

Summary

This chapter presents a summary of the environmental review and analysis of the California Department of Food and Agriculture's proposed Light Brown Apple Moth Eradication Program (Program). It introduces key components of the Proposed Program and provides a summary of the potential environmental impacts of the No Program and Program alternatives in tables at the end of the chapter. The text of this Programmatic Environmental Impact Report (PEIR) is supplemented by six technical reports included as appendices.

S1 BACKGROUND

The California Department of Food and Agriculture (CDFA), as Lead Agency under the California Environmental Quality Act (CEQA), has prepared a PEIR for the eradication of the light brown apple moth (LBAM) (*Epiphyas postvittana*). LBAM is a new pest to North America that feeds on a broad range of plants including many agricultural, horticultural, and forest species of great economic and ecological value. If LBAM is not completely eradicated while the moth population in the U.S. is relatively small, the long-term impacts to the environment and agricultural production could be considerable. The PEIR evaluates the environmental impacts of implementation of eradication strategies and methods (Program) for LBAM in portions of the state where infestations have been identified by the trapping program to date or may be identified in the future. The CDFA is working closely with the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) and a Technical Working Group to develop the most effective strategy and methods to achieve the overall goal of LBAM eradication from California.

The CDFA was notified by a retired professor and collector on February 6, 2007, that a moth expert in Australia had identified LBAM from collections made in 2006 at a site in Berkeley in Alameda County. The CDFA initiated a pheromone¹-baited trapping project in Alameda and Contra Costa counties that resulted in the finding of additional moths.

On April 20, 2007, the CDFA issued a quarantine of at least 182 square miles in Alameda, Contra Costa, San Francisco, Marin, and Santa Clara counties. The USDA issued a federal quarantine order on May 2, 2007, requiring trapping, inspection, and certification of all nursery stock and host commodities from the quarantine area in 8 counties.

Beginning in June 2007, the CDFA and APHIS started emergency treatment of isolated populations with LBAM mating disruption techniques, namely ground applications of a biologically based pesticide and the placement of pheromone-treated twist ties in the Monterey-Santa Cruz area. Growing LBAM populations in the area from the Salinas River south to the Monterey Peninsula required aerial treatment with a microencapsulated pheromone in September and again in October 2007. Aerial treatment was also applied in November 2007 over portions of northern Monterey County and over the City of Santa Cruz.

Because the LBAM infestations are currently local or regional, the overall strategy is to eradicate the pest rather than control it. On June 20, 2008, the Secretary of the CDFA announced that the primary strategy for eradicating LBAM was changed from aerial treatment with pheromone to the release of sterile male LBAMs to disrupt the mating population. In addition, due in part to issues that have prevented Program implementation, the infestation had spread from 9 counties to 12 by mid-2008.

¹ A pheromone is a chemical signal that triggers a natural response in another member of the same species.

As of April 2009, a total of 21,988 pheromone-baited traps have been placed throughout the state, and a total of 73,691 moths have been confirmed as LBAMs. However, most of the captures are from traps located in two specific geographic areas: (1) Santa Cruz and San Francisco counties (74 percent) and (2) portions of Monterey, Alameda, San Mateo, Contra Costa, and Marin counties (25 percent). The remaining less than 1 percent were confirmed positive counts of less than 200 total trapped in Santa Clara, Solano, Sonoma, Napa, San Benito, and Santa Barbara counties. These 13 counties are called the primary Program Area for analysis purposes in this PEIR. As of June 30, 2009, the LBAM infestation has spread to 2,163,200 acres (3,380 square miles).

Following completion of the CEQA process, subsequent eradication activities are scheduled for 2009–2010 in the currently infested counties and in any additional counties within the state where subsequent infestations are found.

S1.1 Light Brown Apple Moth as an Invasive Species

Because LBAM is a new pest to North America that affects a broad range of plants (as many as 2,042 plants identified to date—including native plants, forest species, agronomically important crops, and ornamentals), both APHIS and the CDFA have taken immediate action to eradicate LBAM from California to prevent its spread to susceptible host plants throughout the U.S. and neighboring Mexico and Canada. Host plants include deciduous tree fruits, subtropical fruits, berry fruits, ornamentals, and shade and forest trees. LBAM larvae feed on leaves and buds reducing the plant's photosynthetic ability and deforming its growth patterns, which can lead to general plant weakness and disfigurement. In grapes, apples, kiwifruit, plums, avocados, and citrus, LBAM larvae can feed directly on the fruit, and the resulting damage renders the fruit unmarketable (Irvin 2009). If LBAM is not completely eradicated while the moth population in the U.S. is relatively small, the long-term impacts to the environment and agricultural production could be considerable. The pest is prolific, and the number of generations produced in a growing season varies from 1 to more than 4 (depending on environmental conditions).

S1.2 Potential for Damage in California Ecosystems

As discussed above, LBAM feeds on plants in genera containing 2,042 different species including many agricultural, horticultural, and forest species of great economic and ecological value. See Appendix A for a list of all known plant species that are utilized by LBAM. Furthermore, invasive species such as LBAM trigger use of chemicals to control the pest that end up destroying existing Integrated Pest Management and biological control measures used in horticulture and agriculture.

Agriculture is an essential part of California's economy. It provides crops for final consumption in the state and other domestic and international markets, and also generates jobs and income for thousands of workers in the farm sector, as well as agricultural-support industries. Farm production has important linkages to many industries, such as equipment and chemical manufacturing, food and beverage processing, financial services, textiles, and transportation. In 2003, agriculture, forestry, fishing, hunting, and supporting industries accounted for about 1.5 percent of the state's gross state product of \$1.43 trillion (Agricultural Issues Center, University of California 2006).

