# Environmental Assessment

## Rangeland Grasshopper and Mormon Cricket Suppression Program

New Mexico
EA Number: NM-16-01

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# Site-Specific Environmental Assessment

## Rangeland Grasshopper/Mormon Cricket Suppression Program in NEW MEXICO

### 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 New Mexico. The Animal and Plant Health Inspection Service (APHIS), the Bureau of Land Management, the U.S Forest Service, the New Mexico Department of Agriculture, the New Mexico State Land Office, the New Mexico Energy, Minerals, and Natural Resources Department, Bureau of Reclamation, and the Bureau of Indian Affairs, and tribal and pueblo governances based on location of infestation may upon written request by local land managers or state department of agriculture, conduct treatments to suppress grasshopper infestations.

Populations of grasshoppers that reach a threshold and trigger the need for a suppression program are normally considered on a case-by-case basis. Participation is based on potential damage such as losses of rangeland forage, of wildlife habitat, of soil surface and moisture, of agricultural productivity, of biodiversity, of environmental health, and additional restoration cost of slow environmental and agricultural recovery.

The benefits of treatments include providing adequate forage for grazing, reduced land surface erosion, protection of critical habitat and species diversity, sustaining assessed land value, and mitigating economic impacts Appendix 3 contains the 2015 New Mexico Grasshopper Hazard Map and other related feature maps.

The goal of the proposed suppression program analyzed in this EA is to reduce grasshopper populations to acceptable levels in order to protect rangeland ecosystems. In addition to protecting rangeland, treatments can prevent the movement of grasshoppers onto crops and pastures adjacent to the rangeland.

This environmental assessment (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 April 6, 2016 to October 31, 2016 for New Mexico.

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.) & 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 into 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, to protect rangeland, shall immediately treat Federal, State, or private lands that are infested with grasshoppers or Mormon crickets' … Section 417 of the Plant Protection Act (PPA) (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 (but not eradicate) grasshopper populations and effectively protect rangeland.

In June 2002, APHIS completed an Environmental Impact Statement (EIS) document concerning suppression of grasshopper populations in 17 western states (Rangeland Grasshopper and Mormon Cricket Suppression Program, Environmental Impact Statement, June 21, 2002). The EIS described the actions available to APHIS to reduce the destruction caused by grasshopper populations in 17 States (Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming).

The New Mexico Department of Game and Fish regulations provide for the planned incidental taking of protected wildlife only for scientific and educational purposes under NMSA 17-3.29 and sections of Chapter 17 of the NMSDA 1978. During grasshopper suppression activities incidental take may occur for environmental monitoring purposes under an issued permit. Follow this link: http://www.wildlife.state.nm.us/conservation/wildlife-species-information/threatened-and-endangered-species/ to the NM Game & Fish Department's "New Mexico Species of Concern", indicates some terrestrial habitats are sensitive for some listed species. One hundred twenty two species of concern are currently listed.

Biological affect considerations are an important issue. The State of New Mexico Administrative Code: Title 19, Chapter 21 Part 2.8 is concerned with protecting New Mexico rare plant species and taking of these plant species is prohibited. Chapter 33 Part 1 covers the NM Wildlife Conservation Act, due to the unique and limited

component of this regional flora and fauna. This act covers all animal species and distinct populations, except for insects whose protection would present an unreasonable or excessive risk to humans. (NMSA 17-2-37 et seq.)

APHIS treatment guidelines and operational procedures attempt to mitigate the potential affect or harm to these species and their local habitats; and adhere to all state, local ordinances or tribal laws, and consider other guidance potentially relevant to this proposed action that may apply to the 2016 grasshopper suppression program.

In April 2014, APHIS and the U.S. Forest Service (FS) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two agencies on suppression of grasshoppers on national forest system lands (Document APHIS #14-8100-0573-MU, April 22, 2014). This MOU clarifies that APHIS will prepare and issue to the public site-specific environmental documents that evaluate potential impacts associated with proposed measures to suppress economically damaging grasshopper and Mormon cricket populations. The MOU also states that these documents will be prepared under the APHIS'NEPA implementing procedures with cooperation and input from the FS. This MOU explains in writing the mutual responsibilities and limitations of each agency.

In October 2015, APHIS and the Bureau of Land Management (BLM) signed a Memorandum of Understanding (MOU) detailing cooperative efforts between the two agencies on suppression of grasshopper on BLM system 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 populations. The MOU also states that these documents will be prepared under the APHIS' NEPA implementing procedures with cooperation and input from BLM. **APHIS and the BLM currently have a new MOU in pending status.**

In June 2010, APHIS and the Bureau of Indian Affairs (BIA) signed a Memorandum of Understanding to establish coordination in the management, and when necessary, the suppression grasshoppers and Mormon crickets on BIA managed lands. This MOU (Document # 10-8100-0941-MU, June 14, 2010) explains in writing the mutual responsibilities and limitations of each agency. **APHIS and the BIA currently have a new MOU in pending status.**

## *C. About This Process*

The EA process for grasshopper management is complicated by the fact that there is very little time between the official 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 New Mexico on rangelands (an estimated 30% of the total surface area). 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 the area covered under this EA will be extensively examined to determine if environmental issues exist that were not covered in this EA. This stage is intended mainly to insure that significant impacts in the specific treatment are will not be experienced. A supplemental determination will be prepared to document this finding and would also address any comments received on this EA. Supplemental determinations prepared for specific treatment sites will be provided to all parties who comment on this EA.

## II. Alternatives

The alternatives presented in the 2002 EIS and considered for the proposed action in this EA are: (A) no action, (B) insecticide applications at conventional rates and complete area coverage, (C) reduced agent area treatments (RAATs) and (D) potential experimental treatment may be considered for research purposes, and would meet NMDA's Bureau of Pesticide Management standards and local F&WS' review and concurrence. This treatment would be found in the Appendix 5.
Each of the first three alternatives, their control methods, and their potential impacts are described and analyzed in detail in the 2002 EIS. Copies of the complete 2002 EIS document are available for review at the state office; 270 south 17th Street, Las Cruces, New Mexico. It is also available at the APHIS Rangeland Grasshopper and Mormon Cricket Program web site, Grasshopper/Mormon Cricket, follow the link.
http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/planthealth/sa_domestic_pests_and_diseases/sa_pests_and_diseases/!ut/p/a1/vVFNU4MwFPwtHjwySVM-j_TDQlvUUTstXDIvQEscCJSkjvrrm6I3La0Xc8m8fbvZl30oQRuUCHjjO1C8FlCe6sSm84eADEaYhLPZdITD-7vlo7OYExxZmhD3EBbWdfrxzA9MZ4kxNl2Cw8komDhehHFoX6fHZ46PL-nXKEFJKlSjChRDU3BJ01qoXChactZC-3GLJdD60NJtnR5kVzUl6H6RQ6mKDsjqKpeKp7TRl6QgMppxmYPMvwU_4JNtk_IMxV5upcxiYLAMu4bJGDE81yMGg4HrOUDMYWZ_jXkh6I7Ql2RH6Ikq1lk6Zy2mNnr-49TzK7bHX_f7xNc7OKX-rtDmP5eg_UkbjaOd_haowuBiW6NN_1td_xe4qVarVeUO7afg82VbrV3p3xwBY5WwNg!!/?1dmy&urile=wcm%3apath%3a%2Faphis_content_library%2Fsa_our_focus%2Fsa_plant_health%2Fsa_domestic_pests_and_diseases%2Fsa_pests_and_diseases%2Fsa_insects%2Fsa_grasshopper%2Fct_grasshopper_mormon_cricket

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

All insecticides used by APHIS for grasshopper suppression are used in accordance with applicable product label instructions and restrictions. Representative product specimen labels can be accessed at the Crop Data Management Systems, Inc. web site at 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, included as Appendix 1 to this EA.

### *A. No Action Alternative*

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

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

Alternative B, insecticide applications at conventional rates and complete area coverage, is generally the approach that APHIS has used for many years. Under this alternative, carbaryl, diflubenzuron (Dimilin®), or malathion will be used. 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;*
- *8.0 fluid ounces (0.62 lb a.i.) of malathion per acre; or*
- *1.0 ounce (0.016 lb a.i.) of diflubenzuron 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, malathion, and diflubenzuron 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. Either carbaryl, malathion, or diflubenzuron 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 lb pounds (0.20 lb a.i.) of 2 percent carbaryl bait per acre*
- *4.0 pounds (0.4 fluid ounces (0.31 lb a.i.) of malathion per acre; or*
- *1.0 fluid ounce (0.016 lb a.i.) of diflubenzuron 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 25 to 67 percent. The 2002 EIS analyzed the reduced pesticide application rates associated with the RAATs approach but assumed pesticide coverage on 100 percent of the area as a worst-case assumption. The reason for this is there is no way to predict how much area will actually be left untreated as a result of the specific action requiring this EA. Rather than suppress grasshopper populations to the greatest extent possible, the goal of this alternative is to suppress grasshopper populations to a desired level.

