) of the 14 pesticides tested and reported. Carbaryl was not found to be toxic through topical exposure at the “highest dose advised on the label.” The hazard ratio values permit only a comparative evaluation between the different active compounds tested.

Comment 136
APHIS received the following comment, “Carbaryl caused 100% mortality in *Nomia melanderi* when exposed to field-rate pesticide residues 3 hours post-application, 97% mortality with 8 hours post-application, and 78% mortality 2 days post application. Carbaryl was more toxic than DDT.”

APHIS does not use DDT during Grasshopper Program treatments and does not agree that the relative toxicity to carbaryl is a concern. The study cited by the commenter did not test carbaryl toxicity on bees, but rather included data from earlier studies. The application rate of carbaryl emulated in the earlier studies was I.0 lbs. 80% wettable powder per acre, approximately twice the maximum ultra-low volume rate used by the Grasshopper Program. APHIS found the literature did not provide sufficient details for a reasonable comparison of the carbaryl application methods and rates for additional effects analysis.

Comment 137
APHIS received the following comment, “*Bombus impatiens* colony vitality (as measured by colony weight, worker weight) and the number of workers, honey pots, and brood chambers was reduced following carbaryl exposure.”

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The researchers noted the confinement of the bee colonies within cages represent a worst case scenario in that the workers were caged on the sprayed plots for two or four weeks. Whole-colony consequences of a smaller proportion of the workers foraging on insecticide-contaminated weeds in an open system likely would be less severe. In addition, the researchers explained extent to which an insecticide is hazardous to pollinators is determined by its inherent toxicity as well as the formulation and manner in which it is applied (Stark et al. 1995). For example, pollen contamination, which can decimate honey bee colonies, may be exacerbated by wettable powder or microencapsulated formulations that have high affinity for binding to pollen (Johansen et al. 1983).

APHIS would also like to note the direct application of carbaryl to turfgrass at rates ten times greater (5.44 lbs. a.i./acre) than the maximum rate used by the Grasshopper Program (0.5 lbs. a.i./acre) is not comparable to ultra-low volume foliar spray treatments.

Comment 138
APHIS received the following comment, "In a laboratory study, chlorantraniliprole negatively inhibited the enzymes acetylcholinesterase and glutathione-S-transferase in *Eisenia fetida*."

As previously stated, the Grasshopper Program will not be using chlorantraniliprole in South Dakota during 2020. Therefore any chlorantraniliprole exposure scenarios which the commenter is concerned about are not relevant at this time.

Comment 139
APHIS received the following comment, "Chlorantraniliprole negatively affected *Folsomia candida* (collembola) reproduction."

As previously stated, the Grasshopper Program will not be using chlorantraniliprole in South Dakota during 2020. Therefore, any chlorantraniliprole exposure scenarios which the commenter is concerned about are not relevant at this time.

Comment 140
APHIS received the following comment, "Microscopic examination in an avoidance test revealed that the collembola were paralyzed from the chlorantraniliprole treatment and couldn't migrate, clarifying an observed avoidance at 1 mg/kg, but no avoidance at any higher concentrations. The authors note that chlorantraniliprole may be more toxic to non-target arthropods closely related to insects than to other soil invertebrates."

As previously stated, the Grasshopper Program will not be using chlorantraniliprole in South Dakota during 2020. Therefore, any chlorantraniliprole exposure scenarios which the commenter is concerned about are not relevant at this time.

Comment 141
APHIS received the following comment, "In the field, ground-nesting bumble bees (*Bombus impatiens*) treated with chlorantraniliprole consumed less pollen than control bees."

As previously stated, the Grasshopper Program will not be using chlorantraniliprole in South Dakota during 2020. Therefore any chlorantraniliprole exposure scenarios which the commenter is concerned about are not relevant at this time.

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Comment 142
APHIS received the following comment, “Staphylinidae (Coleoptera) population abundance was slightly but significantly suppressed.”

As previously stated, the Grasshopper Program will not be using chlorantraniliprole in South Dakota during 2020. Therefore any chlorantraniliprole exposure scenarios which the commenter is concerned about are not relevant at this time.