Similarly, the California nursery industry plays an important role in the state's economy and is the largest in the world. In 2001, this industry was the second largest subsector of agricultural production and had approximately \$3.0 billion in sales, contributed more than \$8 billion in total output, and directly and indirectly supported over 81,000 jobs (Carman and Rodriguez 2004). Californians are the primary consumers of nursery products and are the largest single market for lawn and garden products in the U.S.

Agricultural revenues from organic host crops in the Program Area is approximately \$232.1 million annually. Organic vegetable crops generate about \$149.2 million annually, which represents 64.7 percent of the total value of organic host crop production. Organic strawberries, valued at \$40.0 million annually (17.3 percent of the total), and organic grapes, valued at \$14.8 million annually (6.4 percent), are other important organic crops in the Program Area. Recent LBAM infestations in organic berries have caused up to 20 percent crop loss (Agriculture and Natural Resources 2009).

LBAM both (1) directly threatens plant species that it may adapt to feeding on and (2) indirectly threatens animal species, particularly insects, should it adapt to feeding on plants that are relied upon as food supplies or for critical habitat. This tendency is of particular concern to endangered, threatened, and rare species because they often exist as small populations in very limited habitats and, therefore, any substantial decrease in their numbers or habitat could readily drive these populations to extinction.

California has 283 state or federally listed rare, threatened, or endangered plants (CDFG 2008a). Forty-eight of these plants (17 percent) are in genera that are recorded as LBAM hosts (USDA 2008a). These genera are *Arctostaphylos*, *Baccharis*, *Berberis*, *Ceanothus*, *Cirsium*, *Cupressus*, *Helianthus*, *Lilium*, *Lotus*, *Lupinus*, *Opuntia*, *Phlox*, *Polygonum*, *Rosa*, *Trifolium*, and *Verbena*. While many, and perhaps all, of these species of concern have neither been encountered by nor tested against LBAM as of yet, these plants are designated as potential hosts by the USDA due to their relatedness to known hosts in their respective genera and due to LBAM's ability to adapt to feeding on plants that it has not previously encountered. This adaptation also applies to the hosts of endangered and threatened insects.

S2 PROGRAM OBJECTIVES AND PURPOSE

The CDFA's objective is to eradicate LBAM from the state of California by 2015. Initial efforts will be to contain the LBAM population and not allow LBAM to spread into adjacent counties. The CDFA will then suppress heavily infested areas around production nurseries, suppress and eradicate populations in outlying counties to remove these counties from regulation, and finally eradicate populations throughout the state. Eradication is to be accomplished using a variety of tools with reliance primarily on biological control methods applied in an effective and environmentally safe manner.

The Program is needed to protect the state's native plants, forest species, agronomically important crops, and ornamental plants from damage by this invasive pest species. The CDFA must protect agriculture from invasive pests to protect the nation's food supply, the environment, and the economy. Furthermore, eradication of the pest within the state is needed to prevent its expansion to other states and other countries.

S3 PUBLIC INVOLVEMENT SUMMARY

The CDFA distributed a Notice of Preparation (NOP) of a Draft PEIR for the Program pursuant to CEQA Guidelines Section 15082 on February 8, 2008, to the State Clearinghouse and to 800 agencies and individuals, including 15 federal and state responsible and trustee agencies. A press release was distributed to 2,700 news organizations and individuals. Seven newspapers in the Program Area published the public scoping meeting information.² The NOP provided a Program description, the location of Program activities, and the resources and environmental concerns planned for analysis in the PEIR. The NOP announced the public scoping meetings and requested that comments on the scope of the PEIR and the Program alternatives be submitted by March 20, 2008.

² *Berkeley Daily Planet*, *Contra Costa Times*, *Marin Independent Journal*, *Monterey Herald*, *Santa Cruz Sentinel*, *San Francisco Chronicle*, *Watsonville Register*

A second NOP was distributed on July 21, 2008, to address the expanded treatment area and changes to the proposed alternatives. The NOP announced more public scoping meetings and requested that comments on the scope of the PEIR and the Program alternatives be submitted by September 20, 2008.

Comments were received from numerous federal, state, regional, and local agencies; environmental, medical, and consumer organizations; and individual members of the public. Many of the comment letters, as well as the oral comments received at the public scoping meetings, focused primarily on potential impacts on biological resources, water quality, and public safety.

S4 AREAS OF CONTROVERSY/ENVIRONMENTAL CONCERNS

The broad areas of greatest public controversy are:

- **Chemical Treatment and Application Methods.** The public is concerned about potential impacts of the pesticides used, including the active chemical ingredients and the inert ingredients in the formulations. Controversy exists over the chemicals to be used and their safety to the public, with all chemicals assumed by the public to have serious impacts to at least some segment of the population. Not only is the public concerned about impacts to humans but also to domestic animals and to wildlife that could come into contact with the material whether applied from the ground or from the air.
- **LBAM's Potential to Damage Agriculture and Horticulture.** The controversy is over the amount of damage LBAM would cause and whether it is as great as the CDFA has claimed, and whether it justifies large-scale eradication attempts with chemical treatments or whether it is minor and does not justify action by the CDFA. Damage to these industries is also quantified as including costs to comply with regulations to control LBAM's spread and the cost of damaged crops and plant materials that cannot be harvested and sold.
- **Emergency Action for Invasive Species Control and CEQA Compliance.** Initial efforts to control LBAM's spread were done as emergency actions not requiring immediate CEQA compliance in an environmental impact report. Given the CDFA's need to act quickly to control the invading pest and the public's desire for information on the impacts of the control and eradication measures through the CEQA process, how should pest invaders be managed and CEQA compliance activities completed? The CDFA suspended chemical treatment activities in 2008 but continued with the trapping program to monitor the spread of the pest and quarantine regulations.

