United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Asian Gypsy Moth Cooperative Eradication Program in Willowbrook, CA

Environmental Assessment, February 2008

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I. Introduction

Over the past few years, several male Asian Gypsy Moths (AGM) have been found in traps in the Los Angeles County and Orange County areas. The gypsy moth, *Lymantria dispar* L, is one of the most destructive pests of trees and shrubs in the United States. Of the two strains of gypsy moth that exist, the Asian strain poses a higher threat because it has a broader host range and the female flies further than the north American strain thereby spreading the population faster. Currently, eradication efforts of AGM have prevented a population of AGM from becoming permanently established and spreading as the North American Strain did in the United States.

A. Biology and History of Gypsy Moth

The North American gypsy moth was originally imported into Massachusetts from Europe in 1869 for silk production experiments. Some moths were accidentally released and became established. This gypsy moth infestation has spread relentlessly and now covers the entire northeastern part of the United States from Maine south to North Carolina and west to Michigan and Wisconsin. Gypsy moth caterpillars alter ecosystems and disrupt people's lives when in high numbers. Heavy infestations cause defoliation and tree mortality. Defoliated trees are vulnerable to other insects and diseases that may kill them. Heavy defoliation alters wildlife habitat, changes water quality, reduces property and esthetic values, and reduces the recreational value of forested areas. When present in large numbers, gypsy moth caterpillars can be a nuisance, as well as a hazard to health and safety (USDA, 1995).

Gypsy moth egg masses and pupae can attach to nursery stock, vehicles, camping equipment, and outdoor household articles that people bring with them when they enter and leave California. The presence of host plants allows the gypsy moth to begin to establish new populations in areas where they were previously unknown.

Gypsy moths originating in eastern North America that are progeny of the original European introduction are sometimes referred to as North American gypsy moths. AGM are a strain of the same species that comes from eastern Russia and Asia. AGM have also been established in Germany and other European countries where they are interbreeding with North American gypsy moths.

AGM differs from North American gypsy moths in that the female AGM can fly long distances. Female North American gypsy moths, despite having fully developed wings, cannot fly, thus slowing the spread of North American gypsy moths. In addition, there are approximately 500 host

species for AGM, compared to 250 host species for the North American gypsy moth. The increased distance that female AGM can fly, along with more host species for it, necessitate an aggressive, rapid eradication response wherever an AGM is found. These same characteristics also combine to make the AGM a threat to the forest resources of North America. Federal policy has been to eradicate AGM whenever they are found.

B. History of AGM in California

Several male AGM have been trapped over the past few years within a small area near the port of Los Angeles (see Appendix A). In 2003, a male AGM was found near the port of Los Angeles in Los Angeles County, California. Delimiting traps were placed within 5 miles of the 2003 find. There were no AGM detections in 2004.

However, in 2005, two additional male AGM were found (See Appendix A). The first was found near the 2003 AGM find, which is near the habitat of the endangered Palos Verdes Blue Butterfly. The second find was in the residential area of Orange County. Trapping was used in the Los Angeles Port area since it was located near the sensitive area that contains the Palos Verdes Blue Butterfly. The Orange County site was treated with three applications of *Bacillus thurengensis kuristaki* (Btk) followed by an increased density of traps in the area in spring 2006. The environmental effects of the treatment in Orange County were evaluated in an environmental assessment entitled "AGM Cooperative Eradication Program Orange County: March 2006" (USDA, 2006).

In 2006, another male AGM was found within a 5 mile radius of the 2003 find (See Appendix A) in Los Angeles County. It was decided that increased trapping density should be employed to the west of that area in 2007 to determine the extent of the moth population there, and that treatments should not occur in this sensitive area unless there was further evidence of an AGM population in this area.

In 2007, two additional male AGM moths were found in Los Angeles County (See Appendix A). One moth was found in the residential area of Willowbrook. The Willowbrook area had a low density of gypsy moth traps which would be expected to capture less than one percent of the male AGM that may be present there. A capture could indicate that there was only a single moth in the area, but, because of the low density of trapping in this area, it could also indicate the presence of an AGM population.