Comment 143
APHIS received the following comment, “After one application of diflubenzuron, myriapoda populations were nearly eradicated (73% reduction), gamasina mites were reduced by 40%, and uropodina mites were reduced by 57%. Diflubenzuron treatment reduced the populations of oribatid mites, prostigmata mites, and soil arthropod larvae, mostly comprised of coleoptera and diptera, by nearly 15%.”

The cited research does not suggest Grasshopper Program applications of diflubenzuron will result in significant impacts to soil microfauna. The researchers applied diflubenzuron to plots and investigated the effects on Collembola, Insecta, Myriapoda, and 4 groups of mites for 6 months. The observed taxa abundance fluctuated seasonally, but for a majority of taxa no significant differences were noticed between the control and exposed plots. The total number of microarthropods was insignificantly lower in exposed groups. While myriapods were the only taxon that was close to extinction after a single exposure to diflubenzuron the pesticide was applied directly to the soil at a rate four times greater than the maximum conventional application rate used by the program. The researchers noted their data proved that soil has some buffering capacity, and this fact should always be taken into consideration when estimating the risk for the environment.

Comment 144
APHIS received the following comment, “In a field study, collembola populations were negatively affected by diflubenzuron and did not recover for one and a half years. The earthworms, *Dendrobaena rubidus* and *Lumbricus rubellus* were reduced in plots treated with concentrations of diflubenzuron at half the recommended field rate. Gamasid and oribatid mite populations were additionally reduced, and oribatida were observed migrating into deeper soil layers to avoid the pesticide.”

The commenters have cited a study where the researchers applied two treatments of diflubenzuron wettable powder directly to the forest floor at a rate 37% higher than the maximum rate used by the Grasshopper Program. Contrary to the characterization of the research findings presented by the commenter, the mean population size of earthworms did not differ significantly during the potential effect phase between control and the 137% the Grasshopper Program rate treatment plot. The populations of the enchytraeid species E. buchholzi, E. minutus, E. norvegicus and M. clavata did not respond to this 137% treatment of diflubenzuron applied twice per growing season. While the number of oribatids decreased after the application of the insecticides in all experimental plots including the control, these differences were only significant in the plot were diflubenzuron was applied directly to the forest floor at a rate nearly 14 times greater than the maximum Grasshopper Program rate.
Where Brachychthoniid populations declined significantly in the diflubenzuron treated plots, the reductions were in part compensated by changes in numbers of the dominant genus Oppiella.
The researchers explained the half-life of diflubenzuron in soil is reported to range from 1 to 27 days, which was borne out by their data. Therefore, residue accumulations in the organic layer is unlikely if diflubenzuron is only applied once per year.

The researchers’ acknowledged that there could be several potential reasons for differences in populations of soil invertebrates between the study plots. First, the plots could differ independent of any treatment. APHIS

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agrees this is a reasonable interpretation because of the small sample sizes during the pre-application, potential effect and early recovery data recording phases (I.e. four plots including the control, five sample dates, two replicates, n=10). The testing of natural variation during the 9 month pre-application phase may not have been sufficient. They decided to interpret deviations as a response to a treatment, if numbers in the potential effect phase were different to those in the other phases in the same plot and to the control in the same phase.

Comment 145

APHIS received the following comment, "Diflubenzuron treatment resulted in a total loss in brood production of male *Bombus terrestris*, and 100% inhibition of egg hatching success and larval growth. Transovarial transport and accumulation of the pesticide in deposited eggs explained the total loss of reproduction. Abnormal cuticle formation, which can lead to mechanical weakness and death, was observed in dead larvae that worker bees were observed removing from treated nests."

The commenters have cited a study where the B. terrestris was directly dosed with diflubenzuron to test acute toxicity. Adult worker bees were exposed via contact by topical application and orally via drinking sugar water and by eating pollen. For contact application, 50 µL of the aqueous concentration was topically applied to the dorsal thorax of each worker with a micropipette. The worker bumblebees were also provided diflubenzuron treated sugar-water for drinking for 11 weeks. Bumblebees can also be exposed orally to pollen sprayed until saturation with a diflubenzuron concentration. Both the sugar water and pollen were supplied for unlimited oral consumption.

