
Community Perceptions of Emergency Responses to Invasive Species in California

Case Studies of the Light Brown Apple Moth and the European Grapevine Moth

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EXECUTIVE SUMMARY

In 2010, Animal and Plant Health Inspection Services (APHIS) Plant Protection and Quarantine (PPQ) of the United States Department of Agriculture (USDA) created cooperative agreements in Florida and California for research on community perceptions of emergency plant health programs to inform possible future programs at the federal level. In California, our research team, headed by entomologist Frank Zalom, Ph.D., evaluated how diverse stakeholder groups perceived strengths of emergency responses to agricultural invasive species and areas warranting improvement through two recent case studies: the emergency programs for the light brown apple moth (LBAM) and the European grapevine moth (EGVM), detected in 2007 and 2009 respectively. These are both exotic Lepidoptera in the family Tortricidae and were both found in California counties nearby the San Francisco Bay area. However, there is only limited overlap of the identified range of these two species. Responses from both the regulatory community and local communities differed to some extent, permitting a degree of comparisons and contrasts. This report describes selective findings from the evaluative study conducted by a cross-disciplinary team, including researchers from the Entomology and Community Development Departments at the University of California, Davis. Research included collection and examination of archival material, including more than 500 newspaper articles, policy documents, and press releases from government agencies and commodity groups. Research also included 66 interviews with key players involved with one or both of these programs from the health and environment communities, the agricultural communities, academics and some agency officials.

When a new plant pest or plant disease vector is found in the United States, it can prompt a regulatory process from federal, state and local agencies through an emergency response. In an ideal situation, trapping and monitoring efforts are thorough enough to enable early detection of new pests, the pests are found in a relatively containable area, and acceptable and effective methods are available to quickly lower populations of the new pest to zero—the goal of eradication. If this ideal scenario occurs in an agricultural context, additional control measures do not need to be permanently added to farming practices and markets remain open for intrastate, interstate, and international trade. In order to thwart the spread of the pest from an area where a pest has been found, quarantines are imposed on the movement of plant materials. The quarantines establish a boundary around the new pest find(s) and halt movement of plant material unless documented control measures and inspections certify the plant material to be pest-free. Inspections for the new pest may occur on-farm and on produce marked for shipment. APHIS is responsible for enforcing international and interstate regulations. This federal agency has the power to quarantine an entire state within the U.S.A. but not a smaller area within a particular state. Quarantine enforcement within a state may be done by each state's lead agency. In the case of California, this is the California Department of Agriculture. In California there is an additional, local level of governance, the County Agricultural Commissioners, who work collaboratively with the California Department of Food and Agriculture to enforce regulations critical to the local economy and commerce of each county. The County Agricultural Commissioner's system is unique to California.

Overall, our study found that there is a broad range of ways that plant health emergency responses can become more responsive to the needs of diverse communities. Ultimately, a re-assessment of the process leading to the declaration of an emergency could lead to a paradigm shift for how to approach emergencies and invasive species.

A summary of recommendations given by a diverse cross-section of interviewees are listed below starting with those that were brought up most frequently and ending with the ones that may have come up only once but which add a specific actionable idea to a general theme that was brought up by many. Only in the last section are responses differentiated by those with primary experience of the LBAM or EGVM plant health emergency responses. We have not included analysis detailing which of the recommendations are currently implemented by various local, state and federal agencies.

Key findings include

- 1) Communities perceived the possible harm from the LBAM emergency response to be greater than the possible harm posed by the moth itself.
- 2) Communities perceived the EGVM emergency response as a model program.
- 3) Threshold for harm in determining invasive species status differs depending on community values and priorities.
- 4) Emergency determinations may differ depending on community values and priorities.
- 5) Communities will work together for or against an emergency response depending on if they perceive the proposed actions to be necessary or unnecessary relative to the threat posed by the pest.
- 6) Aerial spray programs must only be enacted with support from affected communities.
- 7) Agencies lose credibility and trust from communities when they undertake actions against the will of the people.
- 8) Agencies gain credibility and trust through a willingness to engage and effect change, which includes responding to the needs of communities and the environment and adapting new information from science as appropriate.
- 9) Sustainability factors increase with well-coordinated and effective programs.

SUMMARY OF RECOMMENDED ACTIONS

Based on the recommendations offered by the focus group and from interviews, our research team synthesized three recommendation areas for process and four recommended areas of emphasis.

Process-Oriented

- 1) that the public be brought into program development and decision-making as a partner,
- 2) invest in relationships and effective support networks,
- 3) the organizational approaches to determining plant health emergencies and subsequent responses be reconsidered.

Areas of Emphasis

- 1) more prevention
- 2) more support for sustainable agriculture
- 3) reduce the use of toxics and/or eliminate the use of toxics
- 4) more research

I. INVEST IN RELATIONSHIPS AND SUPPORT NETWORKS

The success of the EGVM emergency response was based on a foundation of strong relationships between the local regulatory officials, Cooperative Extension and diverse organizations active in the region. Citizen groups, environmental groups, and agricultural industry groups were all brought to the table early and included in the decision-making process led by the Napa County Agricultural Commissioner. Interviewees with experience of the EGVM emergency response expressed a sense that if the process they had experienced—where the public was approached as a partner—had been used at the onset of the LBAM emergency that the ultimate outcome would have been different. Since the EGVM program was initiated following the LBAM program, experiences learned in the former program by local, state and federal agency officials, may have informed the latter.

- Sustaining and improving relationships is an on-going process.
- Cultivate good relationships to create the best foundation for expedient and well-coordinated actions when faced with a challenge such as responding to a new pest find.
- Sustaining on-the-ground relationships through education, outreach and research - such as with Cooperative Extension.
- Engage neutral, independent, non-regulatory parties to convey information; respect their neutrality and don't always expect for them to agree.
- Create opportunities for face-to-face dialogue.
- Strengthen communication between agencies and within each agency.
- Encourage agency representatives to request to speak with already established groups, even those with differing opinions at their meetings.
- More work needs to be done by communications experts to facilitate dialogue; to create understandings across difference.
- Build relationships with more of the public by representing a broader diversity of agricultural philosophies rather than one dominant form of agriculture.
- Don't assume there is buy-in from the public; take the time to communicate and build relationships effectively

II. COMMUNITY INVOLVEMENT/ PUBLIC AS PARTNER

Many of the strongest recommendations for community involvement came from individuals with negative experiences during the LBAM emergency response. From all of the recommendations listed below, our research team has synthesized a need for a Community Working Group (CWG) to be formed when a new pest find is identified, or even in advance. Similar to the recommendation for transparency in the selection process of individuals for the Technical Working Groups (TWG), individuals chosen to participate in the CWG would need to be chosen through a fair and transparent process. By having distinct TWG's and CWG's, it would create a structure to differentiate between technical advisers and community advisers, and a mechanism for regulatory officials to be informed by both.

