United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Asian Gypsy Moth Cooperative Eradication Program Orange County, CA

Environmental Assessment, March 2006

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I. Introduction and Need for the Proposal

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), in cooperation with the California Department of Agriculture, proposes to eradicate the Asian gypsy moth (*Lymantria dispar L.*) infestation in a small area located in Orange County, California. 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.

This EA is tiered to USDA's 1995 Final EIS for Gypsy Moth Management in the United States. Eradication is proposed because of the isolated nature of the infestation in Los Angeles County. 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) and APHIS' NEPA implementing procedures (7 Code of Federal Regulations (CFR), part 372), for the purpose of evaluating how the proposed action and alternatives described in the proceedings sections, if implemented, may affect the quality of the human environment.

A. Biology of Gypsy Moth

The gypsy moth, *Lymantria dispar* L., is one of the worst pests of trees and shrubs in the United States. It 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 human lives when in high numbers. Heavy infestations cause defoliation and tree mortality. Defoliated trees are also 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).

Egg masses and pupae of the gypsy moth can attach to nursery stock, vehicles, camping equipment, and outdoor household articles that people bring with them when they come to 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. Asian gypsy moths are a strain of the same species that comes from eastern Russia and Asia. Asian gypsy moths have also been established in Germany and other European countries where they are interbreeding with North American gypsy moths.

Asian gypsy moths differ from North American gypsy moths in that the female Asian gypsy moths can fly long distances. Female North American gypsy moths, despite having fully developed wings, cannot fly. In addition, the host species for Asian gypsy moth is approximately 500 species, as compared to 200 host species for the North American gypsy moth, which contributes to the rationale for an aggressive eradication response wherever an Asian gypsy moth is found. These characteristics combine to make the Asian gypsy moth a threat to the forest resources of North America. Generally, Federal policy has been to eradicate Asian gypsy moths whenever they are found.

There is precedent for eradication of isolated populations of Asian and North American gypsy moths if eradication efforts are swiftly employed, as was demonstrated in North Carolina in 1993. A ship carrying military cargo from Germany was found to be infested with large numbers of gypsy moths, including flying female moths typical of the Asian strain. The ship was sent back out to sea and the cargo was fumigated, but not before large numbers of moths flew ashore. Hundreds of male moths were trapped near the port facilities, along the shore and up to 25 miles inland. Genetic testing indicated that both North American and Asian strain moths were present, as well as some which were apparently mixed strains (N.C. Dept. of Agric. 1994). An eradication program was quickly devised and put into place, and the infestation was successfully eradicated before it could become established.

Several other eradication attempts involving Asian gypsy moth were also successful. In 2000, Washington State treated 725 acres successfully with *Bacillus thuringiensis* var *kurstak* (B.t.k). Oregon successfully treated 910 acres with B.t.k. in 2001. More recently, Idaho used B.t.k. treatments on 640 acres to successfully eradicate the Asian gypsy moth.

B. Affected Environment

The Asian gypsy moth was found at the capture site at 1905 W. Martha Lane, Santa Ana, California with coordinates at 33 degrees 45' 32.49" N. and 118 degrees 17' 46.36" W. The area surrounding the capture site is mostly residential. Within the 200-meter radius treatment zone, there is a total of 148 residences. There are no businesses or schools within the 200-meter radius treatment zone, however, there is a preschool 1/2 block away from the 200-meter zone and an elementary school and city park 3/4 blocks away from the 200-meter zone. The area outside the 200-meter zone and up to a 0.5 mile radius from the capture site includes 1412 total residences, 51 businesses, and one junior college with a separate preschool facility.

C. Need for Action

One male Asian gypsy moth was found in a trap in a residential area in Orange County, California. This find suggests that there may be a population of Asian gypsy moths in this area of California. This population of Asian gypsy moth in California needs to be eradicated to avoid potential ecological or human impacts. Orange County contains preferred host plants that are susceptible to defoliation by the gypsy moth which, therefore, could support successful reproduction and spread of the pest. If the Asian gypsy moth becomes established and spreads throughout Orange County and to other areas in California, the associated damage, defoliation, and mortality from such an occurrence, in the absence of timely eradication action, could be devastating. Asian gypsy moth is not known to be established in the United States, and the proposed eradication treatment is the recommended response for the detection of this pest in Orange County.

II. Proposed Action

Under the Record of Decision of the EIS, the selected alternative was to use a variety of treatment options to further three strategies (slow the spread, suppression, and eradication). Each strategy would be applied, depending on the geography of the area to be treated, relative to the generally infested gypsy moth area. Eradication is the preferred strategy when the presence of an Asian gypsy moth is found, as is the case in Los Angeles County.