### *D. Experimental Treatments Alternative*

**See Appendix 6.**

## III. Affected Environment

### *A. Description of Affected Environment*

The proposed suppression program included in this 2016 EA encompasses blocks of 10,000 acres or larger. For New Mexico, APHIS in this document considers mainly four ecologic regions to exist; these are: the short-grass prairie of the southern extent of Great Plains (Southern High Plains and the Southwestern Tablelands in the eastern counties), the Arizona/New Mexico Plateaus and Mesas (in the northwestern counties), the southern Rocky Mountains with the Arizona and New

Mexico Mountains (north-central and west central counties), the Chihuahuan Desert (in the southern counties). These four basic designated eco-regions are at the northeastern reach of the greater southwest desert area that extends from western Texas to south-central California.

The main watershed basins that dissect New Mexico are Upper Rio Grande and Upper Colorado (San Juan) being fed from the state of Colorado, the Arkansas-White-Red (Southern Canadian), Pecos, Lower Colorado (Zuni and Gila), Lower Rio Grande, Central Closed (Estancia and Tularosa and Salt Basins), Southwest Closed (Mimbres), and Texas-Gulf (Southern High Plains).

New Mexico soils are of three basic soil orders: Aridisoils (being most common in arid zones), Entisoils (incipient soil process), and Mollisoils (usually associated with the mountains).

Basically there are four weather zones found in New Mexico; Northern Chihuahuan Desert, Southern High Plains, Southern Rockies and Arizona-New Mexico Plateau. These zones are affected by colder temperatures increasing with elevation year round. Higher elevations of the upper mountain zones are associated with coniferous and alpine plants; receive more rain, snow and ice than lower mountain elevations. Average annual minimum temperature may reach -25 to -20 degree F.

The intermediate elevations and mountain transition zone below 9,600 feet as l to 7,000 feet above sea level is dominated by mixed coniferous; fir (abeto) and spruce (pinabete) and deciduous trees such as aspen (alamo), and some shrubs, such as bearberry (manzanita) mountain mahagony (lintisco), and barberry (agarito), which receive slightly less moisture during the year with average minimum temperature lows of -15 to -10 degree F. (Italicized names are in New Mexican Spanish usage)

Elevation below 7,000 to 4,500 feet are general considered the marginal limit of the Upper Sonoran Zone with most vegetation consisting of pine/pinyon (pino/ pinon), juniper (sabino/ tascate/ cedro), oak (encino), buckbrush (cuerniblanco), sagebrush and sagewort (chamiza cenizo/ saladillo/abretano/ajenjo), rabbitbrush (chamisa blanco), wolfberry (salicieso), hackberry (granjeno), Apache plume (ponil) and winterfat (roemeria).

Elevation below 4,500 to 2,500 or the Lower Sonoran Zone has predominant vegetation consisting of mesquite (mezquite), cottonwood (algodon), Jerusalem thorn (retama/ cinacina), acacia (guajillo/ huisache/ gatuno), creosote bush (gobernadora/ hediondilla), tarbush (hojase), greasewood (varilla prieta), turpentine bush (aguirre), sand shinnery, (encino chico), whitebrush (palo blanco, vara dulce), yucca (palmilla/datililllo), agave (lechugilla), desert willow (mimbre), beargrass ( sacahuiste), desert candle (sotol), and various cacti (cholla/ nopal/ tasajillo and visnaga), and along riparian zones willows (sauce), Russian olive (paraiso), seep willow (jarilla/batamote) and salt cedar (taray de china/ tamarisco or pino salado).

The elevations below 5,400 feet as l are mostly open rangeland areas with the milder southwest part of the state having winter temperature lows between 15 and 10

degree, and rainfall averages of 12 inches annually. As one goes to eastward, rainfall averages increases to 16 inches or more, and winter temperatures fall to 5 to 0 degree lows. Further decreasing average lows naturally occur as one moves northward in the state.

Public land management covers about 50% of the New Mexico's 33 counties that contain the state's 77,666,400 acres. Of this, the land surface management responsibility is mainly divided between the Bureau of Land Management (16.5%) and the U.S Forest Service (12.0%), the State Land Office (11.9%) and Indian Trust Lands (9.6%).

APHIS mainly does grasshopper suppression programs on level to rolling hill topography, avoiding water resources, over grassland vegetation during daytime in warm weather with wind speeds less than 10 mph. Treatment activities are monitored by direct PPQ supervision, and are found in Appendix 1.

For site specific information, maps or other visual representations of the suppression program area will be included in Appendix 3.

## *B. Site-Specific Considerations*

### *1. Human Health*

The general areas are sparsely populated by isolated ranch units having mainly cattle operations. Rangeland grazing is the predominant livestock-feeding method. A spray-less buffer of 1.25 miles from the perimeter of any town and other communities will be used. Ranch buildings and structures (such as stock tanks) will have a buffer of 200 feet. Federal highways and State roads will have a 25 foot buffer. Potential exposures to the general public from conventional application rates are infrequent and of low magnitude. The RAAT's approach reduces this potential further by using reduced rates and less actual directly sprayed area. The proposed program should benefit human and environmental health by reducing the risk of insect annoyance, blowing dust, higher light reflection and higher temperature on the semi-arid land surface. Sensitive areas to the general public will have designated buffers. Local law enforcement, fire departments, EMS, hospitals and tribal agency will be notified prior to any treatment as an advisory to assess any safety risk, and about the planned treatment's location and date, and contact person.

### *2. Non-target Species*

Non-target species such as pollinators and other beneficial insects, which may be impacted, but not excessively affected, by the suppression program are those present during application in the sprayed swathes by direct chemical contact, or by feeding upon the contacted surface of vegetation, litter or on affected grasshoppers.
Some migratory and nesting birds in contact with the application may

temporarily be affected, mainly by feeding on treated grasshoppers or other insects, but not adversely.
These suppression applications avoid water bodies and aquatic life, and due to the timing of these applications and their short residual life, the risk of their movement into seasonal or permanent water is minimal. Pre-treatment monitoring will identify any potential nearby water source to insure that adequate buffers are used to protect these areas.
Phytotoxicity has not been found a concern to rangeland plants when these chemicals are applied at the recommended rates.
Currently the F&WS has 46 Endangered and Threatened Species and 9 Candidate Species listed for New Mexico. The list of these species is found for individual species details at these three following links.
http://www.fws.gov/southwest/es/ES_Lists_Main.cfm,
http://www.fws.gov/endangered/,
http://www.fws.gov/southwest/es//NewMexico/,
The New Mexico Department of Game and Fish has a list of 118 endangered and threatened species found at http://enconv.org/docs/index- 6577.html

*3.* *Socioeconomic Issues*

Without these proposed suppression activities on rangeland, grasshoppers of sufficient populations have an economic impact level that cause loss of available rangeland forages to livestock and grazing or browsing wildlife, leaving limited or depleted natural food resources. Critical habitat for successful reproduction of many species may be severely impacted. The potential for future invasive plant species is increased, and as is also any Remediation cost. The lost revenue to each rancher is considerable, and the county tax base of the land assessment value will decline significantly. A loss of local buying power will occur and impact local businesses and state revenues from this affected agricultural sector will also be lost. The proposed program should benefit human and environmental health by reducing the risk of insect annoyance, blowing dust, disruption of the natural bio-diversity, and soil erosion and soil moisture loss on the semi-arid land surface. And sustain stable seasonal work for low-income workers on these ranches, quarries and small businesses in local towns. Although the suppression program does not treat infested cropland and pastures, the adjacent rangeland control may relieve or mitigate grasshopper pressures on cropland and pastures, and on nature parks. Public recreation and historic sites, and sensitive environmental areas would be excluded from any proposed control. Any bee keepers on or near the planned rangeland control activity would be notified in advance to remove their bees from the area for the duration. Other persons accessing or staying on the land, such as utility and transmission line workers, oil and gas field servicemen, feed-lot and livestock auction barns, quarry and mining operations, reclamation project workers, recreationists and academic researchers would also be advised in advance. Other special concern sites as determined would be excluded from any proposed treatment by appropriate designated buffers.

## *4. Cultural Resources and Events*

New Mexico has many historic and recreation sites, and unique natural features throughout the state. Most of these occur on federal, state or tribal lands. The majority of these visitor sites and natural features are not found on rangeland, except with low frequency. Lava flow fields, geological landmarks and outcroppings, ancient archaeological sites, man-made reservoirs, lakes and dams, and historical ranch or church sites, and old military forts are sometimes visited within this rangeland environ.
Some county fair-grounds outside of town are located adjacent to rangelands; however, these events occur in late summer or early autumn. Golf courses, racing tracks, rodeo arenas and 4-H livestock shows are located at the margins of towns and would be protected by the designated program buffers. Native American fiesta days and Colonial Hispanic ceremonies are not performed on rangeland, but in towns and pueblos. Old abandoned community graveyards or "camposantos" and Indian burial grounds would be excluded as are heritage and historic, petroglyphs and pictographs sites that are protected and preserved in the National Park Service areas or in NM State parks and monuments. These ancestral cultural areas are under the protection of the federal 1906 Antiquities Act and the 1965 National Heritage Act, and the NM State provisions with the Habitat Protection Act (NMSA 17-6-1 et seq.) and the Rangeland Protection Act (NMSA 76-7B), and excluded from any APHIS grasshopper program.

## *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. APHIS will try to contact all interested parties to understand the purpose of the proposed action and provide justification of the needed action.

