
California Alliance to Stop the Spray (CASS)**Santa Cruz, CA**

Monterey Bay National Marine Sanctuary
Advisory Council Members

February 10, 2008

Dear MBNMS Advisors,

We are writing to express our concern of the potential negative environmental effects that the pheromone-pesticide solution used in the State's light brown apple moth (LBAM) eradication program may have on the Monterey Bay National Marine Sanctuary (MBNMS). It is understandable that MBNMS originally did not believe this spray solution would have a negative impact on the health of the MBNMS, given the State's assertions and claims of having documentation of safety. It is our hope that you have reassessed this philosophically after the first Santa Cruz spray and the observation of the substantial negative effects that have occurred. We do not believe the negative effects observed were coincidental and have provided our rationale as to why.

Even a basic review of the data suggests that the State's assumption of safety needs to be reassessed. We respectfully ask that you consider the comments we are providing and hope that you will use this information to make your own independent assessment. Our primary motivation for writing is because we inherently do not want to be sprayed with substances whose safety has not been sufficiently determined. Our second motivation is because we sincerely love the Santa Cruz area and are committed to its environmental integrity. This includes a love of the Monterey Bay and a desire to see its beauty preserved and its wildlife protected. Please review the information we have provided and conduct your own tests and investigations if you have not already. While much of what we are presenting relates to potential effects on humans, which may be outside the primary purview of MBNMS, we ask that you consider these findings in light of the potential negative impact the same compounds can have on the Monterey Bay. We also ask that you consider the potential toxicity of the State's program in light of the fact that current data demonstrates that LBAM is not the moth of mass destruction as believed. Should you have interest in this data we would be happy to provide it, however,

our primary focus is to express our direct concern for the health of the Monterey Bay and the land we love that surrounds it.

Should you desire further information, please feel free to contact me.

My sincere regards.

Roy Upton

California Alliance to Stop the Spray (CASS)

Santa Cruz, CA

Organizational Supporters

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Introduction

The California Alliance to Stop the Spray (CASS) consists of organizations, health professionals, and individuals who share the same common goal of opposing the spraying of residential communities with pesticides without representation and consent. Our collective concern has arisen out of the fact that the light brown apple moth (LBAM) eradication program currently underway in different parts of California utilizes a aerosol pheromone-pesticide spray that has not undergone formal safety testing by either federal or state agencies, that the spray has never been sprayed on humans before, that the end

goal of eradication will likely not be accomplished, and of particular concern, is the lack of an effective adverse effects monitoring system for assessing the potential for adverse human health effects. This communication is supported by the assigned organizations, health professionals, and individuals. For your consideration, we have provided discussion and documentation of each of these points supporting our reasoning.

1. The spray being administered was exempted from formal safety evaluations by the Environmental Protection Agency (EPA) and was only approved for use under an agricultural emergency declaration in the State of California; neither short- or long-term safety of this aerosol pheromone-pesticide spray has been sufficiently established¹.
2. Beginning the first day and in the few days following the first spray in Santa Cruz County, several hundred dead seabirds were found along the coast. The birds were found stripped of their oil and covered with surfactant, a component of the pheromone-pesticide spray. Reports that red tide was responsible for the death of the dead seabirds were inaccurate. The birds died by drowning, which is inconsistent with red tide. The State's assertion that the Checkmate LBAM-F solution does not contain a surfactant is inaccurate.
3. When a verbal request was made to Moss Landing Marine Laboratory for test results of the dead birds, we were told that information was "classified". We have followed up with formal written request and await a response.
4. Immediately following the spray and rain, a yellow, sticky foam was found on the surface of the water in the Monterey Bay under the Santa Cruz boardwalk; the birds that were injured or died were found to have a yellow sticky substance on them; various individuals reported a similarly described yellow foamy substance in their yards filling up kayaks on dry land after the first rain after the Santa Cruz spray. Other individuals reported a yellow foam on their windows and coming down trees during the rain. Therefore, this substance was not specific to the Monterey Bay as alleged by the reports.

