Environmental Assessment

Rangeland Grasshopper and Mormon Cricket Suppression Program

Western South Dakota
EA Number: SD-16-1

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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 and/or Mormon crickets (hereafter referred to collectively as grasshoppers) may occur in western and portions of central South Dakota. The Animal and Plant Health Inspection Service (APHIS) may, upon request by land managers or State departments of agriculture, conduct treatments to suppress grasshopper infestations.

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

This EA analyzes potential environmental consequences of the proposed action and its alternatives. This EA applies to a proposed suppression program that would take place from March 2016 to November 2016 in western 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.

B. Background Discussion

In rangeland ecosystem areas of the United States, grasshopper populations can build up to outbreak levels 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 conducts surveys for grasshopper populations on rangeland in the Western United States, provides technical assistance on grasshopper management to land owners/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,

Furthermore, 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 national BLM land is necessary. Upon request, BLM will support suppression projects on BLM land by providing land use information, sensitive sites, T&E species and other resource information. BLM may provide personnel, equipment and infrastructure support as available.

Finally BLM will prepare a Pesticide Use Proposal (Form FS-2100-2) for APHIS to treat infestations. This document will be prepared and approved prior to program implementation.

Similarly, in April of 2014, APHIS and the Forest Service (FS) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two agencies on suppression of grasshoppers and Mormon crickets on national forest system lands (Document #14-8100-0573-MU). The FS 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 FS.

The MOU further states that the responsible FS official will request in writing the inclusion of appropriate lands in the APHIS suppression project when treatment on national forest land is necessary.

C. About This Process

The EA process for grasshopper management is complicated by the fact that there is very little time between requests for treatment and the need for APHIS to take action with respect to those requests. Surveys help to determine general areas, among the scores of millions of acres that potentially could be affected, where grasshopper infestations may occur in the spring of the following year. There is considerable uncertainty, however, in the forecasts, so that framing specific proposals for analysis under NEPA is not possible. At the same time, the program strives to alert the public in a timely manner to its more concrete treatment plans and avoid or minimize harm to the environment in implementing those plans.

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

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

Alternative B, insecticide applications at conventional rates and complete area coverage, is generally the approach that APHIS has used for many years. Under this alternative, carbaryl, diflubenzuron (Dimilin®), or Malathion will be employed. Carbaryl and Malathion are insecticides that have traditionally been used by APHIS. The insect growth regulator, diflubenzuron, is also included in this alternative. Applications would cover all treatable sites within the designated treatment block per label directions. The application rates under this alternative are as follows:

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

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

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

C. Reduced Agent Area Treatments (RAATs) Alternative

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

- 8.0 fluid ounces (0.25 lb a.i.) of carbaryl spray per acre;
- 10.0 pounds (0.20 lb a.i.) of 2 percent carbaryl bait per acre;
- 0.75 fluid ounce (0.012 lb a.i.) of diflubenzuron per acre; or
- 4.0 fluid ounces (0.31 lb a.i.) of malathion per acre.

The area not directly treated (the untreated swath) under the RAATs approach is not standardized. In the past, the area infested with grasshoppers that remains untreated has ranged from 20 to 67 percent. The 2002 EIS analyzed the reduced pesticide application

A study to look at a CP® nozzle and tip configuration, in cooperation with USDA, APHIS, PPQ Aircraft and Equipment Operations, McAllen TX. The objective would be to look at tips that would be equivalent to the 8004 TeeJet® tip recommended in the statement of work (SOW). The test would be conducted on grasshopper populations that are present, expansive and warrant control applications at a chosen location. The study will consist of four replicated plots of 40 acres each to be treated to determine the effect of CP nozzles oriented 90 degrees to the slip stream of the aircraft (CP_{down}) as well with the airflow (CP_{down}), a common practice in commercial application industry to be compared with the standard nozzle and tip orientation as specified in the current SOW. This would allow direct comparison of the effect of CP nozzle design and orientation with the treatments consisting of Dimilin and Prevathon applied as a RAATs application.

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

Treatments will be SOW standard (nozzle and tip stainless steel flat fan (8004)) compared to CP_{down}, C, (3)
Replicates 40 acre plots (4)
Chemistries Dimilin and Prevathon each a RAATs treatment (2)
Untreated Checks -4 plots-
Total Plots:
3 treat. X 4 rep X 2 chemicals = 24 + 4 Untreated = 32 plots
32 plots X 40 acres each = 1280 total.