The second male AGM was found within the 5 mile radius of the 2003 find in the Rolling Hills area near the Port of Los Angeles. The level of trapping density in that area has been relatively high, suggesting that a

detection of one male AGM in a given year is probably not indicative of a large population of AGM. Additionally, Rolling Hills is close to the endangered Palos Blue Butterfly habitat.

Due to these multiple finds over the past several years, serious concerns were raised and therefore a technical working group (TWG) was gathered to determine the most effective strategy to employ in the Los Angeles County area. The TWG was convened in January 2008. The TWG recommended a specified pesticide treatment in the Willowbrook area. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) and the California Department of Food and Agriculture (CDFA) selected Btk as the pesticide to be employed due to favorable past experiences with Btk effectiveness and Btk's reduced environmental impacts. Due to the sensitivity of the endangered butterfly population near Rolling Hills and the current high density of trapping, APHIS and CDFA decided not to treat this area with chemicals but to increase the density of traps outside Rolling Hills to ascertain the level, if any, of the population that exists in that area.

II. Purpose and Need

APHIS, in cooperation with the CDFA, proposes to eradicate the AGM (*Lymantria dispar L.*) infestation in a one square mile area located in the Willowbrook area of Los Angeles, CA (See Map in Appendix B). The alternatives being considered here have been analyzed in detail in the 1995 Final Environmental Impact Statement (EIS) for Gypsy Moth Management in the United States. The findings of that EIS regarding these alternatives will be summarized and incorporated by reference into this environmental assessment (EA). The need for this proposed action is based on the potential adverse ecological and economic impacts of gypsy moth infestations on the infested and surrounding areas.

As described earlier, a male AGM was found in a trap in a residential area in the Willowbrook area of Los Angeles County, California. The trapping density in this area was low and would be expected to capture less than one percent of the male AGM that may be present. Therefore although only one male AGM was trapped, considering the low density of trapping, there may be a small population of AGM in this area of California. This potential population of AGM in California needs to be eradicated to avoid potential ecological, economic or human impacts. Los Angeles County contains preferred host plants that are susceptible to defoliation by the gypsy moth and which could support successful reproduction and spread of the pest. If the AGM becomes established and spreads throughout Los Angeles County and to other areas in California it is possible that AGM could further spread to other parts of the country including the surrounding states of Oregon, Washington, Nevada, and Arizona. The

associated damage, defoliation, and mortality of host plants from such an occurrence, in the absence of timely eradication action, could be devastating. AGM is not known to be established in the United States, and the proposed eradication treatment is the recommended response to the detection of this pest in Los Angeles County.

This EA is tiered to USDA's 1995 Final EIS for Gypsy Moth Management in the United States (USDA, 1995). We propose eradication because of the isolated nature of the infestation in Willowbrook, California and the threat that a reproducing population of AGM would pose to the vegetation resources of the Willowbrook area. This site-specific EA is designed to examine the environmental consequences of a range of treatment options under the 1995 Final EIS for Gypsy Moth Management in the United States that may accomplish the program's goals.

This EA is prepared consistent with National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.), the Council on Environmental Quality NEPA regulations (40 CFR part 1500 et seq.) and APHIS' NEPA implementing regulations (7 CFR part 372), for the purpose of evaluating how the proposed action and alternatives described in the following sections, if implemented, may affect the quality of the human environment. This EA is being made available to the general public and comments are requested from any interested party.

CDFA will be conducting a public meeting prior to any anticipated treatment. A mailer will be sent to residents who may be affected notifying them of the public meeting.

III. Affected Environment

A male AGM was found in the Willowbrook area in the county of Los Angeles. A one square mile treatment area has been defined in the Willowbrook area for treatment (see Appendix B). Willowbrook is mainly residential area in South Los Angeles with a population density of 9122 people per square mile. There are very few commercial buildings in this area; however, the one square mile treatment area contains several schools and the Earvin Magic Johnson Park. According to the Census Bureau data of 2000, Willowbrook has a population of 34, 138. This population is diverse with 54 percent of the population being Hispanic and 44 percent of the population African American.