5. Within one week of the first spray in Santa Cruz County, Santa Cruz experienced the worst incidence of red tide that many had ever observed. Compounds in the pheromone-pesticide solution (e.g. urea and sodium phosphate) are known to feed the microplankton that contributes to red tide.
6. There is data establishing that the disclosed ingredients in the LBAM spray are potentially carcinogenic, mutagenic, teratogenic, hepatotoxic, and tumorigenic to humans, even at dilute concentrations (see supporting data attached)ⁱⁱ. This toxicity will likely have negative effects on marine life.
7. Tricaprylyl methyl ammonium chloride, an ingredient in the pheromone-pesticide solution is classified as a “danger to the environment” and is a serious aquatic pollutant that is reported to be very toxic to aquatic organisms and may have long-term effects in the aquatic environment¹. The USDA acknowledges that Checkmate OLR-F is “moderately toxic” to aquatic invertebrates (crabs, abalone, and other shell fish), part of a sea otter’s diet. Tricaprylyl methyl ammonium chloride becomes more toxic as it degrades².
8. The pheromone-pesticide compounds 1,2-benzisothiazolin-3-one (BIT) and 2-hydroxy-4-n-octyl benzophenone are classified as ecological toxins with particular toxicity to fish, mollusks, and zooplankton. According to the EPA high toxicity of 1,2-benzisothiazolin-3-one to green algae and invertebrate species suggests that potential adverse acute effects could occur to some species if environmental contamination from BIT-treated oil recovery fluids occurs (EPA reregistration document).
9. The pheromone-pesticide compounds 1,2-benzisothiazolin-3-one and 2-hydroxy-4-n-octyl benzophenone are classified by the EPA as having low to moderate toxicity

¹ Tricaprylyl methyl ammonium chloride MSDS; Sigma Aldrich: 2/4/06.

² Tricaprylyl methyl ammonium chloride MSDS; Science Lab: 2/4/06.

to birds and mammals, are moderately toxic to freshwater fish, and highly toxic to invertebrates.

10. A large percentage of the 643 post-spray adverse effects reported by individuals in Monterey and Santa Cruz Counties are consistent with the known adverse effects associated with the spray or its ingredientsⁱⁱⁱ (see supporting Executive Summary of HOPE and petitions attached). This suggests mechanistic plausibility that the compounds in the pheromone-pesticide solutions are being delivered at adequate concentrations to create a public and environmental health hazard.
11. Santa Cruz county residents and wildlife in the Monterey Bay will be chronically exposed to the LBAM spray solution continually for a minimum period of 2 years and a State-projected period of from 3-10 years.
12. The contents of the spray are designed to last in the environment from 30-90 days and spraying will continue every 30 days. This process will result in greater and greater overlapping concentrations of pesticide solution and continued exposure that is greater than the individual exposures estimated by the State.
13. Most all drainage channels in Monterey and Santa Cruz Counties lead to the Monterey Bay. With increasing concentrations and continued spray application, the Monterey Bay will be exposed to concentrations of pheromone-pesticide residues that are completely incalculable.
14. Other compounds in the pheromone-pesticide solution (e.g. ammonium phosphate) become more toxic as they degrade.
15. The widespread use of the directly toxic pesticides *Bacillus thuringiensis* (Bt), chlorpyrifos, and spinosad are especially toxic to aquatic ecosystems and should be of concern to stewards of the Monterey Bay.