Some examples for more effectively engaging the public are given by a diverse cross-section of interviewees. Recommendations for logistics of communication are not included in this summary because a number of these items are already being implemented and others will be specific to different regional communities and emergency response strategies. One item on logistics which was contentious in the LBAM emergency response was the lack of even an emergency hotline during the aerial spray. If aerial spraying is not banned, then standards should be established to require collaboration with local health agencies as a check and balance and for education of health emergency first responders and monitoring.

Implementing the following recommendations synthesized from those expressed by individuals we interviewed should help inform the logistics specific to each new pest find. Please note that because the recommendations come from a diversity of perspectives, there is a range of ideas on how—and how much—to involve the community in decision-making before and during an emergency response. Some recommendations would require shifts in program organization.

Community involvement by integrating feedback when making agency decisions

- Consider general public feedback into agency planning and response through, for example, adaptive management strategies that allow for flexibility to consider changing conditions.
- Start dialogue among different groups as early as possible. Ideally, dialogue can begin before there is a problem.
- Broaden the concept of stakeholders to include more of the general public, including people with limited incomes, urban dwellers, non-agricultural people, children, the elderly and people with disabilities including Multiple Chemical Sensitivities (MCS).

- Ensure respect, communication and cooperation between communities and agencies.
- Provide public transparency about how decisions are made.
- Take community input seriously; recognize that the range of individuals who comprise the public include those who can offer substantive feedback.
- Encourage input from the local agency, including those with their 'boots on the ground'.
- Collaborate with leaders from local government to host dialogues and 'townhalls' on the issues rather than emphasizing meetings hosted by the agency implementing the program.

Community involvement through shared decision-making

- Regional communities must share power in the decision-making process.
- Regional communities should be encouraged to define their priorities and values. Facilitate dialogue among communities and invite diverse representation including independent scientists.
- Create a diverse committee for dialogue and local decision-making (such as with the CWG).
- Concurrence from regional communities—such as through representatives from local, city, or county governments—should be one of the requirements for declaring an emergency.
- Communities should have a right to say—such as with a vote to create informed consent—whether or not a chemical intervention can be used that they believe to be disruptive to their health or the environment.

Dialogue to Understanding

- Avoid having to ‘fix public relations.’ Fix the approach instead by listening and integrating community feedback.
- Transparency and open communication build trust; justifying an action by implying that it is legal to do so undermines trust.
- The public needs to engage in dialog about important issues such as whether eradication is really a viable goal or whether a suppression or certification program is sufficient to meet regulatory objectives.
- Create a culture of dialogue where critical feedback is considered from multiple angles with regional communities, including those with an emphasis on health, environment, and agriculture, and within the agencies. Interviewees with experience of the LBAM emergency response described a perception that there was a silencing of individuals within the agencies who might not agree with the way a program is presented, and interviewees from the health and environment communities also described a perception that farmers were intimidated from speaking out for fear of getting increased on-farm inspections with long delays in identification during their harvest season. With one exception, we did not get that type of response from individuals in the agricultural community that we interviewed, which may be due to the fact that those who felt intimidated were less likely to agree to an interview.

The types of recommendations for re-assessment of organizational response were quite different from individuals with experience with either LBAM or EGVM and so are grouped accordingly. The recommendations emerging from the LBAM interviews represent a fundamental re-structuring in the approach to plant health emergency responses. The recommendations emerging from the EGVM interviews affirm what can be done as a model within the current framework¹ to encourage more consideration of local decision-making.

¹ U.S. Department of Agriculture, Animal Plant Health Inspection Service, Plant Protection and Quarantine. National Plant Health Emergency Management Framework (Washington, D.C.: Government Printing Office, 2012),

LBAM

- Reconsider the threshold for harm for an introduced species to be considered invasive.
- Reconsider the process through which plant health emergencies are declared.
- Reconsider the goal of zero tolerance on the farm versus at the point of export.
- Reconsider the feasibility of eradication as a goal. If eradication is not feasible, how can control and suppression methods be effectively approached?
- Reconsider Risk Assessment Models as some members of the community feel that their health is threatened when considered an 'acceptable risk'.
- Consider how these issues need to be re-negotiated at the international trade level.

EGVM

- Allow for more negotiating leverage at the local level to enable greater communication of local context for consideration during the creation of regulatory specifications.
- Bring community groups to the table as early as possible to offer input, allowing for differences of position while building bridges to work toward the same goals.

<http://www.aphis.usda.gov/plant_health/plant_pest_info/biosecurity/download/PHE-framework_2012.pdf>.

- Create a context in which individuals and communities are more likely to want to contribute of their own energy, resources, and commitment towards program success by ensuring the appropriateness and effectiveness of the regulatory requirements (for example, from the EGVM case study, rather than requiring that all truck-loads of grapes be tarped for shipment, slack-filled loads were demonstrated by industry groups to effectively thwart grapes from scattering on the roads, thus fulfilling the goal of preventing the grapes from scattering during transport). When requirements are considered reasonable and effective, there is less resentment of the increased burden of fulfilling the requirements.
- Improve transparency, independence, and timeliness of communication (such as with the e-mail blasts from Cooperative Extension and weekly breakfasts held by the EGVM Grower Liaison)

Many productive recommendations emerged from this study, some of which are easier to implement than others. Those calling for a paradigm shift in plant health emergency management frameworks will be the most difficult to integrate. At the core, discussions between regulatory officials and regional communities collaborating to uphold phytosanitary regulations requires a back and forth iterative approach. Encouraging this interaction and adaptation rather than pursuing 'one size fits all' responses will encourage increased participation of individuals living in an area and offer an increased chance of success in fulfilling the goals of halting the spread of quarantine pests. The ability for agencies to adapt and change is critical for both maintaining integrity with evolving scientific understandings of pest behavior in new environments as well as in creating productive relationships with communities where new pest finds pose challenges.

As has been repeated frequently in the interviews, the likelihood of new pests entering the U.S. with the increased movement of goods and people associated with globalization will increase while climate change will simultaneously alter familiar landscapes. Regulatory structures need to negotiate the tension between upholding agency mandates with fairness for all while allowing for the integration of fresh approaches and solutions.

ACKNOWLEDGMENTS

We extend gratitude to all of the people who took the time to share their experiences and perspectives for this research project. For many, participation in the interview process was an act of hope for change in the future and trust in us to synthesize all of the information.

We appreciate the generosity of people who took the time to send us follow-up documents after interviews. We would especially like to thank Paulina Borsook, Caroline Cox, Yannick Phillips, Ron Tjeerdema, Lucia Varela, Keith Warner, and Dave Whitmer who participated in our focus group which met twice at UC Davis in September 2011 and March 2012 to discuss the themes of this project and to review progress and outcomes. We had additional participation by e-mail from Claudia Reid and Jeff Rosendale. Thank you also to Lisa Jurado who is staff in the Department of Entomology for all of her efforts to help with hosting the focus group.

From USDA-APHIS, we would like to thank Valerie DeFeo for her consistent support with logistics. We also thank Valerie, Russ Bulluck (ADODR), and Osama El-Lissy who met with us periodically during the course of this study to help us understand APHIS-PPQ-Emergency Response Program structure and mission, and for their consistent support and encouragement for the independence of our research.