Chlorantraniliprole (Ryanaxypyr™). This is a recently introduced insecticide that is not yet authorized for use by USDA in grasshopper control programs. This product belongs to the anthranilic diamide insecticide class (Lahm et al., 2005). The mode of action is the activation of insect ryanodine receptors which causes an uncontrolled release of calcium from smooth and striated muscles that impairs muscle regulation and causes paralysis in insects (Cordova et al., 2006; USEPA, 2008; Health Canada, 2008). Although ryanodine receptors also occur in mammals, the insecticide is very selective to insect ryanodine receptors with a more than 350-fold differential selectivity compared to mammalian receptors (Lahm et al., 2007; USEPA, 2008). Primary activity of chlorantraniliprole is through ingestion with some contact toxicity against lepidopteran pests. Other insects affected include those in the orders Orthoptera, Coleoptera, Diptera, and Hemiptera (Hannig et al., 2009). The formulation proposed for use in the Grasshopper and Mormon Cricket Suppression Program is Prevathon®, a 0.43 lb a.i./gal. liquid formulation that can be applied by air or ground at a maximum rate of 20 fluid ounces per acre (fl. oz./ac).

The potential for impacts to soil, air and water quality are expected to be negligible based on the proposed use pattern and available environmental fate data for chlorantraniliprole. Air quality is not expected to be significantly impacted since chlorantraniliprole has chemical properties that demonstrate it is not likely to volatilize into the atmosphere (USEPA, 2008). There will be some insecticide present in the

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, Pennington, Perkins, Shannon, Stanley, Todd, Tripp and Ziebach.

2. Topography, soils and vegetation

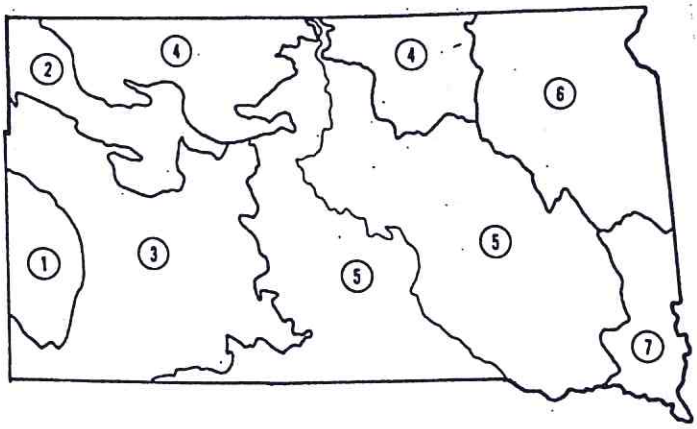

Figure 7. Soil zones of South Dakota.

1. Cool, Moist Forest (Typic Boralfs)
2. Cool, Very Dry Plain (Aridic Borolls)
3. Warm, Very Dry Plain (Aridic Ustolls)
4. Cool, Dry Plain (Typic Borolls)
5. Warm, Dry Plain (Typic Ustolls)
6. Cool, Moist Prairie (Udic Borolls)
7. Warm, Moist Prairie (Udic Ustolls)

Land and resource management can be broken down accordingly:

Federal/Public lands-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).

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 13-20 inches 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 populations

APHIS has routinely conducted adult and nymphal grasshopper surveys throughout western South Dakota, specifically the counties that are west of the Missouri River. Due to reduced funding, USDA-APHIS did not conduct grasshopper survey in 1997. In 1998 and 1999 the SD Department of Agriculture conducted statewide surveys. In 2000 APHIS resumed those activities and they will continue in 2014. Based on 2015 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.

5. Human population

The largest city in western South Dakota is Rapid City with a population of approximately 61,000 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 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

Criteria pollutants, pollutants for which maximum allowable emission levels and concentrations are enforced by the state air control agencies. Pollutants will be produced by fuel combustion in airplanes, vehicles, and machinery used in grasshopper control activities. The amounts of these pollutants should have a negligible temporary effect on air quality.

Increases in ozone concentrations from the volatilization of pesticides and carriers are also expected to be negligible. Malathion, carbaryl and dimilin have a very low vapor pressure and are essentially nonvolatile.

2. Nontarget Species

Under the no action alternative, destruction of grasses and forbs by grasshoppers could cause localized disruption of food and cover for a number of wildlife species.