S5 PROPOSED PROGRAM ALTERNATIVES

S5.1 Proposed Program

The CDFA proposes taking a systems approach over several years using multiple tools including chemical and nonchemical treatment alternatives, specifically the following: SIT, mating disruption pheromone, biological control, and/or insecticide treatments depending upon conditions at specific locations. Current regulatory programs would continue to slow LBAM's spread while eradication actions are implemented. This PEIR evaluates the potential for environmental impacts associated with the following alternatives, all of which are under consideration for use:

- **Sterile insect technique (SIT)** is being developed in Australia and California, and is to be available for initial implementation in California beginning in 2009 (limited releases) and in 2011 on a large scale. SIT could be used at any infested area and is applied aerially.
- The **mating disruption (MD) pheromone** attracts the male LBAMs and prevents them from mating with females but does not kill them. It is to be applied in three ways: for urban infestations and for small and

isolated areas, a ground treatment tool using either pheromone twist ties (MD-1) or in a thick matrix applied to utility poles and trees (MD-2); and aerial application for heavily infested, remote areas (heavily forested and agricultural, MD-3).

- A **male moth attractant (MMA) treatment** using small amounts of pheromone and pesticide (permethrin) in a thick matrix, which is applied to poles and trees, is also being considered for urban and nonurban areas.
- The proposed **biological control (Bio-P)** at present is the release of an egg parasitoid, which is a native wasp (*Trichogramma* spp.). This technique may be used in all infested areas using ground application.
- **Foliar ground treatments (Btk and S)** targeting the insect larvae would use the biologically based pesticide *Bacillus thuringiensis kurstaki* (Btk) or spinosad, an insecticide. This method would be by ground application in heavily infested areas.

For ground applications to trees and utility poles on public and private property and aerial application of pheromone in remote areas, the treatment area is a 1.5-mile radius around each LBAM detection with a projected 30- to 90-day spray interval. For ground treatment using twist ties, approximately 250 twist ties per acre in a 200-meter radius around each LBAM detection are applied and subsequently replaced every 3 to 6 months. Treatment areas may be adjusted to provide the public with identifiable treatment boundaries. After two life cycles of treatment without any LBAM detections, treatment would cease. Post-treatment monitoring traps will remain in place for one additional life cycle.

The No Program Alternative would be to continue and expand quarantine, detection, and inspection activities but without the application of the pheromone or any other insecticides or the use of biological controls on an areawide basis by the USDA or CDFA. Restrictions on domestic and foreign trade would increase. Private individuals may utilize approved insecticides to control LBAM, but without a regional coordinated treatment program, LBAM would flourish in existing areas and spread to surrounding areas, with associated environmental impacts.

S5.2 Alternatives Eliminated From Further Consideration

Appendix H, Eradication Tool Selection Process, describes nine tools that were eliminated from further consideration as candidate tools for the LBAM Program. A brief summary of the eliminated tools follows; additional details regarding these tools are provided in Appendix H.

Integrated Pest Management (IPM) is an approach to controlling pests. IPM evaluates the merits of pest management options and then implements a system of complementary management actions within a defined area. IPM, as a control strategy, was not evaluated further in the process to determine which tools would be used in the LBAM Program because it does not meet the objective of eradication.

Host removal infield or large-scale requires the elimination of host plants in a selected area. However, the use of host removal for a highly polyphagous³ pest like LBAM, especially in an urban environment, is undesirable as it would create an environment devoid of vegetation. This tool would not be environmentally sound and was eliminated from further analysis.

Trap plants can be used to control the damage of polyphagous pests. Trap plants are more attractive to the pest than the plants to be protected. As the pests concentrate in the trap plants, they can be killed by applying insecticides to just the trap plants. Because LBAM is not a very selective insect, it is doubtful this tool would be effective in the LBAM Program; therefore, it was removed from further consideration.

³ Polyphagous means it feeds on a variety of plants.

Egg-laying repellents such as kaolin clay can be applied to crops to protect them from egg laying by pest insects (Dufour 2001 as cited in Appendix H). The repellents deter pests rather than killing them. However, the final result would be an expansion of the LBAM by dispersal into a larger area seeking plants to utilize for egg laying. The potential alternative of egg-laying repellents does not meet the objective of eradicating LBAM.

Classic biological control makes use of the natural enemies of a pest to control its numbers below economically damaging levels. However, classical biological controls are not always successful at lowering the numbers of the target pests below an economically damaging level. At this time, classical biological controls are not eradicated and would not be a useful tool for further analysis.

Inundative releases of predators not only eliminate LBAM but other prey items as well. Generalist predators will attack a range of other leafroller caterpillars and perhaps other caterpillars of about the same size that occur in their vicinity. As a result of their indiscriminate selection of prey, the inundative release of predators was eliminated due to potential effects to the native ecological community.

Mass trapping of female moths is implemented by the application of dilute port wine to traps (Bioresources 2009 as cited in Appendix H). Data are not available concerning the effectiveness of mass trapping against LBAM. Operational limitations prevent using large number of port-wine-baited traps in an urban setting as well as deploying and retrieving large numbers of traps. At this time mass trapping of females is not eradicated and is not evaluated further for the current LBAM Program.

Quarantines are designed to restrict or eliminate the movement of LBAM within and out of infested areas. By controlling the spread of LBAM, quarantines are useful in LBAM eradication; however, they do not eradicate the pest independently. Quarantines are an interim measure for controlling LBAM while a potential permanent eradication program is being analyzed. Quarantines were not evaluated further because they are unable to permanently eradicate LBAM.