   The proposed program should benefit human and environmental health by reducing the risk of insect annoyance, blowing dust, wind, and soil erosion on the semi-arid land surface. Moreover this proposed action should avoid

potential economic loss from grasshopper outbreaks and sustain seasonal work for low-income workers on these ranches, quarries, and with local small businesses.

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 human population under 18 years of age is about 5-10% of the rural ranch population in most area. Treatments used for grasshopper suppression programs are primarily conducted on open rangeland where children would not be expected to be present during a treatment or to enter the control area before the wait period following treatment. The human health risk assessment concludes that the likelihood of children being exposed to these insecticides is very slight.

c. Executive Order No. 13175 (2000), Consultation and Coordination with Tribal Governments. President, George W. Bush, in 2004 reaffirmed this policy between the Federal government's commitment and Indian tribal government for distribution of power and responsibilities with government relationship and proposal review basis.

The United States government acknowledges federally recognized Indian tribes as sovereign nations, thus, any program interaction takes place on a government-to-government basis. Federal agencies designated staff are responsible for carrying out a tribal consultation process with these nations in a comprehensive manner.

In addition federal agencies whenever these formulate policies, "significantly or uniquely affecting Indian tribal governments", are to encourage meaningful and timely" consultation with tribes and consideration of compliance costs imposed on tribal governments when developing polices or regulations that may affect Indian tribes.

## IV. Environmental Consequences

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

## *A. Environmental Consequences of the Alternatives*

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

### *1. No Action Alternative*

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

Grasshoppers in unsuppressed outbreaks would consume agricultural and nonagricultural plants. The damage caused by grasshopper outbreaks could also pose a risk to rare, threatened, or endangered plants that often have a low number of individuals and limited distribution. Plant cover may protect the soil from the drying effects of the sun, and plant root systems hold the soil in place that may otherwise be eroded. Habitat loss for birds and other wildlife and rangeland susceptibility to invasion by nonnative plants are among the consequences that would likely occur should existing vegetation be removed by grasshoppers.

Another potential scenario, if APHIS does not participate in any grasshopper suppression programs, is that some Federal land management agencies, State agriculture departments, local governments, or private groups or individuals may attempt to conduct widespread grasshopper programs.
Without the technical assistance and program coordination that APHIS can provide to grasshopper programs, it is possible that a large amount of insecticides, including those APHIS considers too environmentally harsh but labeled for rangeland use, could be applied, reapplied, and perhaps misapplied in an effort to suppress or even locally eradicate grasshopper populations. It is not possible to accurately predict the environmental consequences of this action alternative because the type and amount of insecticides that could be used in this scenario are unknown.

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

Under Alternative 2, APHIS would participate in grasshopper programs with the option of using one of the insecticides; carbaryl, malathion, or diflubenzuron 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 more than a single treatment in an outbreak year to affected rangeland areas in an attempt to suppress grasshopper outbreak populations from a range of 33 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 risk to killdeer (McEwen et al., 1996a), vesper sparrows (McEwen et al., 1996a; Adam et al., 1994), or golden eagles (McEwen et al., 1996b) in the treatment areas. AChE inhibition at 40 to 60 percent can affect coordination, behavior, and foraging ability in vertebrates. Multi-year studies conducted at several grasshopper treatment areas have shown AChE inhibition at levels of no more that 40 percent with most at less than 20 percent (McEwen et al., 1996a). Carbaryl is not subject to significant bio-accumulation due to its low water solubility and low octanol-water partition coefficient (Dobroski et al., 1985).

Carbaryl will most likely affect nontarget insects that are exposed to ULV carbaryl spray or that consume carbaryl bait within the grasshopper treatment area. Field studies have shown that affected insect populations can recover rapidly and generally have suffered no long-term effects, including some

insects that are particularly sensitive to carbaryl, such as bees (Catangui et al., 1996). The use of carbaryl in bait form generally has considerable environmental advantages over liquid insecticide applications: bait is easier than liquid spray applications to direct toward the target area, bait is more specific to grasshoppers, and bait affects fewer nontarget organisms than sprays (Quinn, 1996).
Should carbaryl enter water, there is the potential to affect the aquatic invertebrate assemblage, especially amphipods. Field studies with carbaryl concluded that there was no biologically significant effect on aquatic resources, although invertebrate downstream drift increased for a short period after treatment due to toxic effects (Beyers et al., 1995). Carbaryl is moderately toxic to most fish (Mayer and Ellersieck, 1986). For additional information about this chemical go to:
http://www.epa.gov/pesticides/reregistration/carbaryl/

**Diflubenzuron**

The acute oral toxicity of diflubenzuron formulations to humans ranges from very slight to slight. The most sensitive indicator of exposure and effects of diflubenzuron in humans is the formation of methemoglobin (a compound in blood responsible for the transport of oxygen) in blood.

Potential exposures to the general public from Alternative 2 rates are infrequent and of low magnitude. These low exposures to the public pose no risk of methemoglobinemia (a condition where the heme iron in blood is chemically oxidized and lacks the ability to properly transport oxygen), direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Potential worker exposures are higher than the general public but are not expected to pose any risk of adverse health effects.

Because diflubenzuron is a chitin inhibitor that disrupts insects from forming their exoskeleton, organisms without a chitinous exoskeleton, such as mammals, fish, and plants are largely unaffected by diflubenzuron. In addition, adult insects, including wild and cultivated bees, would be mostly unaffected by diflubenzuron applications (Schroeder et al., 1980; Emmett and Archer, 1980). Among birds, nestling growth rates, behavior data, and survival of wild American kestrels in diflubenzuron treated areas showed no significant differences among kestrels in treated areas and untreated areas (McEwen et al., 1996b). The acute oral toxicity of diflubenzuron to mammals ranges from very slight to slight. Little, if any, bioaccumulation of diflubenzuron would be expected (Opdycke et al., 1982).

Diflubenzuron is most likely to affect immature terrestrial insects and early life stages of aquatic invertebrates (Eisler, 2000). While this would reduce the prey base within the treatment area for organisms that feed on insects, adult insects, including grasshoppers, would remain available as prey items. Many of the aquatic organisms most susceptible to diflubenzuron are marine

organisms that would not be exposed to rangeland treatments. Freshwater invertebrate populations would be reduced if exposed to diflubenzuron, but these decreases would be expected to be temporary given the rapid regeneration time of many aquatic invertebrates.

**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. EPA's classification describes malathion as having ACh e 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.

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

Malathion will most likely affect nontarget insects within a treatment area.

Large reductions in some insect populations would be expected after a malathion treatment under Alternative 2. While the number of insects would be diminished, there would be some insects remaining. The remaining insects would be available prey items for insectivorous organisms, and those insects with short generation times may soon increase. Malathion is highly toxic to some fish and aquatic invertebrates; however, malathion concentrations occurring in water, as a result of grasshopper treatments, are expected to be low and to present a low risk to aquatic organisms, especially those organisms with short generation times.

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

### *3. Reduced Area Agent Treatments (RAATs) Alternative*

Under Alternative 3, the selected insecticide carbaryl, diflubenzuron, or malathion would be used at a reduced rate and over reduced areas of coverage. Rarely would APHIS apply more than a single treatment to an area per year. The maximum insecticide application rate under the RAATs strategy is reduced 50 percent from the conventional rates for carbaryl and malathion, and 25 percent from the Alternative 2 rate for diflubenzuron. Although this strategy involves leaving variable amounts of land not directly treated, the risk assessment conducted for the 2002 EIS assumed 100 percent area coverage because not all possible scenarios could be analyzed. However, when utilized in grasshopper suppression, the amount of untreated area in RAATs often ranges from 20 to 67 percent of the total infested area but can be adjusted to meet site-specific needs.

**Carbaryl**

Potential exposures to the general public and workers from RAATs application rates are lower than those from conventional application rates, and adverse effects decrease commensurately with decreased magnitude of exposure. These low exposures to the public pose no risk of direct toxicity, carcinogenicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. The potential for adverse effects to workers is negligible if proper safety procedures are followed, including wearing the required protective clothing. Routine safety precautions are expected to provide adequate protection of worker health at the lower application rates under RAATs.

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

rate (George et al., 1992). Using alternating swaths will furthermore reduce adverse effects because organisms that are in untreated swaths will be mostly unexposed to carbaryl.

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

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

**Diflubenzuron**

Potential exposures and adverse effects to the general public and workers from RAATs application rates are commensurately less than conventional application rates. These low exposures to the public pose no risk of methemoglobinemia, direct toxicity, neurotoxicity, genotoxicity, reproductive toxicity, or developmental toxicity. Potential worker exposures pose negligible risk of adverse health effects.

Because diflubenzuron is a chitin inhibitor that disrupts insects from forming their exoskeleton, organisms without a chitinous exoskeleton, such as mammals, fish, and plants are largely unaffected by diflubenzuron. Diflubenzuron exposures at Alternative 3 rates are not hazardous to terrestrial mammals, birds, and other vertebrates. Insects in untreated swaths would have little to no exposure, and adult insects in the treated swaths are not susceptible to diflubenzuron's mode of action. The indirect effects to insectivores would be negligible as not all insects in the treatment area will be affected by diflubenzuron.