We acknowledge our University of Florida collaborator, Professor Lance Osborne, for his participation in discussions during the course of this study. This collaboration helped us interpret findings as well as to compare and contrast the implementation of emergency response programs and community responses in California to those in Florida. Finally, we also want to acknowledge the significance of the American taxpayers for 2008 Farm Bill funding for this research project. We hope that this research serves to offer insight for the future.

Although we have benefitted from the generous contributions of many individuals, the content of this report does not necessarily reflect that of any individual among our contributors, focus groups members, university colleagues, or project sponsors.

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Community Perceptions of Emergency Responses to Invasive Species in California

Case Studies of the Light Brown Apple Moth and European Grapevine Moth

INTRODUCTION

This report is the product of a cooperative agreement between the University of California, Davis, (UC Davis) and the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ). The primary purpose of this agreement is to evaluate the perception of how new exotic pest finds are responded to by Federal, State and local agencies by soliciting responses of individuals from various stakeholder communities. This information will inform USDA-APHIS-PPQ on how diverse communities can be engaged in responding to invasive species issues in California. Two major milestones identified in this agreement were the establishment of 1) a steering committee to organize and advise on our approach to this project and 2) to produce a report that outlines the findings and makes suggestions for improving communication and response to the invasive species threat to the State. The steering committee, which was organized as and is referred to as the project's Focus Group, will be described further in the following section on methodology.

Technological improvements with industrialization and globalization have intensified the movement of people and goods, increasing the risk that plant pests and other causes of plant, animal and human diseases will also be moved. USDA-APHIS-PPQ is charged with creating a regulatory framework to uphold U.S. law for plant protection as well as international law to which the U.S. is signatory. When a new regulated plant pest is found in the U.S., actions such as quarantines and emergency programs are enacted with the goal of keeping the pest from establishing itself in the U.S. or in new regions within the U.S. While APHIS ensures safe agricultural trade between the United States and foreign countries as well as between individual states domestically, the federal agency also works closely with state and local governments to enact regulatory structures, public outreach, and education programs. In California, the state Department of Food and Agriculture (CDFA) and County Agricultural Commissioners play key roles in developing and enforcing more specific intra-state quarantine boundaries, developing and implementing plant health emergency programs, and engaging growers, agricultural industry and the general public in these programs. While the evaluative research presented here is intended for USDA-APHIS-PPQ specifically, it is critical to remember that the programs addressed herein—those of the light brown apple moth and the European grapevine moth—were conducted jointly with the state and local agricultural agencies.

METHODOLOGY

In order to achieve a depth of analysis with both case studies, qualitative data collection methods were pursued including media archives and in-depth interviews with purposive sampling of key individuals and groups. This is different from a quantitative survey of the general population such as one structured for random sampling with calculated statistical variance of responses. We chose not to perform a general survey of the public regarding overall attitudes about agricultural pests and emergency responses in part because such a survey would be unlikely to garner the kind of informed insights and recommendations as from individuals who had devoted extensive thought to the topics.

We determined qualitative methods² to be the best fit for this project because these approaches lend themselves to exploratory analysis embedded with rich detail to illustrate broad general themes. For this research project, we chose to use an open interview format to produce a more comprehensive evaluation of the programs and to generate more tractable recommendations. For example, this approach allowed our research team to follow leads as they emerged rather than pre-defining typologies and classifications. It also allowed us to focus on communities and individuals who are already concerned about plant health emergencies, including both stakeholders who are strong supporters and detractors of current program development and implementation. One of the interviewees from the health and environment community described the experience of the open-ended interview by saying, “I think that I was able to express my opinions and my concerns, at a higher level than just the light brown apple moth...”³ With the interview process, the goal was to allow each interviewee the opportunity to express themselves as fully as they felt comfortable including personal narratives and philosophies.

Media analysis was used in order to establish a timeline and overall sense of the history of the two case studies. Over 500 archival documents were obtained, organized and analyzed. Documents included newspaper articles, press releases, and policy documents. Additionally, a survey of web-based media related to the regulation, education, and activism around the case studies was assessed. Additionally, databases were created to analyze tallies of over 1,000 newspaper articles published.

Figure 1 (below) is an example from the media analysis. It represents a tally of newspaper articles using the LexisNexis Academic Search database. In California, the search term “light brown apple moth” between the dates February 1, 2007 to October 18, 2011 brought up 1,596 articles, of which 1,002 were from the San Francisco Bay Area. These figures also include letters to the editor. It can be seen that the peak of articles coincides with the announcement to spray the San Francisco Bay Area. Blogs, twitter and social media were not included in this tally.

² See for example, Smith, D. 2005. *Institutional Ethnography: A Sociology for People*. AltaMira Press: Lanham, Maryland, USA.; Moss, P (ed.). 2002. *Feminist Geography in Practice: Research and Methods*. Wiley-Blackwell: London.

³ General community, San Francisco/ East Bay, LBAM, interviewed 2011-12, C24.