IV. Alternatives

In isolated AGM finds, as the one found in Willowbrook, eradication is the strategy of choice. There are a number of treatment options, with various levels of effectiveness, available to implement the strategy:

1) Btk. This is a biological insecticide containing the bacterium, *Bacillus thuringiensis* var *kurstaki*. The insecticide is specifically effective against caterpillars of many species of moths and butterflies.

2) Diflubenzuron (Dimilin). This is an insect growth regulator that interferes with the growth of some immature insects.

3) Gypsy moth virus. This is a nucleopolyhedrosis virus which occurs naturally and is specific to the gypsy moth. Gypcheck® is an insecticide product made from the gypsy moth nucleopolyhedrosis virus.

4) Mass trapping. The treatment consists of large numbers of pheromone traps used to attract male gypsy moths and prevent them from mating with females, thereby causing a population reduction. The density of traps in this treatment option is nine or more traps per acre.

5) Mating disruption. This treatment consists of aerially-applied tiny plastic flakes or beads containing disparlure, a synthetic gypsy moth sex pheromone. The pheromone confuses male moths and prevents them from locating and mating with females.

6) Sterile insect releases. Large numbers of radiation-sterilized gypsy moth eggs or pupae are released in a treatment area and develop into adults. The sterile adults mate with fertile adults but viable offspring are not produced. If successful, the effect is population reduction and eventual elimination of the infestation.

Of the treatment options listed above, Btk and diflubenzuron have proven to be the most effective eradication tools for use with small populations of AGM such as the one in Willowbrook, California. This EA analyzes the no action alternative and the proposed action that will treat the area using Btk combined with trapping to ensure that the treatment was effective. The other treatments were not considered in detail due to the low likelihood that they would achieve the program goal of eradication, the effects could not be determined, or the treatment option would create increased adverse environmental effects. Diflubenzuron (Dimilin) was not selected because it contains a growth regulator with a broader non-target host range than Btk and can kill many other insects in addition to larvae of moths and butterflies and is, therefore, not preferable unless Btk is not available. Gypcheck®, mating disruption and sterile insect release are still

in a somewhat experimental stage of development for eradication programs and the results have been variable.

A. No Action

Under this alternative, we would not treat the selected area with any insecticide or mating disruption. This would allow any population of gypsy moth that may be present in the area to become established and spread into the surrounding areas as well as be spread to surrounding states. Although this does not meet the need to manage the gypsy moth population, it does provide a baseline for comparison to the alternatives.

B. Proposed action

Under this alternative, a pesticide application of Btk will be applied via a truck mounted sprayer into the canopy of AGM host trees within a square mile area surrounding the capture site. A total of three applications of Btk will be applied with approximately a 10-day interval between the applications. These applications are timed to occur during the early larval stages when gypsy moth caterpillars hatch from their eggs and are most susceptible to the treatment. It is anticipated that treatment will begin in early to mid March. The Btk applications will be toxic to the caterpillars of moths and butterflies that feed on treated vegetation within the treatment zone potentially eliminating any immature gypsy moths that could be in the area.

Trapping will be used in conjunction with the Btk treatment. Trapping consists of pheromone baited traps at a density of no less than 25 traps per square mile. Traps will be placed within a 5 mile radius area around the AGM find. These traps will attract adult male gypsy moths. The trapping will be used to ensure that the treatments in the area have been successful.

V. Environmental Impacts of the Proposed Action and Alternatives

A. No Action

The no action alternative is required by Council of Environmental Quality regulations (40 CFR §1502.14(d)). The no action alternative forms the basis for a comparison among the effects of the different alternatives. This alternative provides baseline information for understanding environmental impacts associated with the no action alternative and potential environmental effects associated with the outbreak from a non-native species.