While APHIS acknowledges the effects of acute diflubenzuron exposures on the egg hatching and larval stages of bumble bees is a concern, the direct dosing conducted by the researchers is not comparable to any exposure levels that could result from the Grasshopper Program diflubenzuron ultra-low volume spray treatments.

In addition, APHIS would like to note, no acute mortality was observed after topical application, nor after oral exposure to treated sugar-water or treated pollen. In all cases, the number of dead worker bees in the treated nests over a period of 11 weeks was not above that of the control groups using water (0–10%).

Comment 146

APHIS received the following comment, "Multiple studies have observed AChE inhibition in earthworms when malathion was applied. Malathion effected the sperm count and viability and testicular histology of male E. fetida at sublethal concentrations, potentially impairing population abundance."

APHIS agrees with the commenter that the main acute poisonous effect of malathion is the inhibition of the enzyme acetylcholinesterase, and acute poisoning such as was carried out by the researchers with direct exposures to high concentrations of the pesticide could occur in many types of organisms including earthworms. The direct dosing of earthworms to validate their use as toxicological test organisms does not mimic any exposure scenario resulting from the Grasshopper Program use of ultra-low volume sprays of malathion.

To further illustrate the disparity between exposures resulting from laboratory toxicity tests and grasshopper suppression treatments APHIS would like to note the lowest tested concentration was 80 mg/kg of soil. The Grasshopper Program applies malathion ultra-low volume spray at a rate of 0.62 pounds active ingredient per acre. If a cubic foot of rangeland soil weighs 75 pounds, 1 acre (43,560 ft.2) of soil two inches deep would weigh 544,500 pounds, or 246,981 kilograms. The maximum rate used by the Grasshopper Program to apply malathion as an ultra-low volume spray is 0.62 pounds (281227 mg) active ingredient per acre. Therefore, the

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maximum concentration of 1.14 mg malathion spray per kg of soil could result from program applications. However, this analysis assumes none of the foliar spray settled on vegetation, and the malathion instantly absorbed into the top two inches of soil. This hypothetical soil concentration resulting from ultra-low volume sprays should not be compared in a risk analysis with the 80 mg/kg tested for sub-lethal effects in the laboratory.

Comment 147

APHIS received the following comment, "In addition to AChE, the biochemical biomarkers glutathione-S-transferase, and catalase were also inhibited by malathion in studies with *Eisenia andrei*. Malathion has also been observed to negatively affect the reproduction of *E. andrei*."

The commenters have cited research that confirms malathion inhibits AChE in earthworms. While APHIS does not dispute this effect, the agency doubts such effects could result in significant impacts. Notably the researchers found the inhibition period suggests lengthening of retreatment intervals to 45 days is the appropriate conclusion from the study. APHIS only makes one suppression treatment per year to grasshopper infested rangeland.

Comment 148

APHIS received the following comment, "Malathion had a severe effect on AChE activity in *Drawida willsi*. Growth, casting activity, and respiration of *D. willsi* was negatively affected by malathion treatment and did not recover for 75, 60, and 30 days, respectively."

The commenters have cited research that confirms malathion inhibits AChE in earthworms. While APHIS does not dispute this effect, the agency doubts these biomarker effects could result in significant impacts.

The study cited by the commenters described malathion's recommended agricultural dose as 2.7 to 4.0 kg a.i./ha and calculated the equivalent 1.5 to 2.22 mg a.i./kg soil, which APHIS would like to note are comparable to the concentration estimation provided above. However the toxicity results for a single dose of malathion were reported for a concentration of 2.2 mg a.i./kg which is equivalent to double the dose of 4.0 kg a.i./acre, nearly six times the application rate used by the Grasshopper Program.

Comment 149

APHIS received the following comment, "In addition to AChE, the biochemical biomarkers glutathione-S-transferase, and catalase were also inhibited by malathion in studies with *E. andrei*. Malathion has also been observed to negatively affect the reproduction of *E. andrei*."