Chemicals act quickly to reduce grasshopper infestations; thus, damage to vegetation from grasshopper foraging that would occur under the no action alternative would be minimized. Malathion, carbaryl, and dimilin are nontoxic to most plants when applied at label rates. Under chemical control there is a possibility of indirect effects on local wildlife populations, particularly insectivorous birds that depend on a readily available supply of insects, including grasshoppers, for their own food supply and for their young. To the extent that grasshopper spraying may cause a severe reduction in target and nontarget insects, it may jeopardize the survival of local populations of these wildlife species. Research from the Grasshopper IPM Program showed that although direct mortality of birds does not occur, insectivorous birds may temporarily move to untreated areas where insects are more readily available.

Malathion and carbaryl have been shown to reduce brain cholinesterase (ChE) (an enzyme important in nerve cell transmissions) levels in birds. Effects of ChE inhibition are not fully understood but could cause inability to gather food, escape predation, or care for young. Because dimilin is a growth regulating insecticide the higher organisms (birds and mammals) that contain chitin or polysaccharides similar to chitin seem unaffected (Eisler 2000).

In any given treatment season, only a fraction (less than 1 percent) of the total rangeland in a region is likely to be sprayed for grasshopper control. For species that are wide spread and numerous, lowered survival and lowered reproductive success in a small portion of their habitat would not constitute a significant threat to the population.

The wildlife risk assessment in APHIS FEIS 2002 estimated wildlife doses of malathion, carbaryl, and dimilin to representative rangeland species and compared them with toxicity reference levels.

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 sturgeons *(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)* became protected species.

On August 8, 2007, the bald eagle was removed from the List of Endangered and Threatened Wildlife (*Federal Register* 72: 37346-37372). The bald eagle is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. On July 12, 1995, the U.S. Fish and Wildlife Service reclassified the bald eagle from endangered to threatened throughout the 48 conterminous States (*Federal Register* 60:35999-36110). Previously, the eagle was protected under the Bald Eagle Protection Act of 1940 and the Endangered Species Act in 1978 (*Federal Register* 43:6230-6233). Delisting was proposed in 1999 because recovery goals were reached around 1990 and the bald eagle was been determined to be recovered by the bald eagle recovery team (*Federal Register* 64: 36453-36464).

The bald eagle is one of the largest eagles, with adults measuring 30 to 35 inches (76 to 89 cm) long from bill to tip of tail, having a wingspan of 7 feet (2 m), and weighing from 8 to 13 pounds (3.6 to 6 kg). Wings are long and broad, adapted or soaring. Bald eagles live from 20 to 30 years in the wild but may live in excess of 50 years in captivity.

Bald eagles generally mate for life unless one of the pair dies. Females normally breed in the fourth year. The eagles are relatively shy and prefer to live in regions that are relatively unpopulated by man. Nests or eyres of sticks or fresh leaves are built near water in the tops of large trees or on rock outcroppings on the sides of mountains and may be used year after year. A pair of eagles may defend a territory of up to 40 square miles (100 square km) but have been known to nest within 1 mile (1.6 Km) of another pair.

Bald eagles normally hunt near water snatching up fish while flying low. Fish are a primary food source; however food may also consist of prey taken from other birds of prey, especially osprey. Rodents or small birds may supplement the normal food sources, depending on the locale.

The historic breeding range included at least 45 of the contiguous states in 1981; however, occupied nests were known in only 30 states.

A recovery plan for the northern states has been prepared. The primary objectives of the northern bald eagle plan are to reestablish self-sustaining populations in the Northern States region.

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 2002).

The hazards of malathion and carbaryl estimated exposures and risks to representative species are analyzed in detail in APHIS FEIS 2002.

Current operational procedures Appendix 1 state that all label recommendations will be followed. 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 that are not endangered or threatened from drift or runoff.

In general, malathion is moderately toxic, carbaryl is much less toxic. Malathion and carbaryl have been found to exhibit a high biodegradability in soil and water and no bioaccumulation in food chains, but some pickup 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.

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.

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

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.

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

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.

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,

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 orchid 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.

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 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.

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

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).

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.

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).