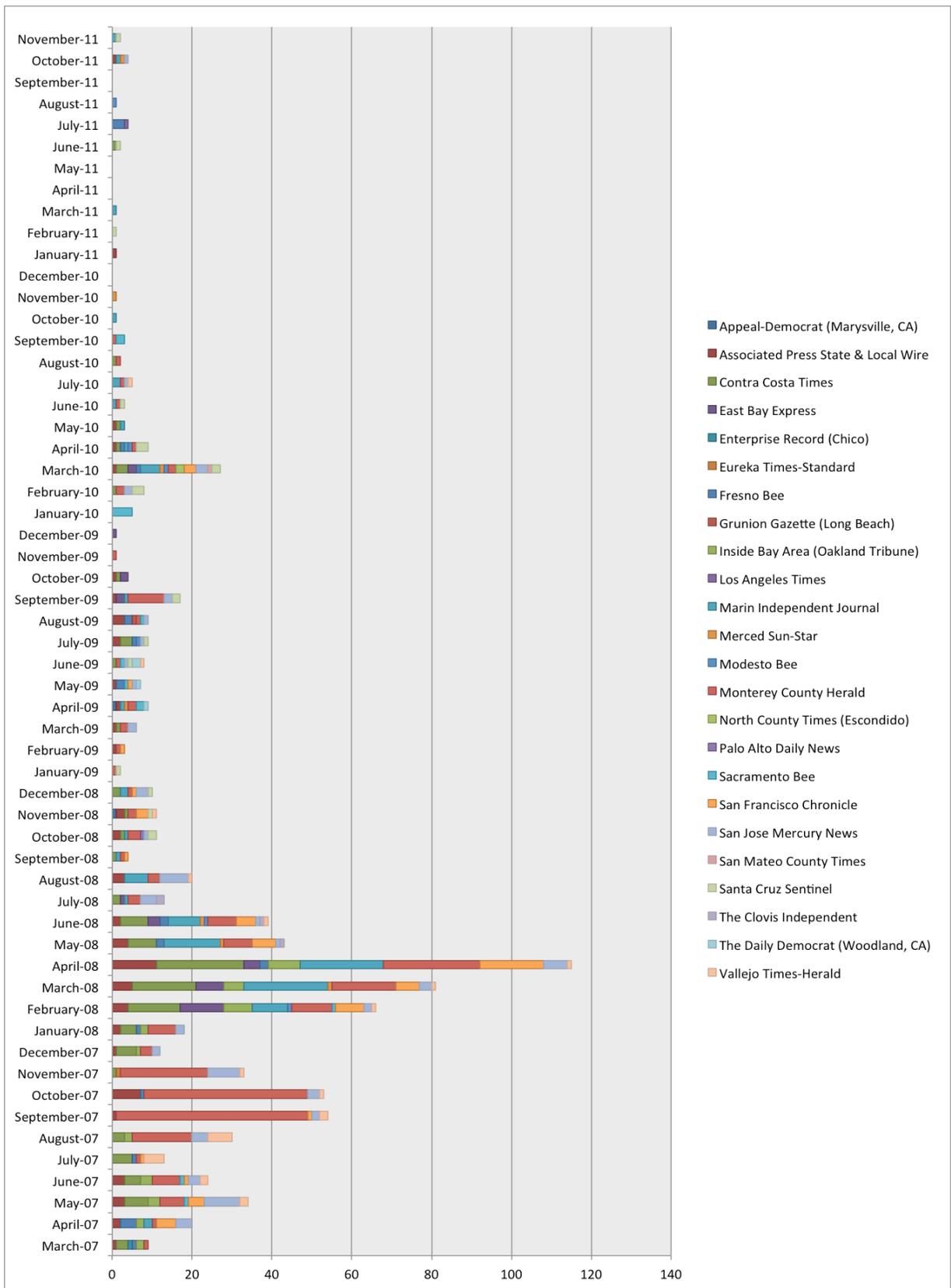


Figure 1: Tally of Newspaper Articles by Month and Year

In-depth interviews were conducted with individuals in the health and environment community, agricultural community, as well as academics and some local and federal agency officials. Although this qualitative data is descriptive and cannot be generalized to represent entire groups, it does offer nuanced and detailed insights from individuals who had direct experience with these two case studies. Although we have summarized themes and recommendations that emerged, we also include some original material from the interviews. By analyzing perspectives and experiences shared

during interviews and media archives, we are able to document a history of what happened with these two case studies and generate a set of recommendations to inform future plant health emergency responses. Prior to conducting interviews, Institutional Review Board (IRB) certification was required for research involving humans. For the broad categories of health and environment communities, agricultural communities and academics, we were granted approval for interviews through an exemption review process because it was considered low-risk in the case of a breach of confidentiality. For the agency officials that were interviewed, approval was obtained through an expedited review process because of the slightly increased risk to employability. We did not gain authorization to conduct agency interviews until relatively late in our process. Although some individuals from the general community requested that their names be associated with their

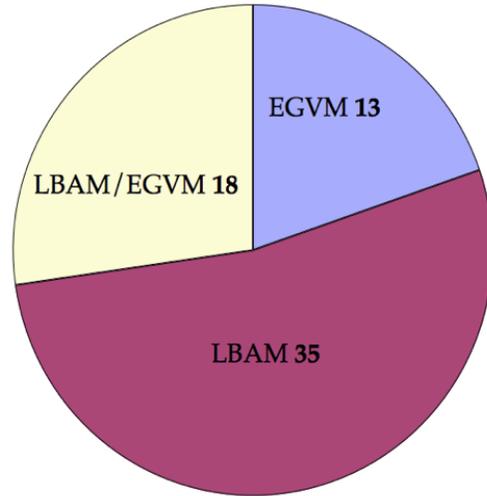


Figure 2: Interviewee experiences by case study

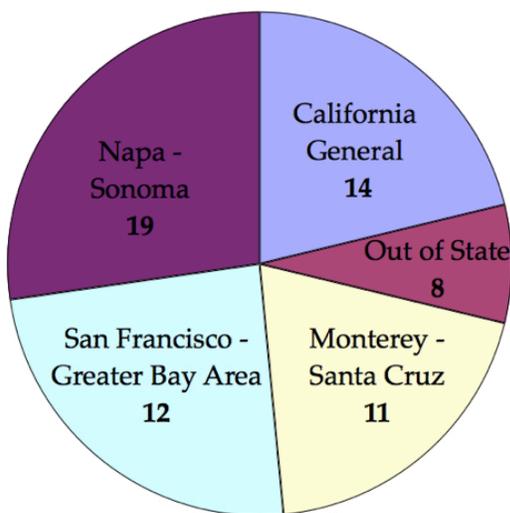


Figure 3: Interviewee categorizations by region

transcripts, our IRB exemption required that we do everything within our power to maintain confidentiality. Perspectives expressed through personal narratives of individuals interviewed were later coded into categories for analysis to aggregate collective responses. Interviews for this research ranged between 13 minutes and 180 minutes depending on the interest and availability of the interviewees. Interviews were conducted with stakeholders representing growers, agricultural industry groups, academics,

environmental advocacy, regulatory agencies, health advocacy, and general communities. Interviewees were initially identified through media analysis and recommendations from the primary investigator and post-doctoral researcher. The research team purposefully sought out interviewees that represented a broad range of perspectives on and experiences with plant health emergency programs, so they might be considered 'informed'

rather than randomly selected from the general populace. After the first round of interviews, additional interviewees were identified through a snow-ball method⁴, whereby interview recommendations are generated from interviewees including personal referrals and forwarded calls for participation made by those already interviewed on list-serves. Those from the general community and agricultural community who responded affirmatively to interview requests tended to be people who were highly invested in either working with their communities to eradicate a pest such as EGVM or working with their communities to oppose a plant health emergency program such as with LBAM.