The commenters have cited two toxicology studies where earthworms were placed in test tubes lined with malathion saturated filter paper to determine acute effect concentrations, extrapolated from the biomarker, AChE reduction. The dosing methods and units of ug a.i./cm2 are not comparable to any exposure levels that could result from the application of malathion ultra-low sprays by the Grasshopper Program. The study cited by the commenter did not make any conclusions regarding malathion affecting reproduction of E. andrei.

Comment 150

APHIS received the following comment, "In a lab test rating the toxicity of 45 pesticides to *E. fetida*, malathion was ranked moderately toxic with an LC50 of 114.4 ug/cm."

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The study cited by the commenter was a comparison of the toxicology of 45 pesticide to determine the LC50. These studies exposed earthworms to varying concentrations of carbaryl to determine toxicological endpoints. Based on the extremely high doses, the impact to the survival of earthworms was not only unsurprising, but the object of the studies. APHIS would like to note this laboratory dosing procedure is not comparable to any exposure scenario resulting from the use of malathion ultra-low volume sprays by the Grasshopper Program.

Comment 151
APHIS received the following comment, "Malathion caused a 40% decrease in survival of the ground-nesting bee, *Nomia melanderi*."

The study cited by the commenter did not test malathion toxicity on bees, but rather included data from earlier studies. The application rate of malathion emulated in the earlier studies was I.0 lb. of emulsifiable concentrate per acre, significantly greater than the maximum ultra-low volume rate used by the Grasshopper Program. APHIS found the literature did not provide sufficient details for a reasonable comparison of the malathion application methods and rates for additional effects analysis.

Comment 152
APHIS received the following comment, "The EAs an agency action subject to this consultation requirement, must be prepared "concurrently with and integrated with environmental impact analyses . . . required by . . . the Endangered Species Act of 1973."

The commenter has again confused the EA prepared by APHIS for the Grasshopper Program in South Dakota with other environmental risk analysis documents. See comment/response 156 below.

Comment 153
APHIS received the following comment, "In order to properly provide information to the public for commenting on the EIS and the EAs, the section 7 process should be completed prior to the completion of NEPA

APHIS would like to note that agencies are not required to publish concurrence letters as part of our NEPA documents. Coordination with other environmental reviews (50 CFR § 402.06) says, ". . . the results should be included in the documents required by those statutes." To reduce paperwork and an emphasis on background material (40 CFR § 1500.4), we make biological assessments part of the administrative record available through FOIA. APHIS complied with the applicable publication requirements for the programmatic EIS and all tiered EAs, consequently reopening public comment periods will not alleviate any perceived deficiency in public access and does not provide any additional remedy for NEPA compliance.

The 1998 ESA Handbook provides guidance for completing consultations. More recent guidance at https://www.fws.gov/endangered/what-we-do/faq.html#10 *says, "Formal consultation should be initiated prior to or at the time of release of the DEIS or EA. At the time the Final EIS is issued, section 7 consultation should be completed." We discussed our Section 7 consultation work to date in the final EIS which included timely initiation of formal consultation and provided for compliance to occur at the State level until a programmatic Biological Opinion is in place. This situation continues.*

Comment 154
APHIS received the following comment, "All endangered species in South Dakota are under the jurisdiction of FWS, and APHIS must complete consultation with FWS to analyze direct and indirect effects of the program on threatened, endangered and sensitive species and their habitats including, but not limited to, runoff, drift, synergistic effects, inert pesticide ingredients, and degraded pesticide ingredients." and "APHIS has failed to

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comply with the basic mandates of the ESA in these EA and actions and if it moves forward with this project, it will be doing so in violation of the ESA."

USFWS issued the letter of concurrence 13 April, 2020 regarding the local site specific biological assessment and is included in The Final EA as Appendix 4.

Comment 155

APHIS received the following comment, "APHIS touts the completion of a 2015 consultation with NMFS in these EAs... there are zero species under the jurisdiction of NMFS in South Dakota"

All reference to NMFS has been removed in the Final EA.