Selecting this alternative likely would result in the establishment of an AGM population in Los Angeles County with commensurate damage to trees relative to the level of infestation. The majority of the trees in the eradication area and surrounding areas are susceptible to damage from feeding of the gypsy moth. The alternative would allow the gypsy moth to flourish in the existing area and continue to spread into surrounding areas. With the establishment of the gypsy moth, the environmental concerns discussed below would be likely to occur.

1. Human Impact

Some people are allergic to the tiny hairs on gypsy moth caterpillars. These people would suffer minor allergic reactions, primarily rashes, if gypsy moths were allowed to become established. In addition, irritation to eyes and throat are common reactions in gypsy moth infestations (USDA, 1995). During outbreaks, gypsy moth caterpillars crawl over sidewalks, patios, lawn furniture, and the like, and they may even enter houses (USDA, 1995). In heavily infested areas, large numbers of caterpillars limit some people's enjoyment of the outdoors (USDA, 1995). The droppings and defoliation are not aesthetically pleasing to those involved in recreational activities (USDA, 1995).

2. Ecological Impact

The ecological effects associated with the AGM were examined by the Forest Service (USDA, 1995). Large proportions of the trees located in the immediate and surrounding areas are host trees and are threatened by gypsy moth defoliation (USDA, 1995). Gypsy moth feeding can lead to changes in forest stand composition (USDA, 1995). Nesting sites and cover for birds and other animals would be reduced (USDA, 1995). Although major water sources are not located within the treatment site, if gypsy moths were to spread to other areas changes in water quality and effects to aquatic organisms would be seen (USDA, 1995). The loss of vegetation in the area could lead to increased erosion of soil and loss of moisture retention (USDA, 1995).

B. Proposed Action

The proposed action will use Btk pesticide in a one square mile area surrounding the location where the male AGM was found in Willowbrook, California at a rate of 1 pound per acre. The Btk will be applied by a truck mounted sprayer applied upward into the canopy of host plants. Delimitating trapping at a density of no less than 25 traps per square mile will follow the three applications of Btk to verify effectiveness. The environmental effects from the various treatment options are discussed in detail below.

Btk

Btk is a naturally derived soil bacteria that has selective insecticidal activity against certain butterflies, moths, beetles, flies and midges. However, sensitivity to Btk within these groups varies. Application of Btk poses negligible risk to human health and the environment as described below in detail. The biological pesticide, Btk, is now commonly the material of choice for gypsy moth eradication programs in the United States.

1. Human Impact

If directly exposed to Btk spray, some individuals (particularly workers who handle or mix the pesticides) may develop minor irritation of the skin, eyes, or respiratory tract. These effects are relatively mild and transient. Pathogenic effects are not likely, even in individuals with impaired immune systems. Allergic responses to Btk are conceivable, but have not been documented. Table 9–4 and figure 9–1, found in appendix F of the 1995 Final EIS for Gypsy Moth Management in the United States (USDA, 1995), clearly and concisely shows human risks due to gypsy moth and all treatment alternatives including Btk

In 1998, EPA published a Reregistration Eligibility Decision *Bacillus thuringiensis* (EPA 1998) in which the agency concluded:

"Based on the reviews of the generic data for the active ingredient, *Bacillus thuringiensis*, the Agency has sufficient information on the health effects of *Bacillus thuringiensis* and on its potential for causing adverse effects in fish and wildlife and the environment. The Agency has determined that *Bacillus thuringiensis* products, manufactured and used as specified in this Reregistration Eligibility Decision will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, the Agency concludes that products containing *Bacillus thuringiensis* for all uses are eligible for reregistration."

2. Ecological Impact

Most non-target species (i.e., birds, mammals, amphibians, and reptiles) will not be affected from the Btk treatment in this area. Although, no direct effects to birds have been seen in forestry applications of Btk, some indirect effects were noted in studies where birds relied on caterpillar larvae as a primary food source (USDA, 2004). In some cases slight effects on reproduction (such as nestling growth rates) were seen when large applications in forested areas occurred (Norton et al., 2001); however, in other studies, no indirect effects on reproduction were noted (USDA, 2004).