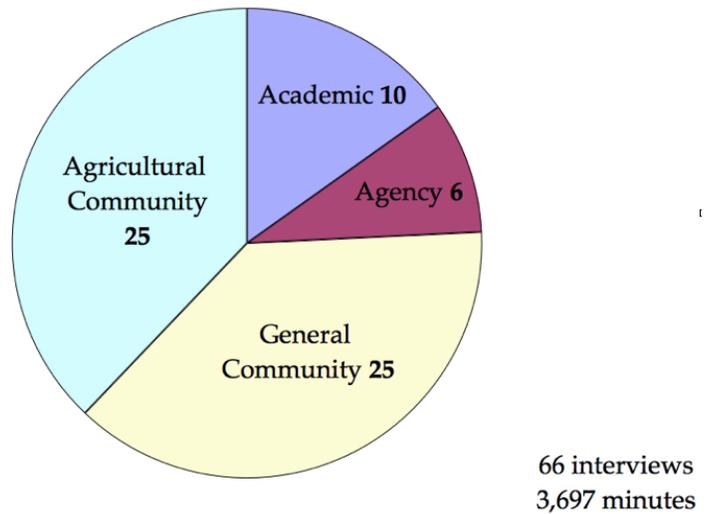


Figure 4: Interviewee categorizations by primary code

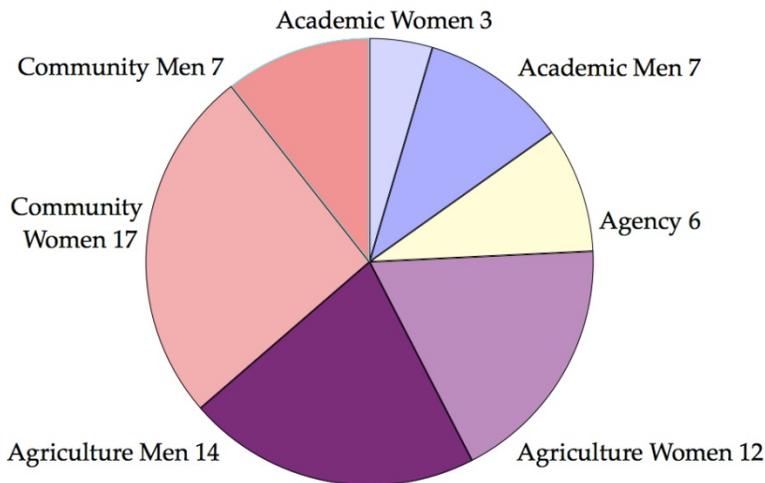


Figure 5: Interviewee categorizations by primary code and by gender

⁴ Longhurst, R. 2006. Semi-structured Interviews and Focus Groups. *Key Methods in Geography*. N. Clifford and G. Valentine (eds.), Sage: London. pp. 117 - 132.

There were a total of 66 interviews. Out of these, 35 were individuals with experience primarily or only with LBAM, 13 were individuals with experience primarily or only with EGVM, and 18 had experience with both LBAM and EGVM (see figure 2). Further categorized by regional affiliation, there were 18 from Napa/Sonoma, 11 from Monterey and Santa Cruz counties, 13 from the San Francisco Bay Area, 14 from elsewhere in California, and 8 from out of state (6 of which were self-identified 'refugees' from Santa Cruz) (see figure 3). Although a number of individuals were affiliated with multiple overlapping communities, of the 66 interviews, 25 were primarily part of the agricultural community, 25 were more broadly part of the general community although largely focused on health and environment, 10 were Academic (including Cooperative Extension), and 6 were from local and Federal agencies (see figure 4). Of those interviewed from the health and environment communities, 17 were with women and 7 were with men. Of the agricultural communities, 12 were with women and 14 were with men. Of the academic interviews, 3 were with women and 7 were with men (see figure 5).

Focus Group Affiliations

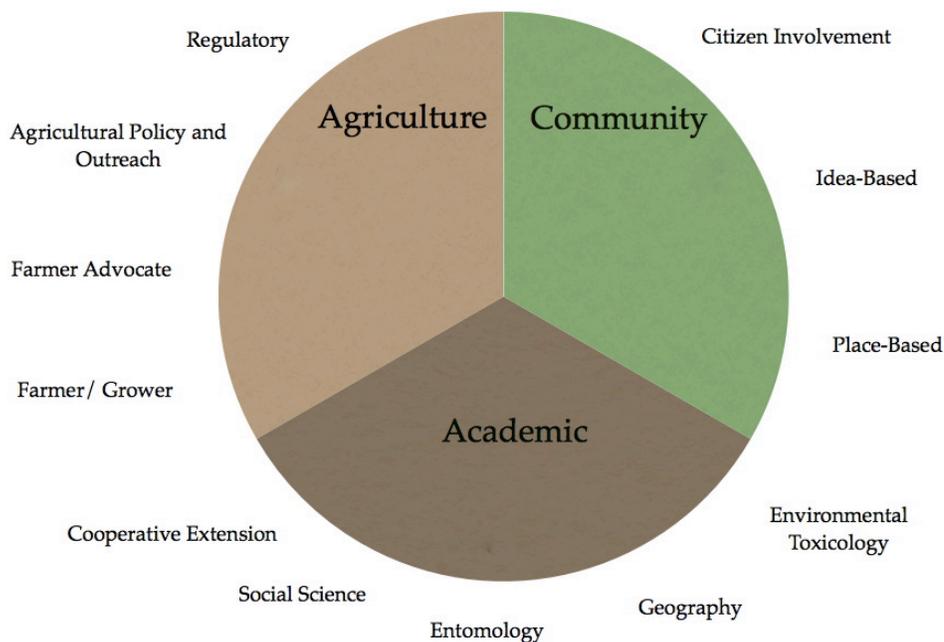


Figure 6: Focus group participation by area of specialization

The findings and recommendations presented here were developed in conjunction with a focus group made up of individuals from within the state of California selected to reflect a broad range of opinions regarding and experiences with plant health emergency programs (see figure 6). All members had experience with either LBAM or EGVM; most had experience with both. The focus

group included representatives from the agricultural, academic, environmental, regulatory, and citizen action communities. The initial proposal described the creation of a steering committee, and this was instead more flexibly structured as a focus group. This group met once in September 2011 to review our research processes and dialogue on the issue of emergency responses to invasive species, and again in March 2012 to offer feedback on our research findings and to provide recommendations. The goal of the focus group was to create more of a participatory methodology where the cross-dialogue between individuals representing different groups within the research project could inform our process and structure of analysis. A utilization-based evaluation recommends a focus group in order to create for a more relevant evaluation and to increase the likelihood that the evaluation will be useful to key stakeholders.⁵

LIGHT BROWN APPLE MOTH (LBAM) PLANT HEALTH EMERGENCY RESPONSE

The LBAM emergency response, specifically the aerial spraying of Monterey and Santa Cruz counties in 2007, now stands as a cautionary tale of the break-down of relations between people living in the affected regions and the agencies involved in enforcing the emergency response.

In early 2007, a retired entomologist in Berkeley caught a tiny, mottled brown moth in his backyard. Concerned that he may have detected an invasive species originally from Australia but also established in New Zealand and Hawaii, he sent the specimen to the California Department of Food and Agriculture (CDFA).⁶ In March 2007, CDFA and USDA-APHIS-PPQ confirmed the inconspicuous insect was indeed *Epiphyas postvittana*, more commonly known as the light brown apple moth.⁷ It was reported that over two thousand plant species, including 250 crops, were possible hosts including many present in both California's wild and cultivated landscapes. To prevent spread of the exotic pest, quarantines were immediately established around the initial finds in the San Francisco Bay Area. Working together, CDFA and USDA-APHIS-PPQ then pulled together a Technical Working Group (TWG) of international experts to develop a plan for assessing and addressing the threat posed by LBAM.⁸ Between March and August 2007, efforts to prevent the establishment and spread of the moth included quarantines, commodity treatments by growers

⁵ Patton, M. Q. 1997. *Utilization - Focused Evaluation: The New Century Text*, (3rd ed.). Thousand Oaks: Sage.

⁶ Raine, G. April 5, 2007. Foreign moth threatens crops, landscaping. *San Francisco Chronicle*. San Francisco, Hearst Communications: C-1.

⁷ Knighten, C. and L. Hawkins. March 22, 2007. News Releases: USDA Confirms Light Brown Apple Moth in California. APHIS. Riverdale, USDA.