Dimilin is always our preferred choice. Because diflubenzuron, dimilin, 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.

d. Candidate Species:

After a thorough analysis FWS has concluded the greater sage-grouse and the Sprague's pipit warrants protection under the ESA. However the FWS has determined that proposing the species for protection is precluded by the need to take action on other species facing more immediate and severe extinction threats. As a result, the sage grouse and the Sprague's pipit are listed as candidate species for ESA protection.

1. Sprague's Pipit *(Anthus sptagueii)*

The U.S. Fish and Wildlife Service in South Dakota have indicated concern regarding the impacts of a grasshopper suppression program on the Sprague's pipit. The Sprague's Pipit is a small passerine of the family Motacillidae, endemic to the Northern Great Plains and strongly tied to native prairie throughout its lifecycle. Native grasslands are disturbance dependent without it; the vegetative specie mix is altered and overgrown with wood vegetation unsuitable for pipit habitat. In addition many of the historical disturbances such as wildfires and buffalo grazing no longer are applicable.

The breeding range for the Sprague's pipit in South Dakota includes its most northern portions. They require large patches of rangeland with specific grass height requirements for their ground nesting. Migration occurs to the southern and southeastern United States. Sprague's pipits primarily feed on arthropods and have been sighted in sunflower fields although their use of crop fields is rare.

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 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.

4. 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.

Tourism is primarily focused in the Black Hills 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. Esthetics of an area will be affected by economic grasshopper populations.

5. Cultural Resources and Events

No negative impacts, directly or indirectly, should occur to any public facilities within likely treatment areas. Quality of grasslands for grazing and wildlife habitat should improve as a result of control programs because available forage and cover will be protected. Local treatment buffer zones and other mitigation measures would be developed by informal field level conferences with managing agencies.

a. Historic Sites

APHIS will adopt mitigative 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.

6. 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 disproportionate risks to children that result from environmental health risks or safety risks. APHIS has developed agency guidance for its programs to follow to ensure the protection of children (USDA, APHIS, 1999).

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

consequences of the no action alternative because the type and amount of insecticides that could be used in this scenario are unknown.

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

An important aspect of protecting humans, non target organisms, sensitive sites and events is that all landowners involved in the program have requested APHIS to conduct the treatment. Consequently any human health, non target organism, cultural resources/events or sensitive sites can be identified and protected prior to program initiation. All operation procedures will be followed to ensure that complete area coverage and conventional rate applications are applied according to APHIS guidelines and label requirements to ensure negligible impact to the environment.

Under Alternative 2, APHIS would participate in grasshopper programs with the option of using one of the insecticides carbaryl, diflubenzuron, or malathion, depending upon the various factors related to the grasshopper outbreak and the site-specific characteristics. The use of an insecticide would occur at the conventional rates. With only rare exceptions, APHIS would apply a single treatment in an outbreak year 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.

Carbaryl

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

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

Carbaryl is of moderate acute oral toxicity to mammals (McEwen *et al.*, 1996a). Carbaryl applied at Alternative 2 rates is unlikely to be directly toxic to upland birds, mammals, or reptiles. Field studies have shown that carbaryl applied as either ultra-low-volume (ULV) spray or bait at Alternative 2 rates posed little

diflubenzuron applications (Schroeder *et al.*, 1980; Emmett and Archer, 1980). Among birds, nestling growth rates, behavior data, and survival of wild American kestrels in diflubenzuron treated areas showed no significant differences among kestrels in treated areas and untreated areas (McEwen *et al.*, 1996b). The acute oral toxicity of diflubenzuron to mammals ranges from very slight to slight. Little, if any, bioaccumulation of diflubenzuron would be expected (Opdycke *et al.*, 1982).

Diflubenzuron is most likely to affect immature terrestrial insects and early life stages of aquatic invertebrates (Eisler, 2000). While this would reduce the prey base within the treatment area for organisms that feed on insects, adult insects, including grasshoppers, would remain available as prey items. Many of the aquatic organisms most susceptible to diflubenzuron are marine organisms that would not be exposed to rangeland treatments. Freshwater invertebrate populations would be reduced if exposed to diflubenzuron, but these decreases would be expected to be temporary given the rapid regeneration time of many aquatic invertebrates.

Malathion

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

Potential exposures to the general public from conventional application rates are infrequent and of low magnitude. These low exposures to the public pose no risk of direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Potential worker exposures are higher, but still have little potential for adverse health effects except under accidental scenarios. Therefore, routine safety precautions are expected to continue to provide adequate protection of worker health.