Effects to nontarget terrestrial invertebrates are highly variable and dependent on test organisms. Even within the lepidopteran group that contains butterflies and moths, sensitivities can be highly variable

(Peacock et al., 1998). In general toxicity to pollinators and beneficial insects are considered low based on laboratory and field studies testing honeybees, as well as other beneficial insects (USDA, 2004). Some non-target Lepidoptera larvae (caterpillars) present in the proposed spray area would likely be killed by the application of Btk. However, depressions in caterpillar populations are expected to be temporary due to recolonization from adjacent untreated areas and the high reproductive capacity of most insects. Animals dependent on caterpillars for food may also be affected, but it is anticipated that these animals will likely use other sources for food or will forage outside the treatment area. Btk is only effective against early instars of caterpillars. Therefore, Lepidoptera larvae exposed in late instars and those present at times other than during treatment applications are not affected.

Btk is not likely to affect most aquatic organisms. Multiple freshwater and saltwater fish species were tested in the laboratory to determine what level of Btk exposure would result in an effect (USDA, 2004). The required levels were much higher than any level that would be used in this program (USDA, 2004). There have been laboratory studies supported by field data that suggest exposure could result in minimal effects to aquatic invertebrates (Richardson and Perrin, 1994; Kreutzweiser, et al., 1992; USDA, 2004). However, studies showed that *D. magna*, mayflies, stoneflies, copepods, and mysid shrimp were not affected when exposed to concentrations well above those expected in the environment after application of Btk (USDA, 2004).

Exposure to light, higher temperature, and moisture decrease the amount of Btk in the environment. In a summary of studies regarding the environmental fate of Btk, the majority of studies indicated that insects were only affected for approximately 1 week; however, other studies have shown that while persistence of Btk in the environment may decrease rapidly, the insecticidal activity can persist up to 3 months under certain environmental conditions (USDA, 1995). Btk's persistence in water depends on organic matter content and salinity (USDA, 1995). Btk has been found in aquatic field studies for 13 days and up to 4 weeks after spraying (USDA, 1995).

Based on the proposed application of Btk from truck sprayers on host materials, the rate of application, and the persistence of Btk in the environment, non-target exposure is expected to be low. There will be minimal risk to nontarget organisms due to the limited exposure and low toxicity as described above. Label requirements and other restrictions, where appropriate, will further reduce risk to sensitive organisms such as some aquatic invertebrates and pollinator species as described above.

Trapping

Trapping will involve disparlure-pheromone baited traps to attract male gypsy moths. Disparlure is a chemical sex attractant that attracts male gypsy moths. Section 5 from appendix G of the 1995 Final EIS for Gypsy Moth Management in the United States thoroughly discussed the ecological effects of disparlure, Btk, and other treatment options on the environment (USDA, 1995).

1. Human Impact

Data are not sufficient for a quantitative risk assessment. By analogy to other insect pheromones, risks of toxic effects, if any, are likely to be slight for the general public and workers. Disparlure is very persistent on and in the body. Individuals that come in physical contact with disparlure may attract adult male moths for prolonged periods of time (up to 2 to 3 years). This may be a considerable nuisance in gypsy moth infested areas such as the eastern United States. The level of exposure required to cause the attractant effect cannot be characterized, although the likelihood of this effect is much greater for workers than for the general public. However, physical contact with disparlure from mass trapping is unlikely and would only occur if someone were to tamper with the trap themselves.

2. Ecological Impact

In acute toxicity tests, disparlure was not toxic to mammals, birds, or fish (USDA, 1995). Pheromone traps do incidentally catch small numbers of non-target organisms that accidently fly into the traps. However, since the pheromone in the trap is specific to gypsy moth, the number of non-target organisms affected will be very small and will have a minimal impact to the environment.