The following is a description of geography in United States with regard to the gypsy moth. The area of the United States where the North American strain of the gypsy moth is established is called the generally infested area. Next to this area is a band 50 to 100 miles wide, called the

transition area, where the gypsy moth is spreading from the generally infested area. The area where the gypsy moth is not established is called the uninfested area. Isolated infestations resulting from accidental spread of the gypsy moth by people may occur in the uninfested area. Different management strategies apply in these areas: the suppression strategy is employed in the generally infested area, the slow the spread strategy in the transition area, and eradication of isolated infestations in the uninfested area. In addition, for all infestations involving the Asian strain, eradication is the preferred strategy in all locations, including the generally infested area.

Recently an Asian gypsy moth was detected in Orange County, California. Therefore, the proposed strategy for this isolated infestation of gypsy moth is eradication.

III. Alternatives

In isolated infestations and any infestations that involve Asian gypsy moth characteristics, as the one found in Orange County, California, eradication is the strategy of choice. There are a number of treatment options, with various levels of effectiveness, available to implement the strategy:

1) B.t.k. 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. Density of traps 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, B.t.k. and diflubenzuron have proven to be the most effective in situations such as the one in Orange County. This EA analyzes the no action alternative and the proposed action that will treat the area using B.t.k. in combination with mass trapping. Other treatments were not considered in detail because the probability that they would achieve the program goal of eradication was judged to be too low or could not be determined. Diflubenzuron (Dimilin) was not selected because the growth regulator has a broader non-target host range than B.t.k. and can kill many other insects in addition to larvae of moths and butterflies and is, therefore, not preferable unless B.t.k. 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 within the area to become established and spread into the surrounding areas. 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 B.t.k. will be applied to an area within a 200-meter radius from the capture site either by treating the entire 200-meter block aerially or by treating only host material that occurs within this 200-meter radius. There will be a total of three applications with approximately a 10-day lapse in 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 intoxication. The B.t.k. 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.

Mass trapping will be used in conjunction with the B.t.k. treatment. Mass trapping involves setting gypsy moth pheromone traps at very high densities. These traps attract adult male gypsy moths. Mass trapping has been attempted as an eradication tool but results have varied. This

technique may be useful as an eradication tool when used in combination with other techniques. Any captured male moths are removed from the breeding population. Traps will be placed outside the 200-meter radius B.t.k. treatment area. Ten traps per acre will be placed within a 0.5 mile radius from capture site. Outside of the 1-mile core, 25 traps will be placed per square mile. Inspections of the traps will occur on a regular schedule, typically 1 week.

IV. 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 would result in the establishment of a gypsy moth population with commensurate damage to trees relative to the level of infestation. This would allow the gypsy moth to establish in the area and expand into the surrounding area. 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 Environment

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 treating infested outbreaks. During outbreaks, gypsy moth caterpillars crawl over sidewalks, patios, lawn furniture, and the like, and they may even enter houses. In heavily infested areas, large numbers of caterpillars limit some people's enjoyment of the outdoors. The droppings and defoliation are not aesthetically pleasing to those involved in recreational activities.

2. Ecological Environment

The ecological effects associated with the Asian gypsy moth were examined by the Forest Service. Large proportions of the trees located in the immediate and surrounding areas are host trees and are threatened by

gypsy moth defoliation. Gypsy moth feeding can lead to changes in forest stand composition. Nesting sites and cover would be reduced. 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. The loss of vegetation in the area could lead to increased erosion of soil and loss of moisture retention.

B. Proposed Action

The proposed action will utilize B.t.k pesticide in a 200-meter radius zone surrounding the location of the gypsy moth find. B.t.k. will either be applied aerially or by ground equipment. If applied aerially, the entire 200-meter radius area will be treated. If applied by ground equipment, only those preferred hosts that occur in the area will be sprayed. Mass trapping will be used outside the 200-meter radius zone to attract male gypsy moths thus preventing them from mating. The traps will be placed at a density of 10 per acre in the zone, extending from 200 meters from the Asian gypsy moth capture site outward to cover 1-square mile. Outward from the 1-square mile area, traps will be placed at the rate of 25 per square mile to cover an area of 5 square miles around the capture site.

B.t.k.

B.t.k. is a naturally occurring soil bacterium. When sprayed on foliage and ingested, it is toxic to most caterpillars (larvae of butterflies and moths). Other insects and vertebrates are not affected by this bacterium. Human health risks from use of B.t.k. in gypsy moth eradication programs have been shown to be extremely low. There are no known effects to mammals, amphibians, birds, or reptiles.

Modern aqueous formulations of B.t.k. contain no organic solvents. None of the inert ingredients in these formulations are on list 1 (Inerts of Toxicological Concern) of the Environmental Protection (EPA) or list 2 (Potentially Toxic Inerts). In addition, all of the inert ingredients are approved by the Food and Drug Administration for use in foods or in food processing. B.t.k. products are organic and are designated by EPA as exempt from residue tolerances. This means that there are no limitations on the amount of residue that exists on food items. B.t.k can be used on food crops up to and including the day these products are harvested, as well as on stored food products. Some genetically modified crops, such as corn, now have B.t.k. genes permanently incorporated in them. All sensitive terrestrial insects are Lepidoptera and include some species of butterfly. The risk characterization for other wildlife species is unambiguous under foreseeable conditions of exposure; however, adverse effects are unlikely to occur.