Cultural control-removal of overwintering sites is an integral part of several eradication programs. In these programs, the old crop must be destroyed and the fields plowed by a specific date. Thus, the overwintering sites for the pests are eliminated and their numbers are greatly reduced the following year (Grefenstette et al. 2007 as cited in Appendix H). However, LBAMs breed continuously throughout the year and their larvae and pupae are found on a wide variety of plants throughout the winter. The polyphagous nature of LBAM makes the destruction of overwintering sites infeasible. Cultural removal of overwintering sites was not evaluated further due to the inability to eradicate LBAM.

S5.3 Environmentally Superior Alternative

None of the Program alternatives have any significant and unavoidable impacts. Most of the environmental impacts are either “no impact” or “less than significant.” There are “potentially significant but mitigable” impacts for all of the Program alternatives. Alternative MD-1 has one potentially significant but mitigable impact, and would be considered environmentally superior. The only potentially significant impact associated with Alternative MD-1 is to salmonid habitat from possible disturbance during placement of twist ties containing the LBAM pheromone. Alternatives MD-2, MD-3, Bio-P, and SIT have only two potentially significant but mitigable impacts.

The No Program Alternative is not the environmentally superior alternative because it would result in potentially significant impacts to economic, urban and rural land uses, noise, odor, human health, aquatic and terrestrial resources, ecological health, and water resources that are largely unavoidable. Significant impacts from the No Program Alternative are assumed to be not mitigable in most cases, because an action that is currently unplanned and/or unfunded would be required to resolve the impact. Furthermore, the No Program

actions to comply with quarantines or to chemically treat for LBAM infestations would be undertaken by private businesses and landowners, not by the CDFA or governmental agencies.

S6 SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Table S-1 provides a summary of all of the environmental impacts and mitigation for the No Program and Program alternatives. The existing condition (2008) sets the baseline against which the alternatives are evaluated for CEQA. Impact statements are presented in their entirety in the resource sections. For Table S-1, impact areas or environmental concerns are merely listed using brief terms for ease of comparison. Symbols used in the table for CEQA determinations of impact are:

- PS = Potentially Significant (No Program only)
- SU = Potentially Significant and Unavoidable Impact
- SM = Potentially Significant but Mitigable Impact
- LS = Less-than-Significant Impact
- N = No Impact
- na = Not Applicable

Tables S-2 through S-8 present only the potentially significant impacts for the Program alternatives, the mitigation required, and the significance following mitigation implementation. Mitigation measures represent actions the CDFA (or other agency) would take to reduce the impact to a level of insignificance. If mitigation is not feasible or practical to implement, or simply not enough to reduce the impact to less than significant, then the impact is “significant and unavoidable.” There are no significant and unavoidable impacts associated with any of the Program alternatives. All of the potentially significant impacts associated with Program alternatives can be mitigated to a less-than-significant level.

Concerning the potential for the Program’s incremental impacts to be cumulatively considerable, only one environmental concern exists. The Program’s incremental contribution to the cumulative noise impact in a community (where noise comes from many sources) on sensitive receptors is potentially cumulatively considerable. Such cumulative impacts are considered significant but can be mitigated to less than significant through avoidance of treatment applications near sensitive receptors and with the implementation of noise-reducing measures.

**LIGHT BROWN APPLE MOTH ERADICATION PROGRAM
DRAFT PEIR**

Table S-1 Summary Comparison of Impacts of Alternatives

Environmental Concern	No Program	MD-1	MD-2	MD-3	MMA	Btk and S	Bio-P	SIT
3. Agriculture & Horticultural Economics								
Effects on Agricultural Production and Land Uses	PS	N	N	N	N	N	N	N
Effects on Agricultural Revenues (Crop Damages)	PS	N	N	N	N	N	N	N
Effects on Agricultural Trade and Exports	N	N	N	N	N	N	N	N
Effects on Farm-Level Production Costs	PS	N	N	N	N	N	N	N
Effects on Organic Farming	PS	N	N	N	SM	N	N	N
Effects on Beneficial Insects and Agriculture	PS	N	LS	LS	LS	LS	N	N
Regional Economic Effects on Agricultural Support Industries	PS	N	N	N	N	N	N	N
4. Urban and Rural Land Uses								
Conflict with Applicable Regulations	PS	N	N	N	N	N	N	N
5. Noise								
Exceedance of Noise Standards	PS	N	LS	LS	LS	SM	N	LS
Substantial Temporary Increase in Noise Levels	PS	N	SM	SM	SM	SM	N	SM
6. Air Quality								
Violate Air Quality Standards	LS	LS	LS	LS	LS	LS	LS	LS
Result in Cumulatively Considerable Increase in Nonattainment Pollutant	LS	LS	LS	LS	LS	LS	LS	LS
Potential Conflict with Applicable Air Quality Plans	LS	LS	LS	LS	LS	LS	LS	LS
Expose Sensitive Receptors to Substantial Pollutants	LS	LS	LS	LS	LS	LS	LS	LS
Expose People to Objectionable Odors	PS	LS	LS	LS	LS	LS	N	N
7. Public Services and Hazard Response								
Increase Demand for Police, Fire, or Health-Care Services	N	N	N	N	N	N	N	N
Create a Significant Hazard to the Public or Environment	N	N	N	N	N	N	N	N
Expose People or Structures to Wildfire Risk	N	N	N	N	N	N	N	N

LS = Less-than-significant impact; N = No impact; na = Not applicable; PS = Potentially significant impact (Applies to No Program only. Program alternatives have either feasible mitigations or unavoidable impacts.); SM = Potentially significant but mitigable impact ; SU = Potentially significant and unavoidable impact