VI. Other Issues

A. Cumulative Impacts

Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agencies or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR § 1508.7). Cumulative impacts resulting from an eradication program can be caused by multiple treatments of the same area in the same season (that is, three applications of Btk in this program) and retreatment of the same project area in following years. Cumulative impacts may be additive resulting in greater effect than the sum of the individual effects.

Cumulative impacts from the proposed alternative could occur from the three Btk applications that extend the time of potential exposure and risk to a greater number of non-target lepidopterans. However, because the proposed eradication area is relatively small, the opportunity for recolonization of non-target lepidopterans from the surrounding areas is high.

Because both Btk application and mass trapping have very little potential for human and environmental effects, when the techniques are used together they also have very little cumulative impact. Btk applications used in conjunction with mass trapping pose little or no risk to non-target organisms. The risk of cumulative impacts to humans, water quality, microclimate, and soil productivity is minimal.

In the event that the gypsy moth outbreak establishes itself in this small area of Los Angeles County, future treatments may be required to eliminate them. Spraying of Btk over several years may lead to decreased likelihood that non-target lepidopterans reestablish populations in this area. However, if future treatments are needed, a subsequent EA will be conducted and these risks will be evaluated further.

B. Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) and its implementing regulations require Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat. The treatment area is a residential section of Los Angeles. There are no listed species in the treatment area or the surrounding areas. The closest critical habitat is for the Palos Verdes Blue butterfly located 10 miles away from the treatment site. APHIS has considered the potential effects of the proposed program on endangered and threatened species and their habitats and determined that no listed species are located within the area affected by the eradication project proposed. Therefore, APHIS has made a no effect determination for the proposed program for eradication of the gypsy moth using Btk and mass trapping in Los Angeles County, California.

C. Site Specific Concerns

The treatment site is mainly residential. Only a small area will be subjected to Btk will be applied by ground application to host trees within the area, thus limiting exposure to humans. Citizens will be on notice regarding the timing of the application of chemicals. It is advised that individuals stay indoors during the application of these chemicals to ensure that any negative effects are limited. Sensitive individuals should

be especially aware of when the application occurs and should take measures to limit their exposure.

Consistent with Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," APHIS considered the potential for disproportionately high and adverse human health or environmental effects on any minority or low income populations. The environmental and health effects from the proposed applications are minimal and are not expected to have disproportionate adverse effects to any minority or low-income population. Although the treatment area is located in a minority area, this area has been selected for treatment due to the male AGM find. The other male AGM find in Los Angeles County, California in 2007 was located to the south and is near critical habitat for the endangered Palos Verdes Blue Butterfly. The higher trapping density in the more southern area is sufficient to allow USDA and CDFA to conclude that the AGM find is most likely a single individual and not indicative of a new population. Applications with Btk may affect the endangered butterfly and will not be conducted. It was determined that because of the low level of trapping in the Willowbrook area less than one percent of an AGM population would be detected, suggesting that if there was one male AGM found in the area, more may exist. Due to the nature of the treatment area and lack of endangered species, it was decided that treatment should be conducted to ensure that any population that exists is eradicated.

Consistent with EO 13045, "Protection of Children From Environmental Health Risks and Safety Risks," APHIS considered the potential for disproportionately high and adverse environmental health and safety risks to children (USDA, 1995). The children in the area are not expected to be adversely affected disproportionately over adults from the program actions proposed.

VII. Listing of Agencies and Persons Consulted

U.S. Department of Agriculture
Animal Plant Health Inspection Service
Plant Protection and Quarantine
Emergency and Domestic Programs
4700 River Road Unit 134
Riverdale, MD 20737

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental Services
4700 River Road Unit 149
Riverdale, MD 20737

California Department of Food and Agriculture
Plant Health and Pest Prevention Services
1220 N Street
Sacramento, CA 95814–5607