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

**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).

#### *4. Experimental Treatments Alternative*

The impact of the "Experimental Treatments" alternative on human health, non-target organisms, socioeconomic issues, and cultural resources and events, described under the "Affected Environment" section is unchanged; because the amounts of the applied chemicals would not exceed the complete coverage alternative rates.

### *B. **Other Environmental Considerations***

#### *1. Cumulative Impacts*

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

APHIS has not performed a grasshopper suppression program on rangeland in New Mexico since 1986. Therefore other recent pest control actions done by private members of the local community are not in the control of APHIS or solely by cooperative agencies, but may have occurred within the same

that grasshopper suppression treatments are planned and reasonably foreseeable future actions need not be included here.

Detailed information regarding pesticide use and timing of these treatments conducted by others within the suppression program area would provide the necessary information required to identify any synergistic effects that might occur with overlapping pesticide treatments. See the 2002 EIS Appendix B for pesticides that have synergistic effects with the three insecticides to be used by the grasshopper program. APHIS guidelines are to do no more than one treatment in an infested area per year, but with rare exceptions.

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

APHIS has evaluated the proposed grasshopper program and has determined that there is no disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

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

Protection of children from alternatives 2 and 3, include the advisory notices and protective surveillance measures that will be implemented to minimize impacts on children. The human health risk assessment for the 2002 EIS analyzed the effects of exposure to children from the three insecticides. Based on review of the insecticides and their use in the grasshopper program, the risk assessment concluded that the likelihood of children being exposed to insecticides is very slight and that no disproportionate adverse effects to children are anticipated over the negligible effects to the general population. Treatments are conducted 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.

**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.

- *Do not apply within 500 feet of any school, school bus storage area or recreational facility.*
- *Ultra-Low-Volume Aerial Application (Liquid Chemical Methods)*
- *Aerial Application of Baits (Dry 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 13175, Consultation and Coordination with Indian tribal Governments*

In accordance with Federal recognized Indian tribal identity and that the U.S Government acknowledges their political sovereignty; an obligation exists to conduct certain dealings with tribal leadership on a "government to government" basis. This executive order supports and respects native tribal sovereignty and self-determination for these tribal governments in these United States.

*5. 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 this purpose, 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 a revised MOU.

*6. Endangered Species Act*

In accordance with section 7 of the ESA, local consultation is conducted for any action authorized, funded, or done by a Federal agency that may affect listed endangered or threatened species or their habitats. On February 12, 2015 APHIS in New Mexico communicated with Ecological Services of F&WS to request a review of and grant concurrence with APHIS 2015 New Mexico's Biological Assessment. F&WS will send APHIS a letter of concurrence, this is pending for the proposed action.

Of the current list of E&T species in New Mexico, APHIS determined that the suppression program, if done, "may affect, is not likely to adversely affect", the lesser prairie chicken, Pecos sunflower, Gypsum wild- buckwheat with critical habitat, and the Sacramento prickly poppy because buffer areas around known locations will ensure that treatments will not occur near these species. For this reason, the program effects are considered insignificant and discountable.

## *7. Environmental Monitoring*

Monitoring involves the evaluation of various aspects of the grasshopper suppression programs. There are three aspects of the programs that may be monitored. The first is the efficacy of the treatment. APHIS will determine how effective the application of an insecticide has been in suppressing the grasshopper population within a treatment area and will report the results in a Work Achievement Report to the Western Hub, Field Operations Office in Fort Collins, Colorado. Or you can find info at this link. http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/planthealth?1dmy&urile=wcm%3apath%3a%2Faphis_content_library%2Fsa_our_focus%2Fsa_plant_health%2Fsa_domestic_pests_and_diseases%2Fsa_pests_and_diseases%2Fsa_insects%2Fsa_grasshopper%2Fct_grasshopper_mormon_cricket

The second area included in monitoring is safety. This includes ensuring the safety of the program personnel through medical monitoring conducted specifically to determine risks of a hazardous material. See APHIS Safety and Health Manual (USDA, APHIS, 1998) available online at: www.aphis.usda.gov/mb/aseu/shes/shes-manual.html).

The third area of monitoring is environmental monitoring. APHIS Directive 5640.1 commit APHIS to a policy of monitoring the effects of Federal programs on the environment. Environmental monitoring includes such activities as checking to make sure the insecticides are applied in accordance with the labels, and that sensitive sites and organisms are protected. The environmental monitoring recommended for grasshopper suppression programs involves monitoring sensitive sites such as bodies of water used for human consumption or recreation or which have wildlife value, habitats of endangered and threatened species, habitats of other sensitive wildlife species, edible crops, and any sites for which the public has expressed concern or where humans might congregate (e.g., schools, parks, hospitals).

**2016 Environmental Monitoring Plan available upon request.**

## *8. Responsibilities & Documentation*

1. Identify, list and prioritize any sites within or near any suppression

program treatment that might have human health or environmental concerns or issues.

2. Demonstrate that operational procedures, appropriate mitigations and protection measures were followed, implemented and monitored.

3. Collect associated data which can be used to evaluate whether or not the assumptions used in the Environmental Assessment (EA) and in the Environmental Impact Statement (EIS) are valid estimates of potential exposure of the public, suppression program workers, endangered and threatened (E&T) species, or other sensitive environmental components to the pesticides used by the program.

4. Place dye cards and conduct sampling according to the determined buffers. Submit for each environmental monitor sample either a completed PPQ form 750 or APHIS form 2060. Complete all other treatment documentation and submit these to the Western Region and file copies locally.

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## VI. Listing of Agencies and Persons Consulted

Name, Title, Organization, Street Address, City, State, Zip Code for each entry

Eric Hein, Endangered Species Biologist, F&WS-Ecological Services, 2105 Osuna Road NE, Albuquerque, NM 87113.

Charles Brown, Program Manager, USDA-APHIS-PPQ, Unit 134, 4700 River Road, Riverdale, MD 20737.

Kia Caraher, Biological Scientist, 2006 Environmental Monitoring Team, USDA- APHIS PPQ, Unit 150, 4700 River Road, Riverdale, MD 20737.

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**APPENDIX 1:**

**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, 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 place of APHIS funding, the Federal land management agency, Tribal authority or other party/ies may opt to reimburse APHIS for suppression treatments. Interagency agreements or reimbursement agreements must be completed prior to the start of treatments which will be charged thereto.

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

   NOTE: the insecticide being considered must be labeled for that crop as well as rangeland.

8. In some cases, rangeland treatments may be conducted by other federal agencies (e.g., Forest Service, Bureau of Land Management, or Bureau of Indian Affairs) or by non- federal entities (e.g., Grazing Association or County Pest District).

APHIS may choose to assist these groups in a variety of ways, such as:

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. giving technical guidance.

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

**Operational Procedures**

**GENERAL PROCEDURES FOR ALL AERIAL AND GROUND APPLICATIONS**

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

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

3. One of the following insecticides that are labeled for rangeland use can be used for a suppression treatment of grasshoppers and Mormon crickets:
   a) Carbaryl
      a. solid bait
      b. ultra low volume spray
   b) Diflubenzuron ultra low volume spay
   c) Malathion ultra low volume spray

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

Furthermore, provide the following buffers for water bodies:

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

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

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

7. Each aerial suppression program will have a Contracting Officer's 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 2015 Environmental Monitoring Plan.

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

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

**SPECIFIC PROCEDURES FOR AERIAL APPLICATIONS**

1. APHIS Aerial treatment contracts will adhere to the 2015 Statement of Work.

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

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

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

4. Application aircraft will fly at a median altitude of 1 to 1.5 times the aircraft's wingspan.

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

All individuals applying chemicals will receive adequate training on safety and application procedures prior to any treatment. This refers to APHIS, NMDA and contracted aerial applicator personnel (include in the prospectus) and is included in the 2009 Guidelines for Treatment of Rangeland Suppression of Grasshoppers and Mormon Crickets.
A copy of the labels and material safety data sheets (MSDS) for the chemicals will be available at all times during the rangeland suppression operations. Employees will be completely familiar with the information in these documents in case it is needed in the event of a spill or incident.
Required personal protective equipment (PPE) for applicators and handlers must be worn at all times when chemicals are being mixed, applied and equipment cleaned.
An emergency spill kit, with direction for use, will be present on site before the arrival of chemicals and throughout the application process. Employees will be trained in the use of the spill kit prior to initiation of operations.

**Procedures for Chemical Spill Containment**

Based on information contended in the EPA document "Applying Pesticides Correctly: A Guide for Private and Commercial Applicators" and rules and regulations of the New Mexico Department of Agriculture's Pesticide Management Bureau.

The following information will be reviewed by all workers who handle chemicals.

Immediately notify the direct supervisor of an incident or spill. Identify the nature of the incident and extent of the spill, including the product and chemical name and the EPA registration number.

Remove any injured or contaminated person to a safe area. Remove contaminated clothing and follow MSDS guidelines for emergency first-aid procedures regarding exposure. Do not leave an injured person alone. Obtain medical help for any injured person.

Contain the spread of the spilled chemical as much as possible at the site. Prevent the spilled chemical from run-off or fire. Cover the spill with absorbent material. If the spill is greater than 2 gallons of chemical, notify the local hazmat unit or fire department and follow their instructions for further remedial actions. Restrict entry to the spill area. Follow disposal of contaminated materials according to label instructions and state requirements.