Table S-1 Summary Comparison of Impacts of Alternatives

Environmental Concern	No Program	MD-1	MD-2	MD-3	MMA	Btk and S	Bio-P	SIT
8. Human Health								
Sensitive Receptors Exposed to Substantial Pollutant Concentrations	PS	N	N	N	SM	N	na	na
Create a Significant Hazard to the Public or the Environment Through the Routine Transport, Use, or Disposal of Hazardous Materials	PS	N	N	N	SM	N	na	na
Impacts on People, Including Sensitive Receptors, Through Ingestion and Other Exposure Pathways	PS	N	N	N	SM	N	na	na
Short-Term, Subchronic, Long-Term, and Additive Health Impacts	PS	N	N	N	SM	N	na	na
Increase in Cancer Risk Due to Application of Pesticides	PS	N	N	N	SM	N	na	na
Adverse Health Effects from Pesticides Analyzed Individually and in Combination	PS	N	N	N	SM	N	na	na
9. Aquatic Resources								
Effects on Aquatic Resources	PS	N	N	N, LS	LS	LS	N, LS	N
Impacts to Listed Species	PS	SM	SM	LS	SM	SM	SM	N
10. Terrestrial Resources								
Impacts to Special-Status Plant Species from LBAM's Spread	PS	na	na	na	na	na	na	na
Impacts to Host Plants for Special-Status Invertebrate Species from LBAM's Spread	PS	na	na	na	na	na	na	na
Impacts to Other Botanical Resources, Including Conifers and Forest Ecosystems, from LBAM's Spread	PS	na	na	na	na	na	na	na
Impacts to Botanical Resources in Riparian Areas	PS	N	N	N	N	N	N	N
Impacts to Botanical Resources in Federally Protected Wetlands	LS	N	N	N	N	N	N	N
Impacts Associated with Exposure of Nontarget Invertebrates and Pollinators, Including Special-Status Species, to the Chemical Constituents, or from Production, Use, or Disposal of These Materials	PS	LS	LS	LS	LS	LS, SM	na	na
Impacts Associated with Exposure of Terrestrial Vertebrate Wildlife, Including Special-Status Species, to the Chemical Constituents, or from Production, Use, or Disposal of These Materials	N, LS, PS	N, LS	N	N	N	N	na	na
Impacts Associated with Exposure of Terrestrial Wildlife, Including Special-Status Species, to the Chemical Constituents through an Accidental Spill	LS	N	LS	LS	N	LS	na	na

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**LIGHT BROWN APPLE MOTH ERADICATION PROGRAM
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Table S-1 Summary Comparison of Impacts of Alternatives

Environmental Concern	No Program	MD-1	MD-2	MD-3	MMA	Btk and S	Bio-P	SIT
Impacts to Terrestrial Wildlife Species from an Increase in Ambient Noise	LS	N	LS	LS, SM	LS	LS	na	LS, SM
Impacts on Nontarget Insects Associated with the Release of Parasitic Wasps	na	na	na	na	na	na	LS, SM	na
Impacts on Wasp Predator Species Associated with the Release of Parasitic Wasps	na	na	na	na	na	na	LS	na
Impacts on Moth Predator Species Associated with the Release of Sterile Male LBAMs	na	na	na	na	na	na	na	LS
11. Water Resources								
Impacts to Water Resources	PS, LS	N	N	N	SM	N	N	N
12. Ecological Health								
Cause exceedance of federal or state agency surface or groundwater quality standard or water quality objective for hazardous materials or priority pollutants as recognized in the California Toxics Rule	PS	N	N	N	SM	N	N	N
Result in an exceedance of a nonregulatory literature-based toxicity reference value for acute or chronic aquatic animal toxicity	PS	N	N	N	N	N	N	N
Result in an exceedance of a literature-based toxicity reference value for acute or chronic ingestion uptake in terrestrial or avian wildlife	PS	N	N	N	N	N	N	N
Result in an exceedance of a literature-based toxicity reference value for acute or chronic inhalation uptake in terrestrial wildlife	LS	N	N	N	N	N	N	N
Result in an exceedance of a literature-based toxicity reference value for acute or chronic ingestion uptake in amphibians or reptiles	PS	N	N	N	N	N	N	N
Result in an exceedance of a literature-based toxicity reference value for plant toxicity	N	N	N	N	N	N	N	N
Result in an exceedance of literature-based toxicity reference value for nontarget invertebrates and pollinators (e.g., bees)	PS	N	LS	LS	LS	LS	N	N
Cause a spill or leak that would contaminate the soil or waters to the extent of eradicating the existing vegetation, inhibiting revegetation, or migrating to other areas and affecting soil and/or aquatic ecosystems	LS	N	N	N	N	N	N	N
Create a potential health hazard or involve the use, production, or disposal of materials in a manner that would be expected to pose a hazard to a wildlife or fish population in the Program Area	PS	LS	N	N	LS	LS, N	N	N

LS = Less-than-significant impact; N = No impact; na = Not applicable; PS = Potentially significant impact (Applies to No Program only. Program alternatives have either feasible mitigations or unavoidable impacts.); SM = Potentially significant but mitigable impact; SU = Potentially significant and unavoidable impact

Table S-1 Summary Comparison of Impacts of Alternatives

Environmental Concern	No Program	MD-1	MD-2	MD-3	MMA	Btk and S	Bio-P	SIT
Create a potential health hazard or involve the use, production, or disposal of materials that pose a hazard to a special-status species population in the Program Area	PS	LS	LS	LS	LS	SM	N	N
Increase the likelihood of impact to fish, wildlife, or human health in the event of an accidental spill of hazardous materials	PS	N	LS	LS	LS	LS	N	N
13. Greenhouse Gases and Climate Change								
Prevent State from Meeting 2020 Emission Reduction Goals	LS	LS	LS	LS	LS	LS	LS	LS