Assessment of Safety of Pheromone-Pesticide by the Environmental Protection Agency (EPA) and California Department of Food and Agriculture (CDFA)

In their Consensus Statement of Human Health Aspects of the Aerial Application of Microencapsulated Pheromones to Combat the Light Brown Apple Moth, the Department of Pesticide Regulations (DPR; see attached) stated that the safety of the pheromone-pesticide spray being used was extrapolated from safety reviews of other pheromones and that the toxicity of the individual ingredients of the pheromone-pesticide spray has not been reviewed. The report also states the documentation of safety was based on oral administration or skin sensitization tests. The only aerial data available was application of a pheromone solution applied in localized emitters or aerially sprayed over non-populated agricultural areas, not populated areas. DPR concluded;

“During more than 10 years of use of lepidopteran pheromones, no adverse effects have been reported. ... The safety record for lepidopteran pheromones has allowed the Agency to conclude that consumption of food containing residues of the pheromones presents no risk. ...Adverse effects on non target organisms (mammals, birds, and aquatic organisms) are not expected because these pheromones are released in very small amounts to the environment and act in a select group of insects. ... This statement refers primarily to the pheromone active ingredients generally used in emitter devices or aerial application over agricultural areas rather than aerial application over populated areas (such as in the present situation).”

The DPR document is the formal basis used by the CDFA in alleging their pesticide spraying program of residential areas, schools, playgrounds, and parks is safe. The basic scientific flaws in this "safety" assessment should be evident. The first flaw is that while the pheromones in the currently used solution may be similar enough to those used elsewhere and a similar safety profile can be expected, the actual solutions used are different. It is scientifically invalid to assume that the safety of one pheromone solution containing one set of ingredients is the same as that of a markedly different pheromone solution. Only if identical solutions are used can such an extrapolation be made. As this is a solution that is to be sprayed over residential areas, playgrounds, expectant mothers, the

elderly, and the national marine sanctuary, this is not a supposition that should be made. A second flaw is that EPA used a lack of reported adverse effects as the basis for determining safety. It is scientifically implausible to suggest that a lack of adverse effects of a different pheromone-pesticide solution sprayed over non-populated areas can be used as a determination of safety of a markedly different pheromone-pesticide solution to be aerially sprayed over residential areas or environments rich with wildlife for extended periods of time. Thirdly, no assessment of safety on non-target organisms can be deduced from a completely different spray applied via emitters in agricultural areas that lack many of these non-target organisms. To date we have found no environmental studies that suggest that the pheromone-pesticide will not have a negative effect on the environment. In contrast, the several hundred dead seabirds, a review of the potential toxicity of a number of compounds in the solution, and the most vicious red tide observed in Santa Cruz in decades suggest that the pheromone-pesticide solution may not be benign to the Monterey Bay.

Moreover, neither the EPA, Department of Pesticide Regulation (DPR), nor the Office of Environmental Health Hazard Assessment (OEHHA) have reviewed toxicity studies on all the specific active or inactive ingredients in LBAM pheromone solutions that are being used along with whatever other materials are being added to the tanks that are actually being sprayed. DPR's Consensus paper additionally concludes;

“Chronic toxicity is not addressed in this document because there will not be long-term exposure to the pheromone product.”

The microencapsulated delivery system that is being used is designed to maintain a constant emission of the pheromone-pesticide solution over a period of from 30-90 days. This equates to continued exposure to the solution for a minimum of 30 days and a estimated maximum of 90 days, from a single spray. The current program mandates a 3-4 day spraying period every 30 days for up to 3 years and State projections of long as 10 years. This translates into approximately 36 to 48 sprays annually for 3 years or 108 to 144 sprays annually, with a projection of up to 10 years or from 360 to 480 sprays of constant exposure for a period of up to 3560 days. The standard medical definition of chronic is something that persists for 90 days or more. Additionally, this spraying

program will result in overlapping and increasing concentrations of the pheromone-pesticide with each subsequent spray. The concentration to which the public is exposed will increase exponentially with each increasing spray as the non-degraded portions of the first spray that persists for 60-90 days is increased with each new spray. It is unconscionable that CDFA, EPA, DPR, OEHHA, and USDA would suggest that the program as initiated will not result in long-term exposure to humans or wildlife.

The significance of the hasty approval of the pheromone-pesticide solution that is being used is illustrated in the 643 human adverse effects and several hundred dead seabirds that were reported after the sprayings in Monterey and Santa Cruz counties.