⁸ Lyle, S. March 22, 2007. Light Brown Apple Moth Detected in East Bay: Detections in Alameda and Contra Costa Counties. Sacramento, California Department of Food and Agriculture.; Rein, J. V. and S. Lyle. 2007. Pheromone "Twist Ties" to Aid in Eradication of Light Brown Apple Moth. CDFA. Sacramento, California Department of Food and Agriculture. Release #07-059, Available online at http://www.cdfa.ca.gov/egov/Press_Releases/Press_Release.asp?PRnum=07-059.

that were either mandated or preventatively-applied (depending on commodity) to ensure movement of their product, and some state-led pheromone twist-tie applications. However, during this time detections of the moth increased with the greatest concentration appearing in Santa Cruz County, and additional detections in Monterey County and elsewhere in the San Francisco Bay area.⁹ In order to address the detections, CDFA and USDA-APHIS announced a new strategy in August 2007; the aerial application of pheromones.¹⁰ The initial applications were to be made over sixty square miles of Monterey County at what was believed to be the southernmost edge of the quarantine area.

This plant health emergency response program focused on the eradication of LBAM from the continental U.S.—in order to safeguard agricultural resources—by reducing the moth population over time through mating disruption with a Tortricid-specific pheromone, and later, when it was available, a LBAM specific pheromone, that would be applied aurally every few months over several years starting with the fringes of the infestation and moving inward to what trap captures indicated to be the center of the outbreak. This plan was communicated to the public through a series of press releases and news articles followed by several public meetings in which residents could approach individual experts to ask specific questions.¹¹ Very generally, many residents and local officials were concerned about the possible environmental and health impacts of the proposed program as well as the bureaucratic processes that exempted CDFA and USDA from conducting an environmental impact review prior to the initiation of the program under an emergency declaration order that allowed them to concurrently pursue the program while conducting the review. An onslaught of lawsuits, city council resolutions, letters to the editor, protests, and advocacy coalitions appeared. Additional public meetings were held and ever more press releases issued by both the state and federal agencies, however the increase in information did not stem the tide of concern from the general public. After two rounds of aerial application in Monterey and one in Santa Cruz County, the public reaction reached its peak in February 2008 with the announcement that counties throughout the San Francisco Bay would also receive aerial treatment. Faced with mounting political pressure and legal challenges, CDFA announced it would pursue other methods of eradication in June 2008.¹² Over the next few years, the program would include the breeding and release of sterile moths, parasitic wasps, ground applications of pheromones, and a host of

⁹ USDA-APHIS-PPQ. July 5, 2011. Light Brown Apple Moth in California, Collected 2007. USDA, APHIS, PPQ GIS Specialist. Data from: CDFA, USDA, APHIS, PPQ. TeleAtlas DynaMap. Available online at: http://www.aphis.usda.gov/plant_health/plant_pest_info/lba_moth/downloads/maps/LBAM_2007.jpg

¹⁰ Lyle, S., L. Hawkins, J. van Rein. August 14, 2007. Aerial Release of Light Brown Apple Moth Pheromone Scheduled for Effort to Eradicate Infestation in Northern Monterey County. CDFA. Sacramento, CDFA. Release # 07-065.

¹¹ Reynolds, J. August 21, 2007. Getting the apple moth jitters. *Monterey County Herald*. Monterey, Monterey County Herald: B1.

¹² Kay, J. June 20, 2008. U.S. officials call off urban aerial spraying for brown apple moth. *San Francisco Chronicle*. San Francisco, Hearst Communications: A1.

treatments applied by growers to meet regulations within quarantined areas. The damage LBAM was forecast to cause did not manifest at any appreciable level. In January 2012, the state cut funding for the program entirely and federal funding for the program was greatly reduced.¹³

EUROPEAN GRAPEVINE MOTH (EGVM) PLANT HEALTH EMERGENCY RESPONSE

The EGVM plant health emergency response, specifically in Napa County where it was first detected in 2009, were described by some of those interviewed as a model for how community needs can be effectively integrated into the decision-making process. Following on the heels of the LBAM plant health emergency response which embroiled the CDFA in numerous lawsuits with both citizen's groups and County Local Governments, the local Agricultural Commissioner's office in Napa was able to achieve greater negotiating leverage for adapting regulatory requirements to the local political, economic and cultural landscape. Although only California has an Agricultural Commissioner system at the county level, the lesson is to support as much of a bottom-up hierarchy for decision-making as possible to effectively adapt to different contexts.

Originally found during trapping efforts for LBAM, *Lobesia botrana*, the Latin nomenclature for EGVM, was initially dismissed as simply "not LBAM." The sample from Napa County was officially identified in September 2009. EGVM is native to Italy.¹⁴ Its larva directly damages grapevine flowers and fruit.¹⁵ Vividly described in the San Francisco Chronicle as "the monster that is threatening to turn premium Napa Valley wine into rotting slime,"¹⁶ the EGVM's capacity to damage crops was showcased when it destroyed its first vineyard in 2009. During this time, the County Agricultural Commissioner's office received praise in the media for both their quick communication and education efforts as well as political affirmation in December when the Napa County Supervisors re-appointed Dave Whitmer.¹⁷ After the harvest wrapped up and winter set in, the European grapevine moths went into diapause, a resting state. However, vintners and regulators alike were anticipating the spring, when the extent of the invasion could be fully assessed.

¹³ Rogers, P. February 10, 2012. State to Stop Funding Program to Fight Pest - After Initial Aggressive Response, No Cases of Insect Harming Crops. *San Jose Mercury News*. San Jose, San Jose Mercury News: 1B.

¹⁴ Varela, L., F. Zalom, et al. 2011. "European Grapevine Moth, *Lobesia botrana*: Provisional Guidelines." from <http://www.ipm.ucdavis.edu/EXOTIC/eurograpevinemoth.html>.

¹⁵ USDA-APHIS-PPQ. 2012. Plant Health: European Grapevine Moth (*Lobesia botrana*) http://www.aphis.usda.gov/plant_health/plant_pest_info/eg_moth/index.shtml.

¹⁶ Fimrite, P. March 21, 2010. Napa sounds alarm on grapevine moths. *San Francisco Chronicle*. Napa, Hearst Communications.

¹⁷ Trevelen, M. March 10, 2010. Moth quarantine area is created: agricultural officials to release details soon. *Napa Valley Register*. Napa, Napa Valley Register.