LS = Less-than-significant impact; N = No impact; na = Not applicable; PS = Potentially significant impact (Applies to No Program only. Program alternatives have either feasible mitigations or unavoidable impacts.); SM = Potentially significant but mitigable impact ; SU = Potentially significant and unavoidable impact

**LIGHT BROWN APPLE MOTH ERADICATION PROGRAM
DRAFT PEIR**

Table S-2 Significant Impacts and Mitigation for Alternative MD-1

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
Aquatic Resources			
Impacts to Listed Species	Impact AR-2: Twist-tie placement near aquatic environments may result in disturbance of aquatic species. Short-term disturbance is expected to be less than significant and would not require mitigation. This impact would be potentially significant if it disrupted spawning behavior for anadromous salmonids. Mitigation is required.	AR-2: Restrict access for twist-tie placement adjacent to the same stretch of stream or river where anadromous salmonids are known to spawn to fewer than one visit per month during the spawning season. Spawning areas are to be identified with NOAA Fisheries' and CDFG's assistance.	Less than significant

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Table S-3 Significant Impacts and Mitigation for Alternative MD-2

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
Noise			
Substantial Temporary Increase in Noise Levels	Impact N-4: Truck-mounted sprayers and staging of equipment could result in a substantial temporary increase in noise levels over existing noise levels. Impacts would be potentially significant but mitigable.	<p>N-4a: Install temporary or permanent noise barriers and/or acoustical enclosures on compressors, generators, pumps, and engines. Noise barriers and/or acoustical enclosures will be properly installed and will remain in place during operation.</p> <p>N-4b: Properly maintain equipment. The application contractor will properly maintain and tune engines of all application equipment and maintain properly functioning mufflers on all internal combustion engines to minimize noise levels.</p> <p>N-4c: Provide advance notice specifying a window of time that operations may be near sensitive receptors. Program managers and subcontractors will provide 72 hours advanced notice prior to planned backpack and/or truck-mounted spraying near sensitive receptors in the Program Area. The advanced notice will describe the potential noise disruption and the steps the CDFA plans to take to minimize the noise, in a format suitable for reproduction and posting. If spraying is delayed due to operational issues or weather delays of more than 1 week, an additional notice will be provided.</p> <p>N-4d: Provide liaison for nuisance complaints. The LBAM Program will identify and provide a liaison to respond to concerns of noise from Program operations. Procedures for reaching the liaison via telephone (hotline) or in person will be included in notices distributed and posted in accordance with Mitigation Measure N-4c. Nuisance complaints, and the approach used to resolve the complaint, will be reported to the CDFA.</p>	Less than significant

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Table S-3 Significant Impacts and Mitigation for Alternative MD-2

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
		<p>N-4e: Install noise barriers and enclosures between noise sources and sensitive receptor. Noise barriers and/or acoustical enclosures, as discussed in Mitigation Measure N-4a, will be properly installed between the noise source and the receptor and tested in locations deemed necessary by the CDFA (or as otherwise requested by a sensitive receptor). Enclosures will remain in place and functional within 250 feet of the sensitive receptor. The CDFA or its contractor will respond to complaints of noise in accordance with Mitigation Measure N-4d. Complaints filed with the CDFA contractor and the approach used by the contractor to resolve the complaint will be reported to the CDFA. Methods to resolve complaints may include the CDFA's modification of treatment sites to reduce noise near sensitive receptors.</p> <p>N-4f: Perform noise monitoring. As discussed in Mitigation Measure N-4b, the application contractor will properly maintain and tune all engines. In the event of complaints by nearby parties, the CDFA or designated contractor will monitor noise during application. Noise will be measured at the perimeter of the work area or adjacent to sensitive receptors. In the event that application noise exceeds the specified limits prescribed by the CDFA, the offending activity will cease until appropriate measures are implemented. Noise thresholds will be included in the application contractor's contract with the CDFA.</p>	
Aquatic Resources			
Impacts to Listed Species	Impact AR-4: Treatment near aquatic environments may result in disturbance of aquatic species. Short-term disturbance is expected to be less than significant and would not require mitigation. This impact would be potentially significant if it disrupted spawning behavior for anadromous salmonids. Mitigation is required.	AR-4: Restrict access for treatment adjacent to the same stretch of stream or river where anadromous salmonids are known to spawn to fewer than one visit per month during the spawning season. Spawning areas are to be identified with NOAA Fisheries' and CDFG's assistance.	Less than significant

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Table S-4 Significant Impacts and Mitigation for Alternative MD-3