**Procedures for Chemical Handling: Mixing, Loading and Disposal**

Mixing of the chemical and adjuvants will be done at least 100 feet from any well head or surface water.

Dilution water will be added to the spray container prior to the addition of the chemical concentrate.

Hoses used to add dilution water to the spray container shall be equipped with a device to prevent back–siphoning or a minimum 2-inch gap.

Workers mixing chemicals will wear the maximum personal protective equipment required

on the label.

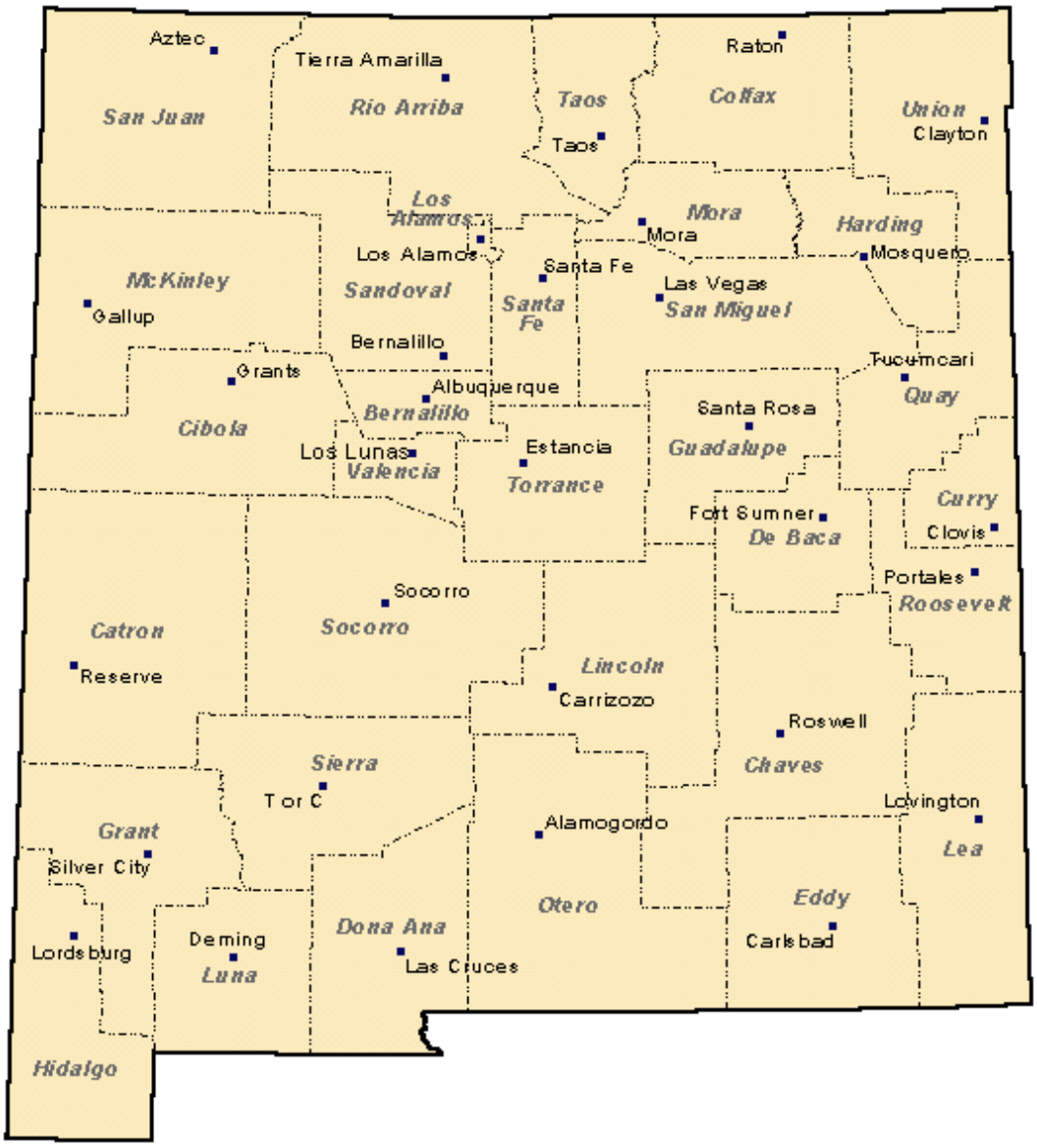
Empty containers will be triple rinsed. All rinsate will be added to the spray mix container or tank or disposed of on the application site at a rate that does not exceed amounts stated on the label.

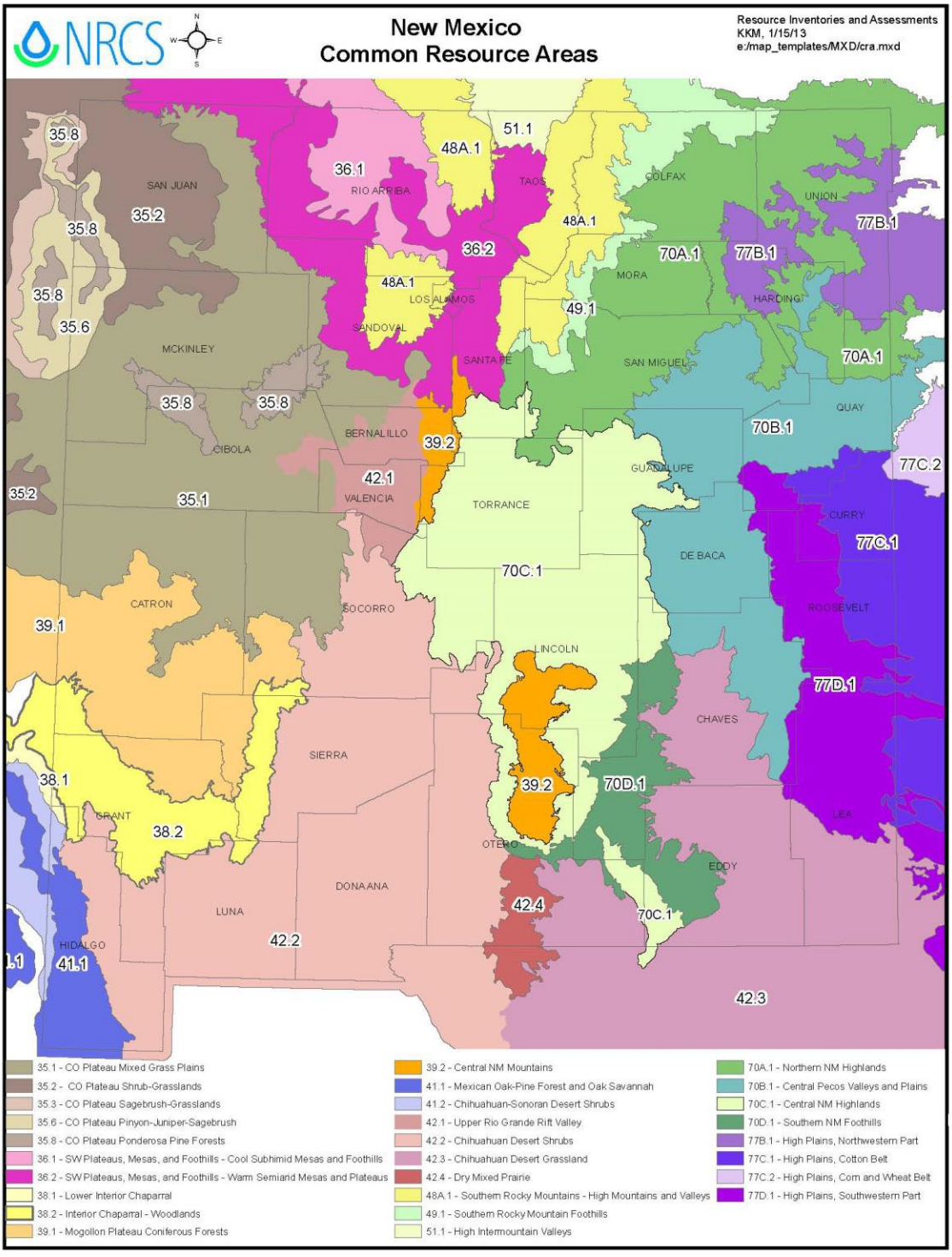
Unused chemical will be stored and secured in a protected area with appropriate advisory signage.

Empty and rinsed non-refillable chemical containers will be punctured and disposed of according to the label's specified instructions.

For additional information please contact the New Mexico state Plant Health Director, Jerald Levitt At: 602-431-3200, or the Western Region Grasshopper/Mormon Cricket Program Manager, Bruce Shambaugh at: 307-432-7979.