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

The RAATs strategy has two components: insect suppression and conservation biological control, first, treatments made under RAATs rely on grasshopper suppression using insecticides. Grasshoppers in the treated area are directly exposed to insecticides and suffer mortality. Grasshoppers in the areas not directly treated (untreated) may also be exposed to insecticides if drift occurs from the treated areas or if individuals move from the untreated area into the treated area and thus become exposed to the insecticide. Second, RAATs strategy relies on conservation biological control. This means that naturally occurring predators and parasites of grasshoppers are retained in the untreated areas. These predators and parasites remain after treatments and are available to suppress grasshoppers in both the treated and untreated areas.

The goal of grasshopper suppression under the RAATs alternative is to economically and environmentally suppress grasshopper populations to a desired level rather than reduce those populations to the greatest possible extent. The efficacy of the RAATs alternative in reducing grasshoppers is therefore less than conventional treatments. The RAATs efficacy is also variable. Foster *et al.* (2000) reported that grasshopper treatment mortality using RAATs was reduced 2 to 15 percent from conventional treatments while Lockwood *et al.* (2000) reported 0 to 26 percent difference in mortality between the conventional and RAATs alternatives. During grasshopper outbreaks when grasshopper densities can be 60 or more per square meter (Norelius and Lockwood, 1999), grasshopper treatments that have 90 to 95 percent mortality still leave a number of grasshoppers (3 to 6) that is generally greater than the average number found on rangeland, such as in Wyoming, in a normal year (Schell and Lockwood, 1997).

Potential exposure to the general public, environment, non target organisms and cultural events and sites as well as sensitive sites from RAATS application rates are lower that those from conventional applications and adverse effects decrease commensurately with decreased magnitude of exposure.

Refer to the 2002 EIS Chapter V. Environmental Consequences. The impacts identified for this alternative will be reduced compared to Alternative 2. The impacts to these resources will be minimized by the implementation of the program guidelines described in Appendix 1.

Carbaryl

Potential exposures to the general public and workers from RAATs application rates are lower than those from conventional application rates, and adverse effects decrease commensurately with decreased magnitude of exposure. These low exposures to the public pose no risk of direct toxicity, carcinogenicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. The potential for adverse effects to workers is negligible if proper safety

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

Malathion

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

Potential risks to workers are negligible if proper safety procedures are adhered to, including the use of required protective clothing. The low exposures to malathion from program applications are not expected to pose any carcinogenic risks to workers or the general public.

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

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

B. Other Environmental Considerations

1. Cumulative Impacts

Cumulative impact, as defined in the CEQ NEPA implementing regulations (40 CFR § 1508.7) "is the impact on the environment which results from the incremental impact of the action when added to the past, present, and reasonably

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, plan aerial ferrying and turnaround routes to avoid flights over congested areas, bodies of water, and other sensitive areas that are not to be treated.

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

In accordance with various environmental statutes, APHIS routinely conducts programs in a manner that minimizes impact to the environment, including any impact to migratory birds. In January 2001, President Clinton signed E.O. 13186 to ensure that all government programs protect migratory birds to the extent practicable. To further its purposes, the E.O. requires each agency with a potential to impact migratory birds to enter into a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service (FWS). In compliance with the E.O., APHIS is currently working with FWS to develop such an MOU.

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VI. Listing of Agencies and Persons Consulted

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South Dakota Department of Agriculture, 523 East Capital, Pierre, SD 57501

APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program
FY-2016 Treatment Guidelines
Version 2/11/2016

The objectives of the APHIS Rangeland Grasshopper and Mormon Cricket Suppression Program are to 1) conduct surveys in 17 Western States; 2) provide technical assistance to land managers; and 3) when funds permit, suppress economically damaging grasshopper and Mormon cricket outbreaks on Federal, Tribal, State, and/or private rangeland. The Plant Protection Act of 2000 provides APHIS the authority to take these actions.

General Guidelines for Grasshopper / Mormon Cricket Treatments

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

2. Subject to the availability of funds, upon request of the administering agency or the agriculture department of an affected State, APHIS, to protect rangeland, shall immediately treat Federal, 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% charged to any funds received by APHIS for federal involvement with suppression treatments.

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

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

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

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

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

7. Each aerial suppression program will have a Contracting Officer's 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 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 assure that any environmentally sensitive sites were protected.