Lack of Monitoring of Potential Negative Effects on the Environment

We feel that an environmental impact review (EIR) is an absolute necessity for identifying potential negative effects to the environment and MBNMS. We understand that the State felt they needed to move rapidly into their eradication program. However, the negative biological consequences of doing so may be much greater than the biological probability of meaningfully achieving their goal. Most biologists agree that the moth goes into relative reproductive senescence during the cooler months and that rainy months are the most ineffective for spraying.

The State has declared that the concentrations of the spray to which residents and the environment would be exposed are sufficiently dilute so as not to represent a public or environmental health risk. However, as the supporting data provided shows, toxicity of some of the compounds in the spray can occur even in dilute quantities, and for some, the degradation compounds are more toxic than the parent compounds. Still other of the compounds can become toxic over time. The exact concentrations of compounds within the LBAM spray are proprietary information and so the actual concentrations delivered in the spray solution cannot be assessed, nor their safety independently evaluated.

In addition to the potential for toxicity directly associated with the Checkmate portion of the LBAM spray, there are unknown safety consequences potentially associated with the delivery system, the safety of which has not been sufficiently evaluated. Of greatest concern is the lack of safety data on one class of carriers used in the spray known as microcapsules, as well as surfactants. Regarding the microcapsules, the DPR in their Consensus Statement on Human Health Aspects of the Aerial

Application of Microencapsulated Pheromone to Combat the Light Brown Apple Moth (October, 2007)^{iv} estimated the size of the microcapsules at a minimum of 25 microns, and because of this, performed no safety or toxicity studies on the potential for the spray to cause respiratory effects. The same document reports that respiratory symptoms are plausible at the 25-micron particle size. One month later (November 2007) a group of researchers at the University of California at Davis published a CDFA-sponsored study, the conclusion of which revealed that the microcapsules in the LBAM formula in actuality range in size of from 10-190 microns (Werner et al 2007)^v. The American Lung Association considers aerosol particles of 10 microns in size as particulate pollution (known as PM10) that contribute to a host of adverse health conditions, mostly, but not exclusively, respiratory in nature. Particulate matter air pollution is especially harmful to people with lung disease such as asthma and chronic obstructive pulmonary disease (COPD), which includes chronic bronchitis and emphysema. General exposure to particulate air pollution can trigger asthma attacks and cause wheezing, coughing, and respiratory irritation. The majority of adverse effects currently reported for the Checkmate aerial sprays were respiratory or mucus membrane related (see attached DPR Consensus), including a near-death of a child who experienced a first asthmatic attack the day after the spray. The prevalence of actual adverse effects reported and the findings of the CDFA toxicity study strongly demonstrate that the incidence and severity of respiratory disturbances due to the spray are much greater than originally estimated by CDFA. While this class of adverse effects may not be of consequence to aquatic life it does demonstrate that USDA's and CDFA's safety assessments are flawed.

There is at least one surfactant present in the LBAM solution (e.g. tricaprylyl methyl ammonium chloride) that is of particular concern. Surfactants are substances similar to detergents and soaps used to reduce the surface tension of liquids and, in the LBAM solution, are present to ensure a smooth flow of spray through the spray nozzles. The lungs are especially affected by surfactants as pulmonary surfactant is an inherent part of normal respiration. However, the lungs must maintain a normal balance between pulmonary surfactant and surface tension. Surfactants were associated with the death of hundreds of seabirds, which occurred immediately after the Santa Cruz spray. The association of surfactants with the dead birds is likely causative as many of the birds were stripped of their oils, which led to their drowning. While the contribution of the

surfactants and the dead birds is different than what would be experienced in humans, the stripping of the oil in the dead birds strongly suggests exposure to surfactants at concentrations that are great enough to influence the delicate balance of the human respiratory system. This can result in a two-fold problem; endogenous systemic effects in individuals susceptible to minor changes in respiratory surface tension (asthmatics) and greater absorption of exogenous particles that can trigger allergic responses in susceptible individuals. Despite these associations, state and federal agencies have yet to perform a single respiratory toxicity study, and currently have stated there is no intention to do so. Again, while these effects may seem inconsequential to the Monterey Bay, these discussions should clearly demonstrate that inadequate attention and oversight has been given to ensuring the materials being used are safe.