**Appendix 3:** Map of Affected Environment




NRCS
New Mexico
Common Resource Areas
Resource Inventories and Assessments
KKM, 1/15/13
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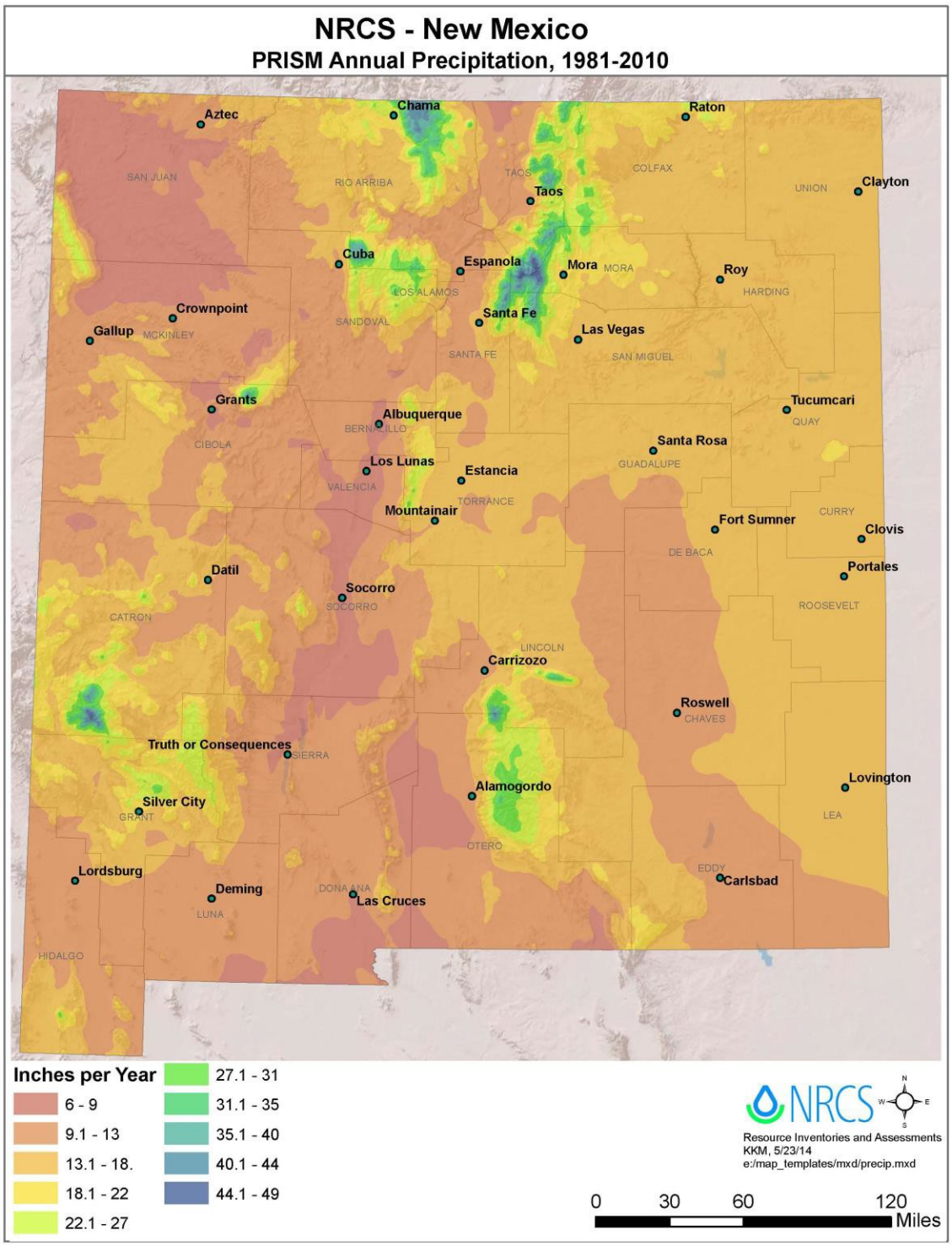
35.8
35.2
35.8
35.8
35.6
35.8
35.8
35.2
35.1
35.1
39.1
38.1
38.2
41.1
42.2
42.3
42.4
70C.1
70C.1
70D.1
70A.1
70A.1
70B.1
77B.1
77B.1
77C.2
77C.1
77D.1
48A.1
48A.1
48A.1
49.1
51.1
36.1
36.2
39.2
39.2
42.1
SAN JUAN
MCKINLEY
RIO ARRIBA
TAOS
COLFAX
UNION
MORA
HARDING
LOS ALAMOS
SANDOVAL
SANTA FE
SAN MIGUEL
QUAY
CIBOLA
BERNALILLO
GUADALUPE
VALENCIA
TORRANCE
CURRY
DE BACA
ROOSEVELT
CATRON
SOCORRO
LINCOLN
CHAVES
SIERRA
GRANT
OTERO
EDDY
LEA
DONA ANA
LUNA
HIDALGO
35.1 - CO Plateau Mixed Grass Plains
35.2 - CO Plateau Shrub-Grasslands
35.3 - CO Plateau Sagebrush-Grasslands
35.6 - CO Plateau Pinyon-Juniper-Sagebrush
35.8 - CO Plateau Ponderosa Pine Forests
36.1 - SW Plateaus, Mesas, and Foothills - Cool Subhimid Mesas and Foothills
36.2 - SW Plateaus, Mesas, and Foothills - Warm Semiarid Mesas and Plateaus
38.1 - Lower Interior Chaparral
38.2 - Interior Chaparral - Woodlands
39.1 - Mogollon Plateau Coniferous Forests
39.2 - Central NM Mountains
41.1 - Mexican Oak-Pine Forest and Oak Savannah
41.2 - Chihuahuan-Sonoran Desert Shrubs
42.1 - Upper Rio Grande Rift Valley
42.2 - Chihuahuan Desert Shrubs
42.3 - Chihuahuan Desert Grassland
42.4 - Dry Mixed Prairie
48A.1 - Southern Rocky Mountains - High Mountains and Valleys
49.1 - Southern Rocky Mountain Foothills
51.1 - High Intermountain Valleys
70A.1 - Northern NM Highlands
70B.1 - Central Pecos Valleys and Plains
70C.1 - Central NM Highlands
70D.1 - Southern NM Foothills
77B.1 - High Plains, Northwestern Part
77C.1 - High Plains, Cotton Belt
77C.2 - High Plains, Corn and Wheat Belt
77D.1 - High Plains, Southwestern Part