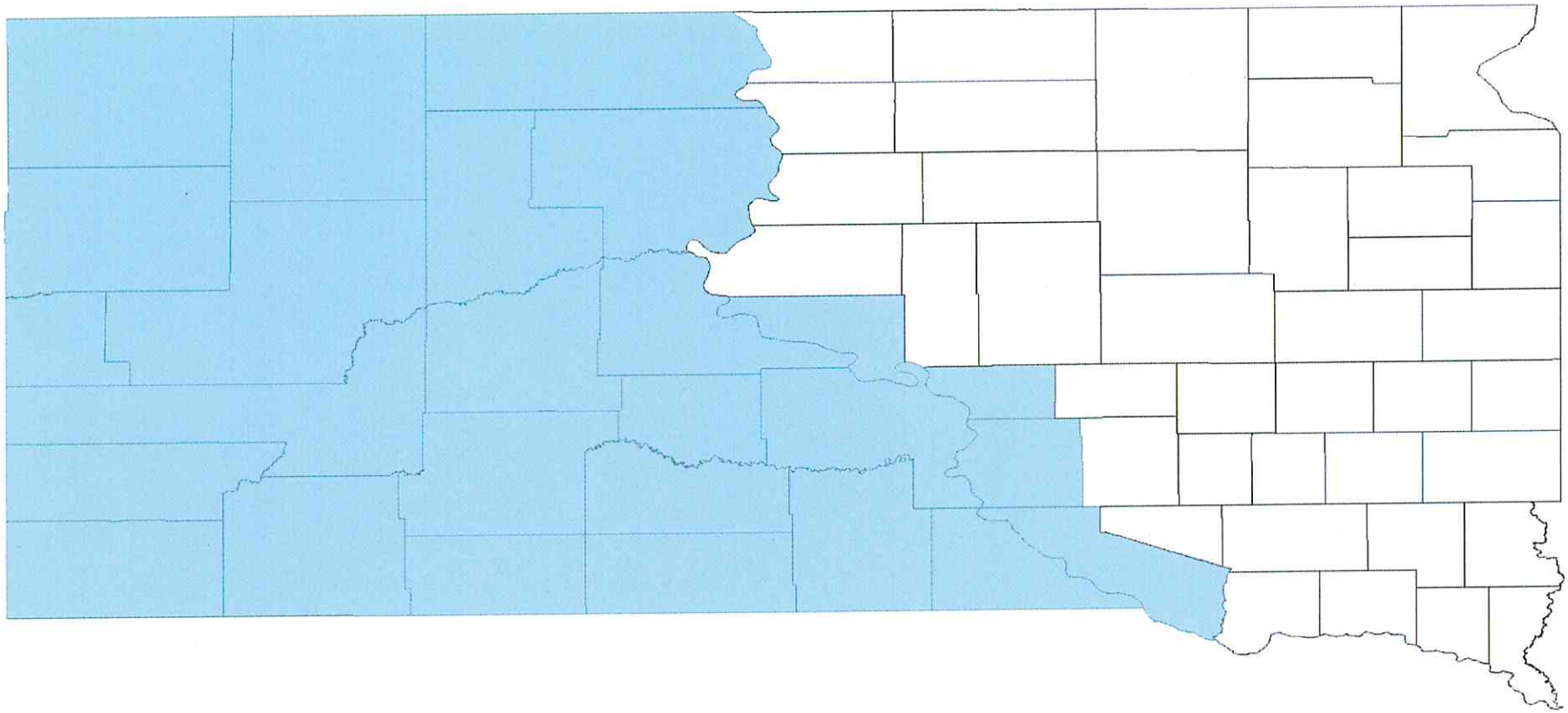
9. APHIS reporting requirements associated with grasshopper / Mormon cricket suppression treatments can be found in the APHIS Grasshopper Program Guidebook: http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/grasshopper.pdf