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
NOISE			
Substantial Temporary Increase in Noise Levels	Impact N-6: Aerial application would result in a temporary increase in noise levels at a 300-foot-above-ground-level release height, which may be substantial depending on ambient noise levels. Impacts would be potentially significant but mitigable.	N-6: Respond to noise complaints from aircraft operations. The CDFA or its contractor will respond to complaints of noise caused by aircrew using high-power settings during spray applications. Noise levels will be limited in duration due to flight times; however, the CDFA implement feasible and appropriate measures to ensure aircrew stay within the flight plan published. Measures include daily preflight and post-op briefings, written flight envelope procedures, and review of recorded GPS flight data (including altitude). Complaints filed with the CDFA contractor and the approach used by the aerial application contractor(s) to resolve the complaint will be reported to the CDFA (and the USDA as necessary).	Less than significant
Terrestrial Resources			
Impacts to Terrestrial Wildlife Species from an Increase in Ambient Noise	Impact TR-17: If LBAM infestations occurred near sensitive receptors, such as nesting eagles or other special-status raptors, then they could experience short-term and temporary noise-level increases from aerial application. Noise disturbance could result in disruption to nesting, interrupted feeding of nestlings, or nest abandonment. Impacts would be potentially significant but mitigable.	TR-17a: Avoid operating aircraft close to active nests of federally or state-listed raptors. Aerial treatment will not be conducted close to active nests of federally or state-listed raptors during the breeding season. The buffer area may vary by species, ranging up to 0.25 mile. TR-17b: Avoid operating aircraft close to active nests of bald eagles. Aerial treatments will not be conducted within 1,000 feet of an active bald eagle nest during the breeding season, except where eagles have demonstrated tolerance for the activity (USFWS 2007b). TR-17c: Avoid operating aircraft close to active nests of other special-status raptors. Aerial treatment will not be conducted within 300 feet of an active nest for any other special-status raptor during the breeding season, except where the raptors have demonstrated tolerance for the activity.	Less than significant

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Table S-5 Significant Impacts and Mitigation for Alternative MMA

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
Agricultural/ Horticultural Resources and Economics			
Effects on Organic Farming	Impact AG-10: Alternative MMA with its use of permethrin would have a potentially significant but mitigable impact on the organic farming industry throughout California.	AG-10: Do not apply materials containing permethrin on or adjacent to organic farming operations.	Less than significant
Noise			
Substantial Temporary Increase in Noise Levels	Impact N-8: Truck-mounted sprayers and staging of equipment could result in a substantial temporary increase in noise levels over existing noise levels. Impacts are potentially significant but mitigable.	N-8: See Mitigation Measures N-4a through N4-f.	Less than significant
Human Health			
Sensitive Receptors Exposed to Substantial Pollutant Concentrations	Impact HH-7: Sensitive receptors could be exposed to substantial pollutant concentrations under Alternative MMA. Impacts would be potentially significant but mitigable.	HH-7a: Apply the MMA material containing Permethrin E-Pro to poles, trees, or similar structures at heights that are above the breathing zone of an average person. Placement of the formulation at this height should preclude most opportunities for direct contact while enhancing volatilization of the material. The planned height is 8 feet aboveground, and this height has been tested for sufficiency by the DPR (Kim 2009). HH-7b: The CDFA will avoid parks and schools when treating for LBAM.	Less than significant
Create a Significant Hazard to the Public or the Environment through the Routine Transport, Use, or Disposal of Hazardous Materials	Impact HH-8: Alternative MMA could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Impacts are potentially significant but mitigable.	HH-8a: Ensure that Alternative MMA pesticides are applied in strict accordance with label requirements. HH-8b: Ensure that appropriate worker training is conducted prior to use of pesticides. HH-8c: Ensure that appropriate personal protective equipment is used. Also see Mitigation Measure HH-7a.	Less than significant
Impacts on People, including Sensitive Receptors through Ingestion and other Exposure Pathways	Impact HH-9: Alternative MMA could have impacts on people, including sensitive receptors, through ingestion and other exposure pathways. Impacts are potentially significant but mitigable.	HH-9: See Mitigation Measures HH-7a, HH-7b, HH-8a, HH-8b, and HH-8c.	Less than significant

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Table S-5 Significant Impacts and Mitigation for Alternative MMA

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
Short-Term, Subchronic, Long-Term, and/or Additive Human Health Impacts	Impact HH-10.3: Cancer risks for nursery/project workers and adult and child residents exceed 1×10^{-6} . Alternative MMA could have long-term, human health impacts. Impacts are potentially significant but mitigable	HH-10.3: See Mitigation Measures HH-7a, HH-7b, HH-8a, HH-8b, and HH-8c.	Less than significant
Increase in Cancer Risk Due to Application of Pesticides	Impact HH-11: Application of pesticides under Alternative MMA could cause an increase in cancer risk. Impacts are potentially significant but mitigable.	HH-11: See Mitigation Measures HH-7a, HH-7b, HH-8a, HH-8b, and HH-8c.	Less than significant
Adverse Health Effects Individually and in Combination	Impact HH-12.3: Pesticides evaluated in Alternative MMA could have adverse chronic health effects from cancer when analyzed individually and in combination. Impacts are potentially significant but mitigable.	HH-12.3 and HH-12.4: See Mitigation Measures HH-7a, HH-7b, HH-8a, HH-8b, and HH-8c.	Less than significant
Aquatic Resources			
Impacts to Listed Species	Impact AR-10: Treatment near aquatic environments may result in disturbance of aquatic species. Short-term disturbance is expected to be less than significant and would not require mitigation. This impact would be potentially significant if it disrupted spawning behavior for anadromous salmonids; however, a 25-foot buffer from water bodies is required for application of permethrin under its label directions.	AR-10: See Mitigation Measure AR-4.	Less than significant
Water Resources			
Impacts to Water Resources	Impact WR-4: Alternative MMA could result in the exceedance of water quality standards when permethrin is used. Impacts would be potentially significant but mitigable. No impacts would occur from other chemicals used under Alternative MMA.	WR-4: The CDFA will maintain 25-foot buffer areas from the edge of streambank or shoreline, and spraying will not occur on days with wind speeds exceeding 10 miles per hour. Additional mitigation, wherein spraying is avoided near open water when wind direction is towards nearby water, should be implemented.	Less than significant
Ecological Health			
Cause Exceedance of Federal or State Agency Surface or Groundwater Quality Standard or Water Quality Objective for Hazardous Materials or Priority Pollutants as Recognized in the California Toxics Rule	ECO-34: Alternative MMA could result in the exceedance of a surface water quality standard from the use of permethrin. Impacts are considered potentially significant but mitigable.	ECO-34: The CDFA will maintain 25-foot buffer areas from bodies of water, and spraying will not occur on days with wind speeds exceeding 10 miles per hour. Additional mitigation, wherein spraying is avoided near open water when wind direction is towards nearby water, should be implemented.	Less than significant