Comment 156

APHIS received the following comment, "APHIS must complete consultation with FWS to analyze direct and indirect effects of the program on threatened, endangered and sensitive species and their habitats including, but not limited to, runoff, drift, synergistic effects, inert pesticide ingredients, and degraded pesticide ingredients. APHIS must ensure that consultation addresses all species and critical habitat that could be directly and indirectly affected by the proposed project."

See previous responses to comments. APHIS consults at the local level directly with USFWS. Appendix 4 in each EA lists all the T&E and proposed T&E species in South Dakota, including the mitigation measures that APHIS will employ during suppression projects to insure that said species will not be adversely impacted.

Comment 157

APHIS received the following comment, "APHIS would unlawfully be making an irreversible or irretrievable commitment of resources if it allows insecticide application on rangeland grasshoppers and/or Mormon crickets to occur prior to fulfilling its section 7 obligations. APHIS will run afoul of its Section 7 ESA requirements if it chooses to move forward, and it will also likely violate the ESA's prohibition against the take of endangered species as described by Section 9 of the statute if it moves forward with this project prior to properly completing its Section 7 duties. Even where there is a letter of concurrence, APHIS would still fail to comply with the ESA because informal consultation does not authorize the incidental take of federally-listed species nor does it authorize the adverse modification or destruction of critical habitat.

APHIS has been able to complete informal consultation with the USFWS regarding the APHIS Grasshopper Program at the State level. Formal consultation has not been required since the USFWS has concurred with the APHIS determinations of not likely to adversely affect, including any associated critical habitat.

The commenter errs in assuming that any of APHIS's projects will result in "incidental take" since the agreed-upon mitigation measures, included in Appendix 4 of the EA, and were developed to preclude such. Neither will APHIS projects modify or destroy critical habitat. Quite the contrary, the failure to suppress severe grasshopper infestations pose the real inherent risk of "take" of T&E species and "adverse modification or destruction of critical habitat" due to overfeeding, often causing defoliation of nurse plants and consumption of sensitive plants, themselves.

Comment 158

APHIS has received the following comments, "Grasshopper spraying can decrease prey populations for these species as well as produce chronic sub-lethal effects as a result of drift or ingesting pesticide through the insects they consume. For all these species, insecticide spraying threatens their food supply and imperils them with acute and subacute poisoning impacts." This comment is in reference to the Interior Least Tern (*Sterna*

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antillarum), Piping Plover (*Charadrius melodus*), Red Knot *(Calidris canutus rufa),* and the Whooping Crane *(Grus Americana).*

Protective measures were developed during the lengthy local USFWS Section 7 consultations for each of the 19 T&E species and species of concern within proposed treatment areas. APHIS protective measures were determined using the USFWS Recommended Protection Measures for Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service" (USFWS 2007). The USFWS letters of concurrence agree with our determinations. See Appendix 4 for USFWS concurrence letter.

Comment 159

APHIS has received the following comments, "APHIS neglected to include this species (Pallid sturgeon) in the list of species it would engage in informal consultation on for this EA and must do so unless it can demonstrate that there are no pallid sturgeon present in the proposed action area.

In South Dakota, Pallid sturgeon is addressed in the 2020 Biological Assessment and concurrence letter. Please reference Appendix 4 in the Final EA.

Comment 160

APHIS has received the following comments, "Both of these species (Northern long-eared bat and black footed ferret) can rely on the very rangelands this EA targets, or may pass through them. Impacts of spraying can include habitat disturbance, acute and subacute poisoning, and reduced prey, amongst other possible impacts that must be considered."

Please reference Appendix 4 in the Final EA.

Comment 161

APHIS has received the following comments, "Use of insecticides can directly effect plants, can harm their soil and can also reduce available frustrated for these plants, threatening the viability of their life cycle. Any mitigation efforts to avoid adverse effects to this species will necessitate knowledge of all occupied habitat, which requires regular surveys, and also knowledge of groundwater, as well as knowledge of unoccupied but nonetheless essential habitat. This knowledge would also have to factor in current and anticipated threats, cumulative impacts, and likely climate change migration."

Please reference Appendix 4 in the Final EA.

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