Application of B.t.k. poses negligible risk to human health or the environment. B.t.k.'s host range is limited to caterpillars of Lepidoptera (moth and butterflies). The biological pesticide, B.t.k., is now commonly the material of choice for gypsy moth eradication programs in the United States. In the past decade, improved formulations and more concentrated applications of B.t.k. have increased gypsy moth larval mortality and have provided more consistent foliage protection where it has been used. Aqueous B.t.k. formulations do not affect aquatic organisms and can be applied over open water. B.t.k. is relatively expensive because three applications are usually required to ensure eradication.

1. Human Environment

If directly exposed to B.t.k. 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 B.t.k. 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 B.t.k.

In 1998, EPA published 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 Environment

Some non-target Lepidoptera larvae (caterpillars) present in the proposed spray area would likely be killed by the application of B.t.k. In turn, theoretically, those animals dependent on caterpillars for food may be affected. However, depressions in caterpillar populations are expected to be temporary due to recolonization from adjacent areas and the high reproductive capacity of most insects. B.t.k. 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.

There are no known effects from B.t.k. to mammals, amphibians, birds, or reptiles. Water quality and soil conditions should not be directly affected by B.t.k. B.t.k. is not likely to affect most aquatic organisms and naturally occurs in soils worldwide. B.t.k. reduces the amount of defoliation by leaf-eating caterpillars; therefore, changes in microclimate due to defoliation are not expected after B.t.k. application.

Mass Trapping

Intensive mass trapping involves the use of large numbers of disparlure-baited pheromone traps. 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, B.t.k., and other treatment options on the environment.

1. Human Environment

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 exposed to 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, exposure to disparlure from mass trapping is unlikely and would only occur if someone were to tamper with the trap themselves.

2. Ecological Environment

In acute toxicity tests, disparlure was not toxic to mammals, birds, or fish. Pheromone traps do catch small numbers of non-target organisms. 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.

V. 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 B.t.k. 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.

The cumulative impacts in the proposed alternative could occur from the three B.t.k. 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 B.t.k. 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. B.t.k. application used in conjunction with mass trapping poses 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, future treatments may be required to eliminate them. Spraying of B.t.k. 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. APHIS has considered the potential effects of the proposed program on endangered or threatened species and their habitats and determined that no listed species is 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 B.t.k. and mass trapping in Orange County, California.

C. Site Specific Concerns

The treatment site is mainly residential. Only a small area will be subjected to B.t.k. and, if applied by ground application, only host trees within the area will be sprayed 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 more aware of when the application occurs and 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.

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. The children in the area are not adversely affected disproportionately over adults from the program actions proposed.

VI. Listing of Agencies and Persons Consulted

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VII. References

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USDA—See U.S. Department of Agriculture

United States Department of Agriculture, 1995. Gypsy Moth Management in the United States: A Cooperative Approach. Final Environmental Impact Statement. November 1995. Forest Service, Washington, DC.

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Finding of No Significant Impact for
Asian Gypsy Moth Cooperative Eradication Program
Orange County, CA
Environmental Assessment
March 2006

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) has prepared an environmental assessment (EA) for its participation in the eradication of the gypsy moth population in Orange County, CA. The EA, incorporated by reference into this document, is tiered to the "Final Environmental Impact Statement for the Gypsy Moth Management in the United States: A Cooperative Approach." This EA is available from:

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

or

U.S. Department of Agriculture
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The EA analyzed the following alternatives: no action and the proposed action which uses a combination of the pesticide *Bacillus thuringiensis* var. *kurstaki* and mass trapping. The proposed action was preferred because of its ability to achieve the eradication objective in a way that minimizes potential environmental consequences and provides the most opportunity for successful eradication.

APHIS has determined that there would be no significant impact to the human environment from the implementation of the proposed program. APHIS' Finding of No Significant Impact for this program was based upon its analysis of the program's characteristics and its anticipated environmental consequences, as analyzed in the EA. APHIS has considered the potential effects on endangered and threatened species and their critical habitats, and has made a no effect determination.

I find that the proposed program will pose no disproportionate adverse effects to minority and low-income populations and the actions undertaken for this program are entirely consistent with the principles of "environmental justice," as expressed in Executive Order 12898, and the protection of children, as expressed in Executive Order 13045. Lastly, because I have not found evidence of a significant environmental impact associated with the proposed program, I further find that an environmental impact statement does not need to be prepared and that the proposed program may be implemented.

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Helene Wright
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Animal and Plant Health Inspection Service

Date