SPECIFIC PROCEDURES FOR AERIAL APPLICATIONS

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

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

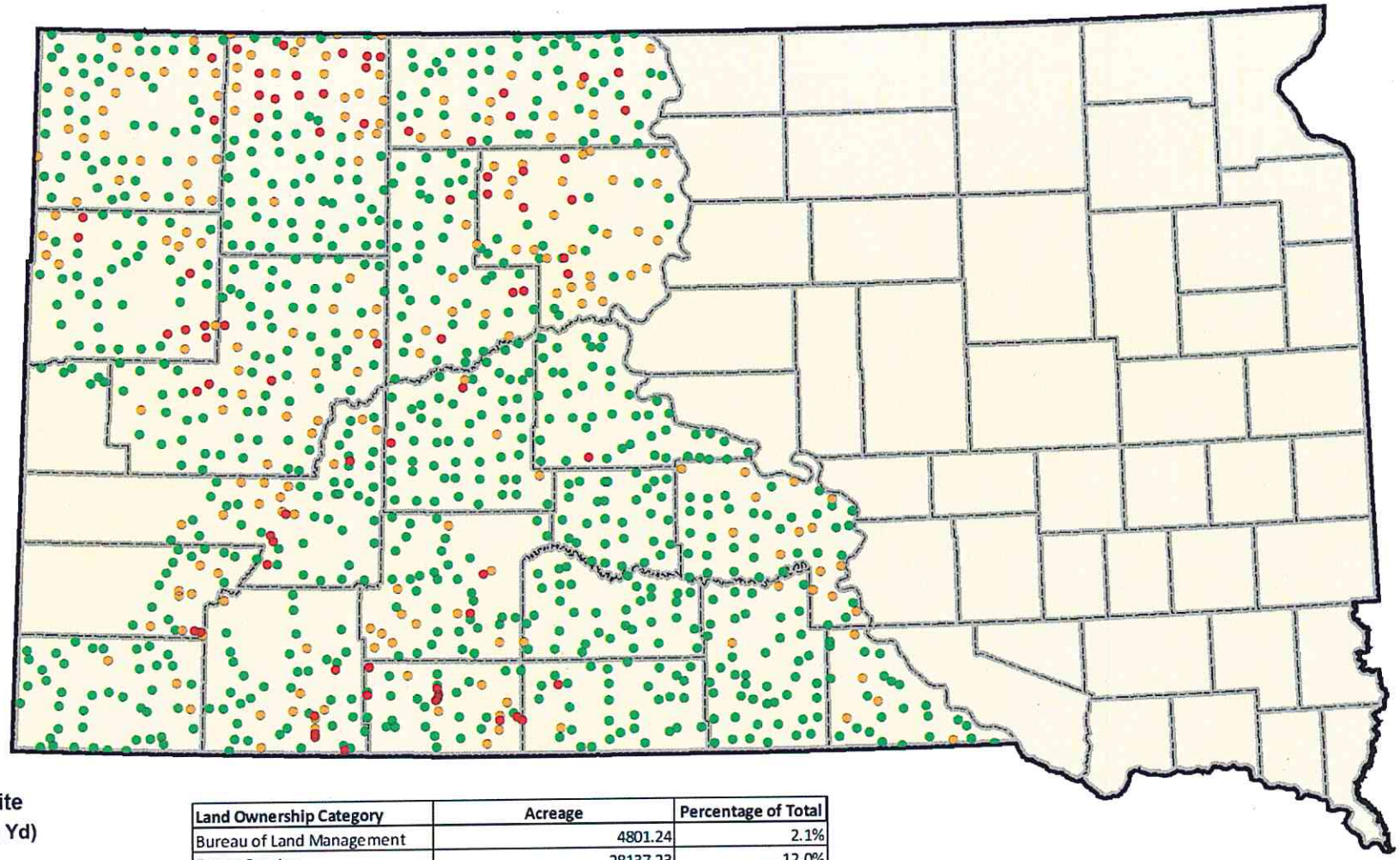
Appendix 2
Environmental Assessment Coverage Area



APPENDIX 3

USDA United States Department of Agriculture

2015 Adult Grasshopper Density - South Dakota



Grasshopper Site
(Adult GH per Sq Yd)

- 0 - 3
- 4 - 7
- 8 or more

Land Ownership Category	Acreage	Percentage of Total
Bureau of Land Management	4801.24	2.1%
Forest Service	28137.23	12.0%
Bureau of Indian Affairs	82723.96	36.7%
Private	115064.81	49.2%
Total	**230727.24**	**100.0%**

0 12.5 25 50 Miles

N

USDA APHIS PPQ
314 Henry Street, Suite 200
Pierre SD 57501

Data Source: USDA APHIS PPQ South Dakota, ESRI, and TeleAtlas.
Date: 11/10/2015
Coordinate System: NAD 1983 StatePlane South Dakota South FIPS 4002 Feet