NRCS - New Mexico
PRISM Annual Precipitation, 1981-2010
Aztec
Chama
Raton
SAN JUAN
RIO ARRIBA
TAOS
COLFAX
UNION
Clayton
Taos
Cuba
Espanola
Mora
MORA
Roy
HARDING
LOS ALAMOS
Crownpoint
SANDOVAL
Santa Fe
Gallup
MCKINLEY
Las Vegas
SANTA FE
SAN MIGUEL
Grants
Albuquerque
Tucumcari
QUAY
BERNALILLO
CIBOLA
Santa Rosa
GUADALUPE
Los Lunas
Estancia
VALENCIA
TORRANCE
Mountainair
Fort Sumner
CURRY
Clovis
DE BACA
Datil
Portales
Socorro
SOCORRO
ROOSEVELT
CATRON
LINCOLN
Carrizozo
Roswell
CHAVES
Truth or Consequences
SIERRA
Alamogordo
Lovington
Silver City
GRANT
LEA
OTERO
Lordsburg
EDDY
Carlsbad
Deming
DONA ANA
Las Cruces
LUNA
HIDALGO
Inches per Year
6 - 9
9.1 - 13
13.1 - 18.
18.1 - 22
22.1 - 27
27.1 - 31
31.1 - 35
35.1 - 40
40.1 - 44
44.1 - 49
NRCS
Resource Inventories and Assessments
KKM, 5/23/14
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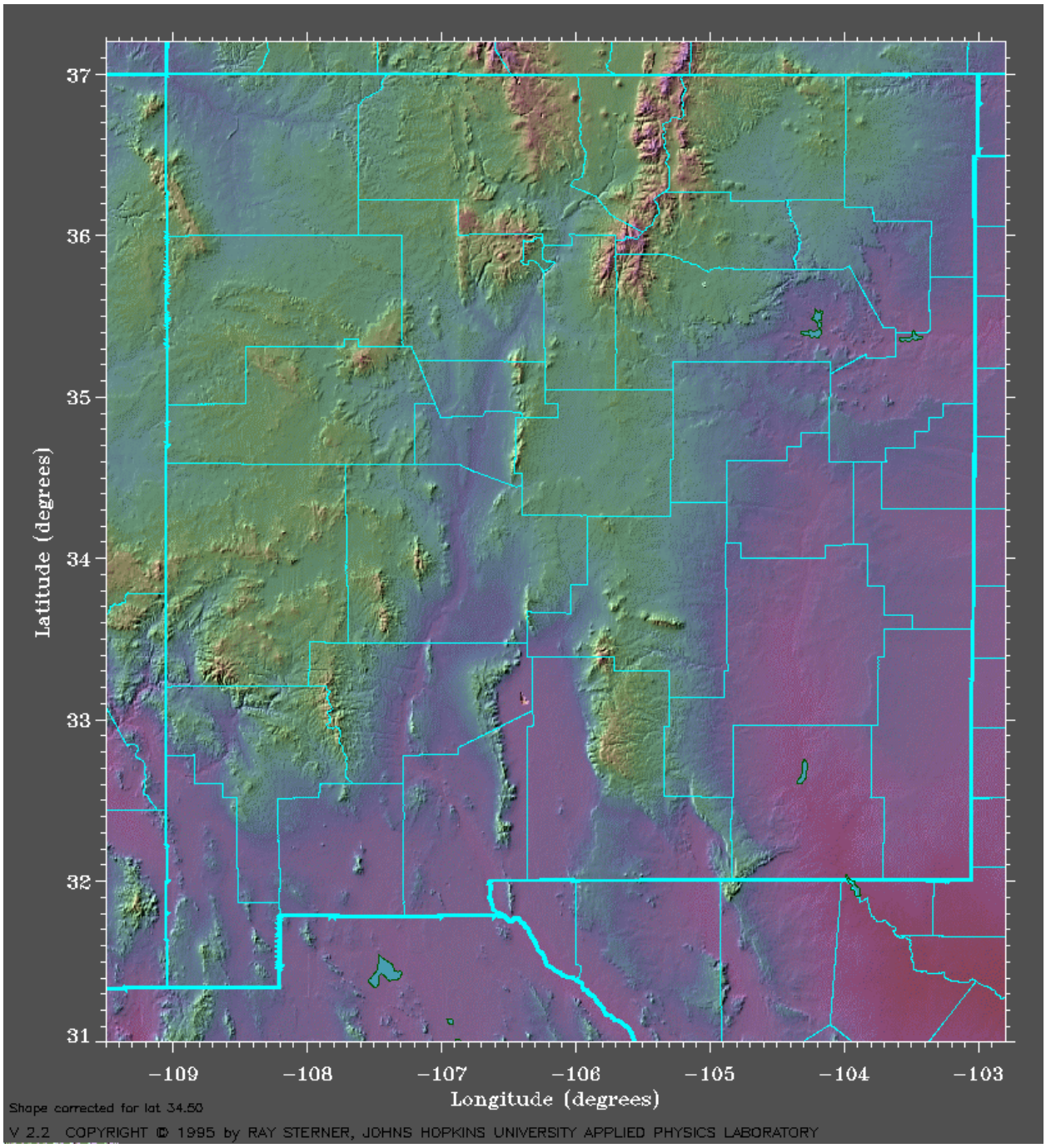
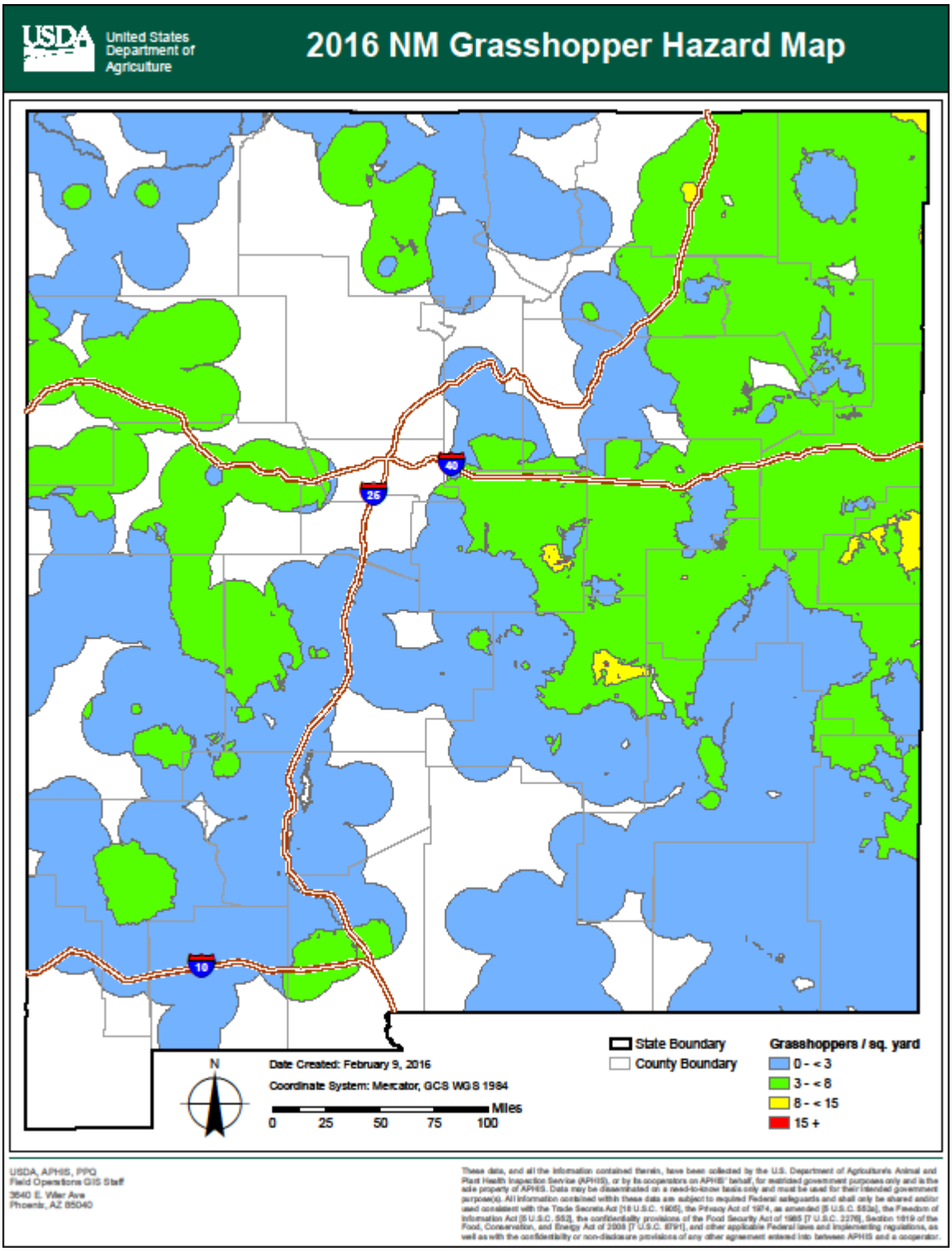
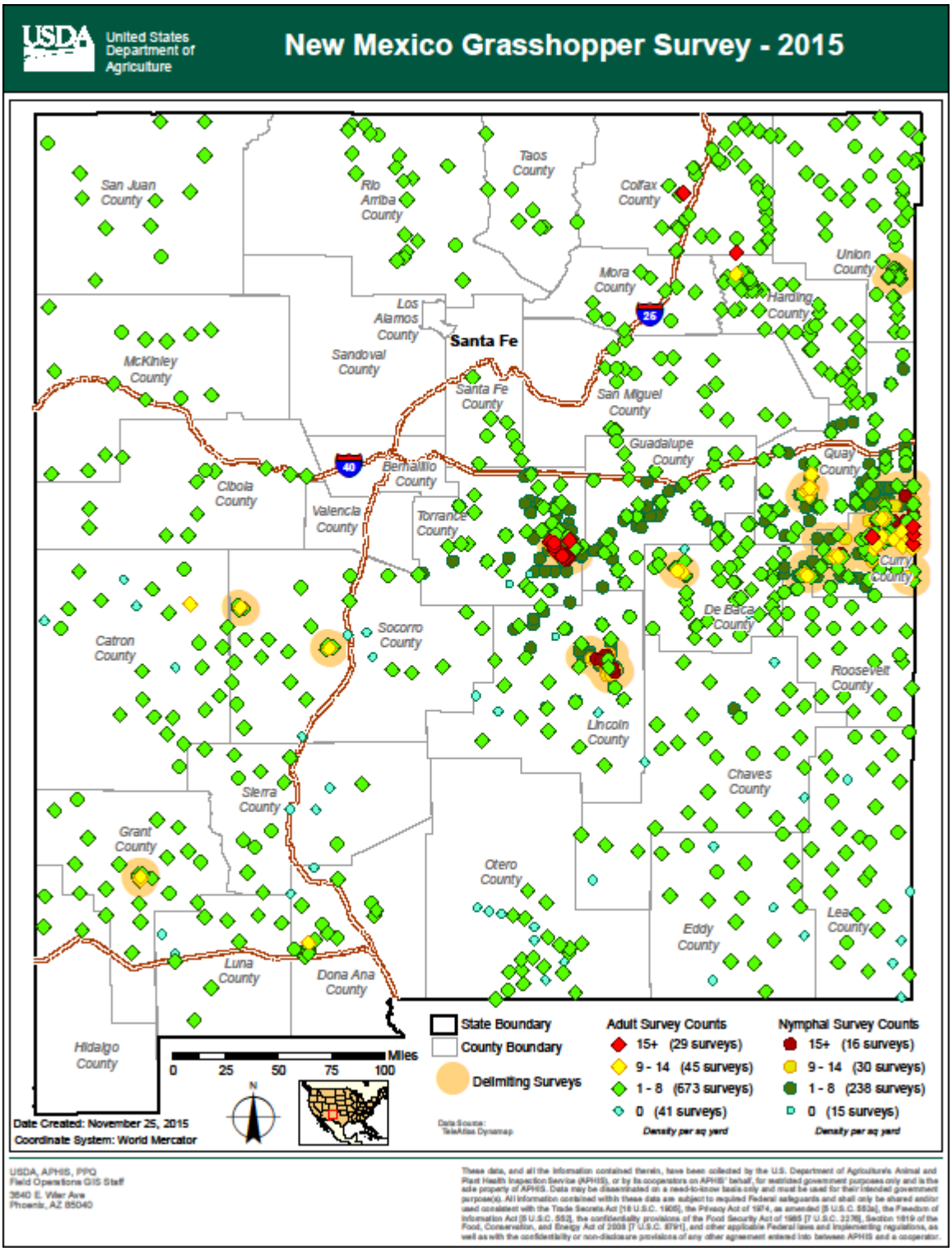
0
30
60
120
Miles