Following the early signs of spring, the CDFA began deploying traps around the state to catch moths emerging as the grapevines came out of dormancy.¹⁸ Staying ahead of the curve, the County Agricultural Commissioner's office and Cooperative Extension Farm Advisors were already working with industry groups, growers, and pest control advisers to educate the grape growing community about how to identify, report, and target EGVM. This proactive, local campaign to communicate, educate and collaborate with the community became one of the hallmarks of the fight against EGVM in Napa County. Cooperative Extension Farm Advisors tested a range of possible insecticides locally and provided a menu of options, which also considered how controls applied for EGVM could affect natural biological controls for other insects, to local growers. The County Agricultural Commissioner's office met with concerned community groups and local political leadership as well as growers in order to bring a diverse range of stakeholders into the conversation as well as to hear and respond to fears that might arise as a result of the plant health emergency response. By and large, it appeared local regulators and educators were at the forefront of community engagement. Indeed, in the press, the County Agricultural Commissioner's office and Cooperative Extension Farm Advisors are praised by name in letters to the editor from industry representatives and growers.¹⁹ ²⁰

Treatment for EGVM was multi-tiered: pheromone twist-ties were deployed in vineyards throughout the region, unpicked fruit were removed, organically-acceptable *Bacillus thuringiensis* (Bt) or spinosad as well as insect growth regulators were applied to the vineyards instead of more broad-spectrum insecticides. Additionally, the USDA developed EGVM sterile moths for release as part of the mating disruption strategy (and also provided funding for pheromone dispensers). The moths were developed in California in less than one year which was unprecedented. Aerial application of any substance was never recommended for control of EGVM. After one year of the program, EGVM pheromone trap captures had dropped dramatically. By the time this report was written, officials at the local and Federal levels were optimistic that EGVM could be eradicated in Napa and Sonoma counties within the next two years.

DIFFERENCES AND SIMILARITIES IN THE CASE STUDIES

While the two case studies deal with Tortricid moths primarily threatening high value crops - strawberries, caneberries and nursery plants in Monterey, Santa Cruz and San Mateo counties and grapes in Napa and Sonoma counties - the differences between the two are also substantial and notable.

¹⁸ Lyle, S. March 9, 2010. Portions of Napa, Sonoma, Solano Counties Quarantined in Repsonse to European grapvine moth (EGVM) infestation. CDFA. Sacramento, CDFA. Release #10-014

¹⁹ Hanna, B. November 26, 2010. A grapegrower's Thanksgiving. *Napa Valley Register*. Napa, Napa Valley Register.

²⁰ Wolf, M. June 21, 2010. Thanks for help combating pest. *Napa Valley Register*. Napa, Napa Valley Register.

- **Airplanes:** Airplanes were deployed as part of the LBAM program. There was no aerial application of any substance in the EGVM program.
- **Crop damage:** At the outset of the EGVM program, there was verified evidence of significant damage to crops locally. There were not similar levels of damage attributable to LBAM in Monterey, Santa Cruz or San Mateo counties.
- **Local leadership:** Local leadership in pest management programs appears to differ between the two cases. Media analysis of local press reveals that local Agricultural Commissioners in Napa and Sonoma were quoted and referred to in virtually every article printed regarding EGVM. However, local Agricultural Commissioners are not quoted or referred to in local press in August 2007 for LBAM. This is significant as the comparable silence occurs during the initial announcement of the plan to apply pheromones aerially and immediately subsequent public meetings. During this time, state and Federal agencies were quoted regularly. The EGVM emergency response is described as more of a bottom-up approach and the LBAM response is described as top-down management.
- **Public outreach:** Following the previous point, the ways in which local, state, and Federal agency representatives and regulators interfaced with the public was different in the two case studies. In Napa and Sonoma counties, local agricultural officials went to city council meetings and met with concerned organizations and individuals at their own gatherings as well as those convened by the state and county. In Monterey and Santa Cruz counties, the public was invited to formal meetings convened by CDFA. Attendees interviewed by local press at the time indicated the format - experts on various topics standing behind tables throughout a large room - was 'confusing and frustrating'. Later meetings included formal presentations with a question and answer section.
- **Public engagement:** Additionally, the ways in which regulators and officials engaged the public contrasted. On one end of the spectrum was the largely top-down approach of the LBAM program; the stance was exemplified when a public relations officer with CDFA was asked by the Santa Cruz Sentinel if public opposition could change the state's decision to pursue the aerial application of pheromones to which he responded, "The authority rests with the state. There is no vote"²¹. On the other end of the spectrum, was the more bottom-up approach of EGVM where county agricultural officials in Napa describe their approach as 'asking everyone to help out'. This approach included contacting environmental organizations and local political leadership to discuss plans and options. For example, the Napa Valley Grapegrowers asked for public participation through newspaper media ²²

²¹ Ragan, T. September 26, 2007. More Moth Spray Coming. *Monterey County Herald*. Monterey, Monterey County Herald: A1.

²² Phillips, B. June 10, 2010. How to Deal with Moth. *Napa Valley Register*. Napa, Napa Valley Register.

- **Culture and economy:** Some interviewees have suggested that the degree to which community members who were not personally involved in agriculture accepted or resisted the pest management programs may have also been affected by the overall local economic dependence on the crops under threat as well as the perceived cultural value of those agricultural activities. According to this logic, the stake of Napa and Sonoma county residents in the health of the grape-growing community may be higher than the stake in agricultural activity in Monterey and Santa Cruz counties by residents outside the agricultural sector, thus leading to increased acceptance of the program to contain EGVM in Napa and Sonoma counties.
- **Trade:** Interstate and international trade is at the heart of the issue with LBAM. Though regulatory agencies did not emphasize this at the time, it was an issue not always viewed positively by community groups that formed in opposition to the program. EGVM is not about international trade in Napa and Sonoma counties as the wine grapes are usually taken to wineries within the county, although there was concern expressed by table grape producers in the San Joaquin Valley that the insect might move into their region.
- **Trapping:** The initial EGVM crop damage was sent in for testing as suspected LBAM. When the identification results came back as “Not LBAM”, then increased scrutiny ensued to identify the new mystery pest. The early detection of EGVM while it still had limited distribution also lent towards a more successful plant health emergency response.
- **Sustainability:** The EGVM emergency response is described as focused more on sustainability as a long-term issue - to decrease the need for growers to apply control methods in the future. The EGVM emergency response also contributed to sustainability because of the growers interviewed, many mentioned that least-toxic management approaches were sought by local regulatory, grower, Cooperative Extension and community interests alike. It was mentioned in interviews that if well-coordinated information had not been provided by the Agricultural Commissioner’s office, Grower Liaison, Cooperative Extension and agricultural industry groups, there would have been increased application of ‘hard chemistries’. With the LBAM emergency response, growers reported needing to apply additional chemicals for their produce to gain certification to move products out of the quarantined area even when they had no problems with LBAM or other Tortricids in their fields. In this way, the LBAM emergency response increased the use of pesticides by growers.

KEY FINDINGS

The following highlights represent major themes that emerged from the interviews. Each theme will be followed by a brief synopsis along with one to two illustrative quotes.

1) Individuals interviewed from health and environmental communities perceived the possible harm from the LBAM emergency response to be greater than the possible harm posed by the moth itself.

Individuals with experience of the LBAM emergency response were more likely to describe how they found out about the spray treatment and/or their personal narrative of the experience of the spray than to describe any threat from the moth. All recommendations about integrating health departments and independent physicians came from community members who had experience with the LBAM emergency response. Many recommendations arose from this group about the importance of community activism to serve as a check on agency actions. As shown in Figure 7, those from the health and environment communities who accepted an interview for this project resoundingly felt that their needs had not been addressed by the program.