Use of Pesticides More Toxic Than the Current Pesticide Solution

In their most recent proposal, CDFA has stated they will use a variety of directly toxic pesticides such as permethrins, *Bacillus thuringiensis* (Bt), and spinosad, which consists of 88% propylene glycol, a known immuno-, neuro-, respiratory, and sensory toxin. Pyrethroids are very toxic to aquatic life and are therefore of particular concern to aquatic ecosystems. A fragile balance exists between the quality and quantity of insects and other invertebrates that serve as food for fish. The LC50s for a variety of fish including salmon, rainbow trout, and bluegill sunfish are relatively low. As a group, synthetic pyrethroids are toxic to all estuarine species tested. These are in addition to required treatment of nurseries with chlorpyrifos should a positive LBAM find be confirmed. Many nurseries are situated along waterways and streams, are in the midst of residential areas, and near schools. Treatment with chlorpyrifos has the potential to directly poison waterways and the residues wash into the Monterey Bay in an attempt to destroy a moth with whose destructive powers have been greatly exaggerated and sensationalized.

Conclusion

Regardless of whether or not one personally believes that pheromone-pesticides are safe, the fact that this particular pheromone-pesticide solution has never been sprayed on residential areas, has not been adequately tested for human or environmental safety, and in the wake of the detrimental effects on residents and the Monterey Bay already

observed, suggest that a formal EIR should be performed prior to an future spraying. Monterey and Santa Cruz Counties were initial testing grounds for this program and there is currently no formal and integrated program in place to monitor negative effects. The spraying program is to recommence in February in Santa Cruz, San Francisco, and Marin counties. The negative effects we have experienced need not be repeated in other communities.

As citizens concerned about both human and environmental health, we believe that any material that is to be aerially sprayed on residential areas and will inevitably be washed into the Monterey Bay needs to be shown to be safe before application. We find it reprehensible that the State of California would require citizens to carry the burden of proof in showing this material to be potentially harmful. Rather, we believe it is the responsibility of State and/or Federal agencies to prove this material, in the complete form and manner in which it will be dispensed, is safe prior to the spraying of residents, including children, pregnant women, and the elderly, as well as protected sanctuaries, such as the MBNMS.

As the Advisors and Stewarts of the Sanctuary, we ask that you use your resources to help independently investigate these concerns. If your investigations show you feel there is no harm to the Monterey Bay from the pesticide spray, permethrins, or chlorpyrifos that is being used and will be washed to the Monterey Bay we ask that you help allay our concerns. If you find there is potential harm, we ask that you use your resources and authority as a national sanctuary to do what you can to protect the Monterey Bay and stop the recommencement of the LBAM eradication program.

Respectfully,

Roy Upton (831-461-6317/herbal@got.net)

Citizens For Health

California Alliance to Stop the Spray

ⁱ Appendix 1: EPA Grants Emergency Approval of Checkmate: no formal safety studies conducted.

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- ii Appendix 2: Safety Concerns of Checkmate Ingredients. Material Safety Data Sheets (MSDS) & Review of MSDS.
 - iii Appendix 3: EXECUTIVE SUMMARY OF COMPLAINTS and RECOMMENDATIONS: A Review of 643 Documented Complaints of Adverse. Helping Our Peninsula's Environment (HOPE). Released; January 4, 2007; including Petitions and Comments.
 - iv Appendix 7: Department of Pesticide Regulation; Consensus Statement on Human Health Aspects of the Aerial Application of Microencapsulated Pheromones to Combat the Light Brown Apple Moth. October 31, 2007.
 - v Appendix 6: Werner I, Deanovic LA, Markiewicz D. 2007. Toxicity of checkmate® LBAM-F and *Epiphyas postvittana* pheromone to *Ceriodaphnia dubia* and fathead minnow (*Pimephales promelas*) larvae. Aquatic toxicology laboratory. University of California, Davis.