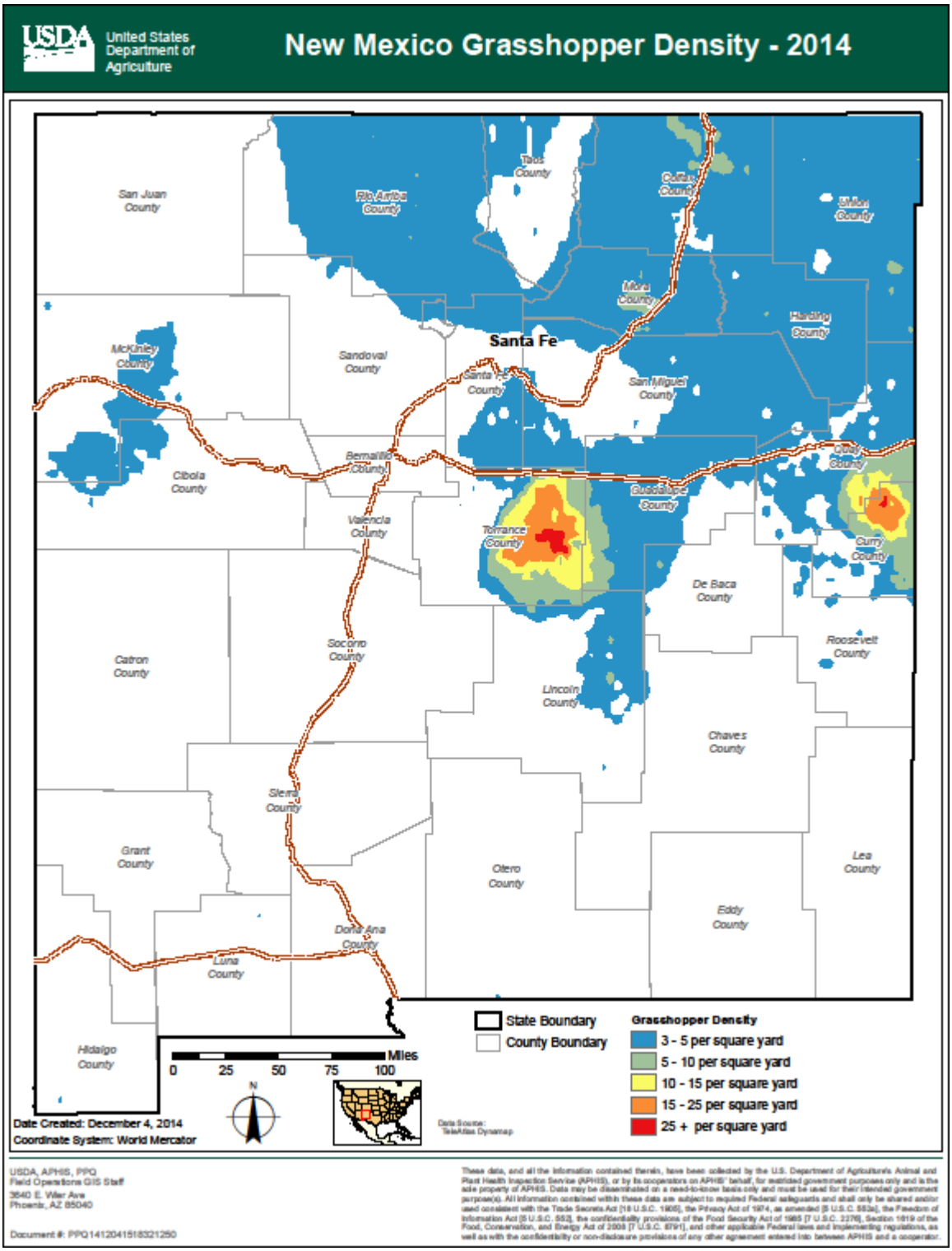
# General Topographic Map of New Mexico



# New Mexico 2016 Grasshopper Hazard Forecast Map




United States Department of Agriculture
New Mexico Grasshopper Survey - 2015
San Juan County
Rio Arriba County
Taos County
Colfax County
Union County
Mora County
Harding County
Los Alamos County
Santa Fe
Sandoval County
McKinley County
Santa Fe County
San Miguel County
Guadalupe County
Quay County
Bernalillo County
Cibola County
Valencia County
Torrance County
Curry County
De Baca County
Socorro County
Catron County
Roosevelt County
Lincoln County
Chaves County
Sierra County
Grant County
Otero County
Lea County
Eddy County
Luna County
Dona Ana County
Hidalgo County
State Boundary
County Boundary
Delimiting Surveys
Adult Survey Counts
15+ (29 surveys)
9 - 14 (45 surveys)
1 - 8 (673 surveys)
0 (41 surveys)
Density per sq yard
Nymphal Survey Counts
15+ (16 surveys)
9 - 14 (30 surveys)
1 - 8 (238 surveys)
0 (15 surveys)
Density per sq yard
Miles
0 25 50 75 100
N
Date Created: November 25, 2015
Coordinate System: World Mercator
Data Source: TeleAtlas Dynamap
USDA, APHIS, PPQ
Field Operations GIS Staff
3840 E. Wier Ave
Phoenix, AZ 85040



**APPENDIX 4:** FWS/NMFS Correspondence:

1) 2005 Lincoln County B.A; FWS Consultation # 2-22-05-I-0460
2) 2006 New Mexico B.A; FWS Consultation # 22420-2006-I-0069
3) 2007 New Mexico B.A, FWS Consultation #22420-2006-I-0069a
4) 2008 New Mexico B.A, FWS Consultation #22420-2008-I-0062
5) 2009 New Mexico B.A, FWS Consultation #22420-2009-TA-0027
6) 2010-2015 New Mexico B.A, FWS Consultation #22420-2010-I-0047
7) 2015 New Mexico B.A. FWS Consultation - #02ENNM00-2015-I-0244
8) 2016 New Mexico B. A. FWS Consultation - **Pending**

**APPENDIX 5:** State and Tribal Species of Concern Review:

1) Navajo Nation, Division of Natural Resources: Endangered Species List (Resource Committee Resolution No. RCS-41-08), September 10, 2008. nnhp.navajofishandwildlife.org/endangered.htm
2) New Mexico Energy, Minerals & Natural Resources Department, Forestry and Resource Conservation Division, Title 19, Chapter 21 Part 2.9 Endangered Plants Species List. August 31, 1995.
3) New Mexico Department of Game and Fish: Conservation Services Division; Threatened and Endangered Fishes of New Mexico by David L. Propst, 1999.
4) New Mexico Department of Game and Fish: Conservation Services Division: New Mexico Species of Concern – Status and Distribution. April 2003
5) New Mexico Department of Game and Fish: Conservation Services Division, Threatened and Endangered Species, look in "Bison M" database, 2010 www.wildlife.state.nm.us/conservation/threatened_endangered species/index.htm
6) New Mexico Rare Plant Technical Council: New Mexico Rare Plants; home page, http://nmrareplants.unm.edu (last update: 09-04-2009)
7) Disturbance or Take of Golden/ Bald Eagles; effective 11-10-2009. http://www.fws.gov/migratorybirds/baldeagle.htm

**APPENDIX 6:** Potential Experiment Treatment Alternative:

## Experimental Treatments: *(applied using air and/or ground equipment)*

APHIS continues to refine its methods of grasshopper control in order to make the program more economically feasible and environmentally acceptable. These refinements can include reduced rates of currently used pesticides, improved formulations, development of more target specific baits and development of biological pesticide suppression alternatives or improvements to aerial and ground application equipment. A division of APHIS, the Center for Plant Health Science and Technology (CPHST) located in Phoenix, AZ conducts methods development and evaluations for our agency.

To accomplish this work, experimental plots are used to refine equipment and methods or develop formulations that will possibly be used in future rangeland grasshopper programs. The experimental plot investigations are typically located throughout the western United States, including New Mexico. During the local informal field level consultation with the appropriate agencies, locations of experimental trials will be made available in order to ensure these activities are not conducted near sensitive species or habitats. Due to the small size of experimental plots, location of plots away from sites with endangered species conflicts, EPA approval and informal field level consultations, no adverse effects to the environment or its components are expected from these research activities.

Stressor tests, mixtures of native pathogen isolates combined with low doses of insecticides, will be conducted on native species of grasshoppers in a series of field cage exposures. Each test will consist of a series of mini-plots to be treated with Field Aerial Application Spray Simulation Tower Technique (FAASSTT). The treated plots, ten for each treatment, will be 14 inches in diameter. Grasshoppers confined in field cages on these areas will be followed to determine if the combination enhances field mortality of grasshoppers. Likely insecticides are diflubenzuron, Neem oil and chlorantraniliprole.

A series of experiments using ATV application equipment to apply labeled materials using RAATs and blanket applications to determine expected mortalities associated with barrier or crop protection and hot spot treatments. This may include baits or liquid applications.

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.