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Table S-6 Significant Impacts and Mitigation for Alternative Btk and S

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
Noise			
Substantial Temporary Increase in Noise Levels	Impact N-10: Truck-mounted sprayers and staging of equipment could result in a substantial temporary increase in noise levels over existing noise levels. Impacts would be potentially significant but mitigable.	N-10: See Mitigation Measures N-4a through N-4f.	Less than significant
Aquatic Resources			
Impacts to Listed Species	Impact AR-12: Treatment with Btk near aquatic environments may result in disturbance of aquatic species. Short-term disturbance is expected to be less than significant and would not require mitigation. This impact would be potentially significant if it disrupted spawning behavior for anadromous salmonids. Mitigation is required.	AR-12: See Mitigation Measure AR-4.	Less than significant
	Impact AR-15: Treatment with spinosad near aquatic environments may result in disturbance of aquatic species. Short-term disturbance is expected to be less than significant and would not require mitigation. This impact would be potentially significant if it disrupted spawning behavior for anadromous salmonids. Mitigation is required.	AR-15: See Mitigation Measure AR-4.	Less than significant
Terrestrial Resources			
Impacts Associated with Exposure of Nontarget Invertebrates and Pollinators, Including Special-Status Species, to the Chemical Constituents, or from Production, Use, or Disposal of These Materials	Impact TR-26: Application of Btk or spinosad could result in impacts to special-status moths and butterflies. These impacts are potentially significant but mitigable.	TR-26: Avoid application of Btk and spinosad in occupied habitat for federally listed butterflies and moths. The CDFA or its contractors will check the locations of known populations of federally listed moths and butterflies prior to scheduling the application of Btk or spinosad. No Btk or spinosad treatments will be conducted within 1-mile buffer zones around known populations of federally listed moths or butterflies, or as determined in consultation with the USFWS.	Less than significant

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Table S-6 Significant Impacts and Mitigation for Alternative Btk and S

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
Ecological Health			
Create a Potential Health Hazard or Involve the Use, Production, or Disposal of Materials That Pose a Hazard to a Special-Status Species Population in the Program Area	Impact ECO-54: Alternatives Btk and S may cause significant but mitigable impacts to special-status insects, and mitigation would be required.	ECO-54: Avoid spraying areas with Btk and spinosad in localized areas known to harbor special-status insects. The CDFA will identify habitat for special-status insects prior to treatment. No Btk or spinosad treatments will be conducted within 1 mile of known populations of special-status insects.	Less than significant

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Table S-7 Significant Impacts and Mitigation for Alternative Bio-P

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
Aquatic Resources			
Impacts to Listed Species	Impact AR-18: Treatment near aquatic environments may result in disturbance of aquatic species. Short-term disturbance is expected to be less than significant and would not require mitigation. This impact would be potentially significant if it disrupted spawning behavior for anadromous salmonids. Mitigation is required.	AR-18: See Mitigation Measure AR-4.	Less than significant
Terrestrial Resources			
Impacts on Nontarget Insect Species Associated with the Release of Parasitic Wasps	Impact TR-30: Special-status insect species could be slow to recover from a temporary increase in parasitic wasp numbers at treatment sites. Impacts would be potentially significant but mitigable.	TR-30: Avoid parasitic wasp releases near known populations of federally listed insects. The CDFA or its contractors will check the locations of known populations of federally listed insects prior to scheduling the release of parasitic wasps. No parasitic wasp treatments will be conducted within 0.5 mile of known populations of federally listed insects.	Less than significant

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Table S-8 Significant Impacts and Mitigation for Alternative SIT

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
Noise			
Substantial Temporary Increase in Noise Levels	Impact N-14: Aerial application would result in a temporary increase in noise levels at a 300-foot-above-ground-level release height, which may be substantial depending on ambient noise levels. Impacts would be potentially significant but mitigable.	N-14: See Mitigation Measure N-6.	Less than significant
Terrestrial Resources			
Impacts to Terrestrial Wildlife Species from an Increase in Ambient Noise	Impact TR-34: If LBAM infestations occurred near sensitive receptors, such as nesting eagles or other special-status raptors, then they could experience short-term and temporary noise-level increases from aerial release of sterile male moths. Noise disturbance could result in disruption to nesting, interrupted feeding of nestlings, or nest abandonment. Impacts would be potentially significant but mitigable.	TR-34: Implement Mitigation Measures TR-17a and TR-17b.	Less than significant

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S7. ISSUES TO BE RESOLVED

The CDFA is the Lead Agency under CEQA and will decide whether to certify the PEIR. After consideration of public comments on the Draft PEIR, the Final PEIR, and additional comments on the Final PEIR, and then certification, the CDFA Secretary will decide whether and how to approve and carry out the Proposed Program. This decision will focus on whether to use all of the Program alternatives or whether any further limitations will be placed on the use of any of the alternatives, based on the areas of controversy (Section S4) and how to resolve any remaining controversy over the use of chemical and nonchemical treatment methods to eradicate LBAM in California. A Mitigation Monitoring or Reporting Program will be adopted. The Secretary will make written findings for each potentially significant environmental impact identified in the Final PEIR.