VIII. References

EPA – See U.S. Environmental Protection Agency

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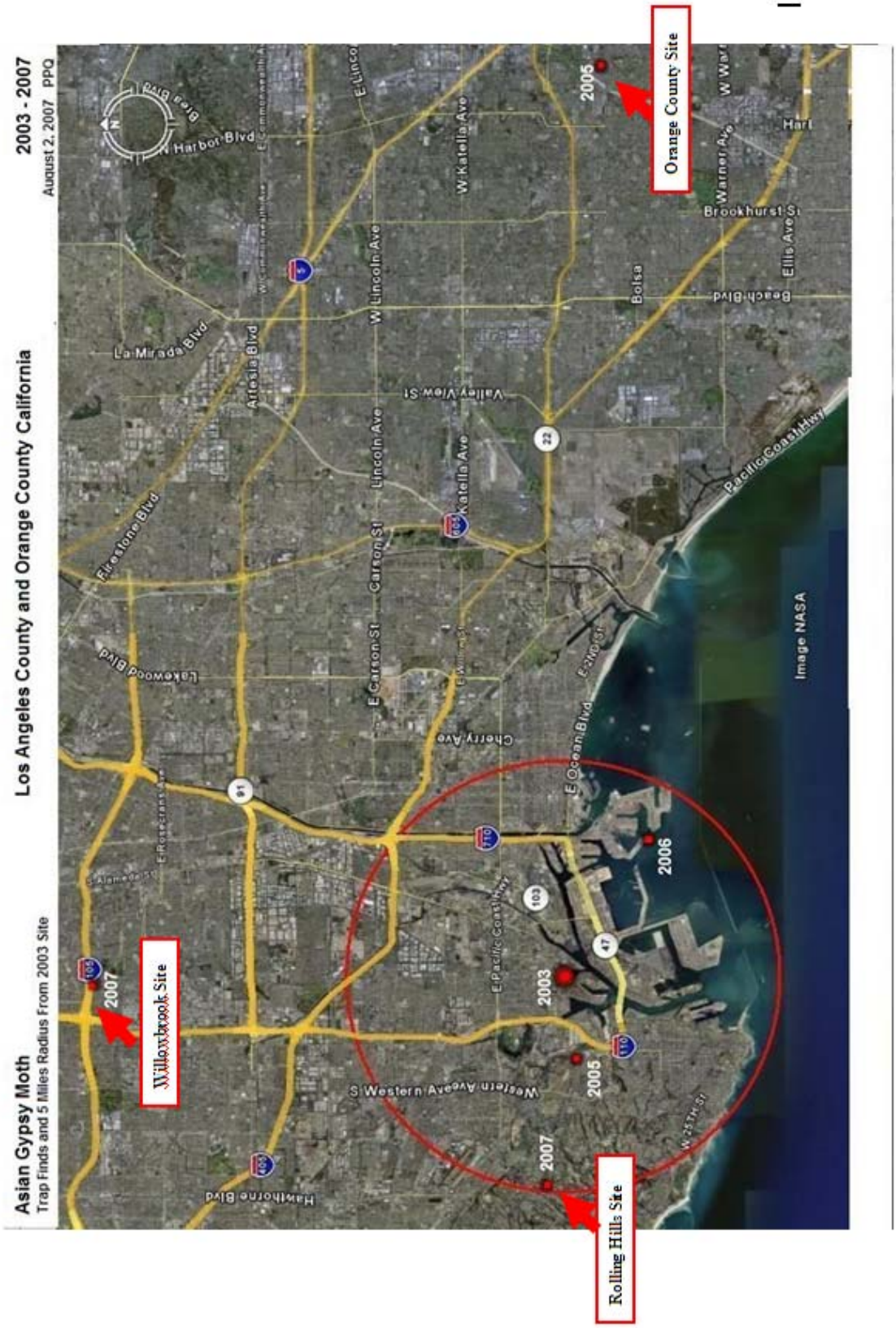
U.S. Environmental Protection Agency, 1998. Reregistration Eligibility Decision (RED): *Bacillus thuringiensis*. Office of Prevention, Pesticides and Toxic Substances. EPA738–R–98–004. 157 pp.

Appendix A. Map of the AGM Finds 2005 - 2007



Appendix B. Map of the Treatment Area