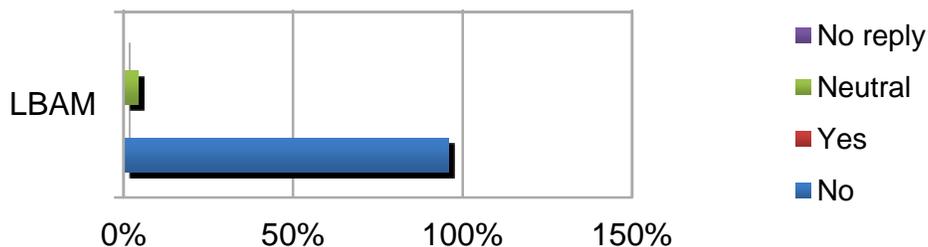


Figure 7: Responses from individuals with in the health and environment communities with experience of the LBAM emergency response to the question, “Do you think that the needs of your community were considered during an emergency response for invasive species”²³

For example, an individual from the general community in the San Francisco/ East Bay described the following series of person-to-person communications among neighbors upon learning of the planned aerial application of synthetic pheromones over their region.

²³ Academic and Agency categories are the same in both EGVM and LBAM graphs.

The word “appalled” came up frequently among interviewees with experience of the LBAM emergency response. Many people described themselves as not having been involved with activism prior to their involvement with the Stop the Spray campaign. However, the extreme disconnect between the magnitude of the proposed action and the pest threat, and the perceived misuse of science and government power compelled many people to dedicate hundreds of hours over several years to find multiple ways in the political system to collectively use their citizen power as a check against the agency actions such as expressed in the quote (below).²⁴

And, my hair stood on end at that point. I was like, "What?" Nobody could believe it. You know, no one could believe that in 2008, the state would send airplanes full of pesticides over populated areas and do a mass application given the outrage over the Medfly in the late 70's... I would tell people and they would say "No, no, no, you must have it wrong. That can't be right. I know you usually have your facts right... but this just doesn't sound right." ...and the more I learned, the more it seemed to me that the claims about it were overblown, [and] that there certainly wasn't the scientific evidence to suggest that this was an insect of great significance to agriculture or to wild-land plants—that there wasn't a lot of data indicating that they had done a lot of damage. There was one grape crop in Australia thirty years ago where there had been some damage, but that's not really significant. In my book, that's not adequate justification for launching mass spraying of chemicals, so the more I read, the more concerned I got... And I was just appalled, you know, that they would take such a heavy-handed and dangerous approach. And then, when they sprayed [in Monterey and Santa Cruz counties] and people got sick, and they were still going to come and spray a larger metropolitan area [San Francisco Bay Area], it was just like OK—Something has got to change here.

2) Individuals interviewed from agricultural communities perceived the EGVM emergency response as a model program. For the most part, health and environmental communities did not mobilize against this program.

When individuals interviewed from the agricultural communities were asked whether they thought that their needs were met by the plant health emergency program with which they had the most experience, the majority with experience of the LBAM emergency response expressed that their needs were not met, and the majority with experience of the EGVM emergency response expressed that their needs were met (figure 8). The agricultural communities and the regional communities in Sonoma and particularly in Napa counties are more tightly knit. Individuals from the agricultural communities, including grape growers, winemakers and representatives of agricultural advocacy organizations, with experience of the EGVM emergency response were more likely to describe their own experience with damage from the moth or their understanding of the threat of the moth to agriculture in their county.

²⁴ Health and environment communities, San Francisco/ East Bay, LBAM, interviewed 2011-12, C34.

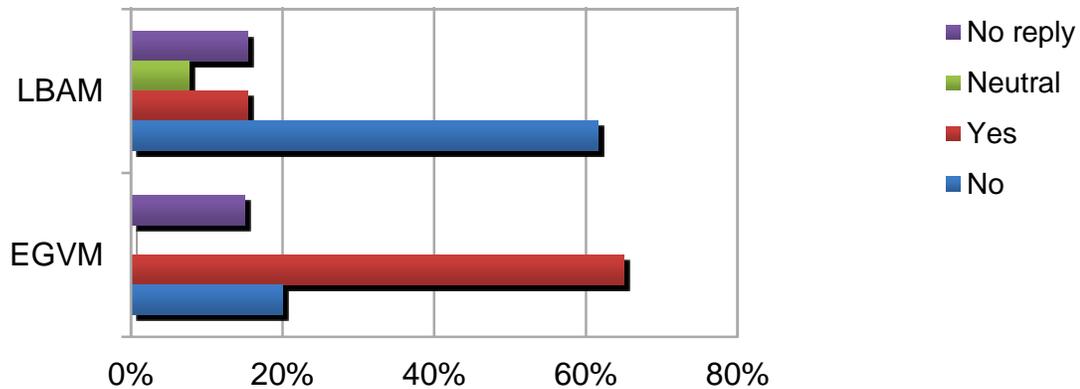


Figure 8: Responses from individuals in the agricultural communities with experience of the LBAM and EGVM emergency responses to the question, “Do you think that the needs of your community were considered during an emergency response for invasive species”

Many from this group reported that they had no recommendations to offer because they considered the EGVM response to be a model program. For example, the following individual involved with the wine industry in Napa and Sonoma counties offered the following praise (below left).²⁵

I think that what happened in the past couple years with the European grapevine moth - I think that was a great response and I think that the county in particular did a good job of getting the word out - not only to the agriculture community but also to the general public - getting everyone aware of what it is and what the problem was - why it is a problem and really the solutions that they are going to take to get rid of it. I think that they were doing a really good job. I don't have any recommendations of how they could have done it differently.

The appreciation of the program highlights the inclusive team-oriented approach exemplified by the County Agricultural Commissioner who is known for cultivating relationships with the whole community and not just those in the agricultural community. Although this approach is overwhelmingly described as successful, it does not mean that there was one-hundred per cent compliance from the all of the communities in the region for the eradication program. Some interviewees described frustration that there were some absentee wine grape growers who did not participate, residents who never clipped the fruit off of their backyard grapevines and households that refused to have pheromone traps or mating disruptions placed on their properties. This kind of non-participation is not possible with an aerial spray program. Participation was phrased as an invitation to contribute to the goal of eradication of EGVM. Although even some who chose to participate

remained skeptical that it would ultimately be possible to suppress the population sufficiently to achieve eradication, there were enough residents who were willing to make the effort and enough growers seeking to fulfill compliance agreements. March 15, 2012 funding became available from

²⁵ Agricultural communities, Napa/Sonoma, EGVM, interviewed 2011-12, G94.

the USDA, CDFA and the County of Napa to help “growers who up to this point have borne the expense of EGVM treatments in commercial vineyards.”²⁶

3) Threshold for harm in determining invasive species status differs depending on the values and priorities of communities in a region.

Integral to the definition of an invasive species is the subjective concept of harm broadly described in the Executive Order 13112 as a species “whose introduction causes or is likely to cause economic or environmental harm or harm to human health.”²⁷

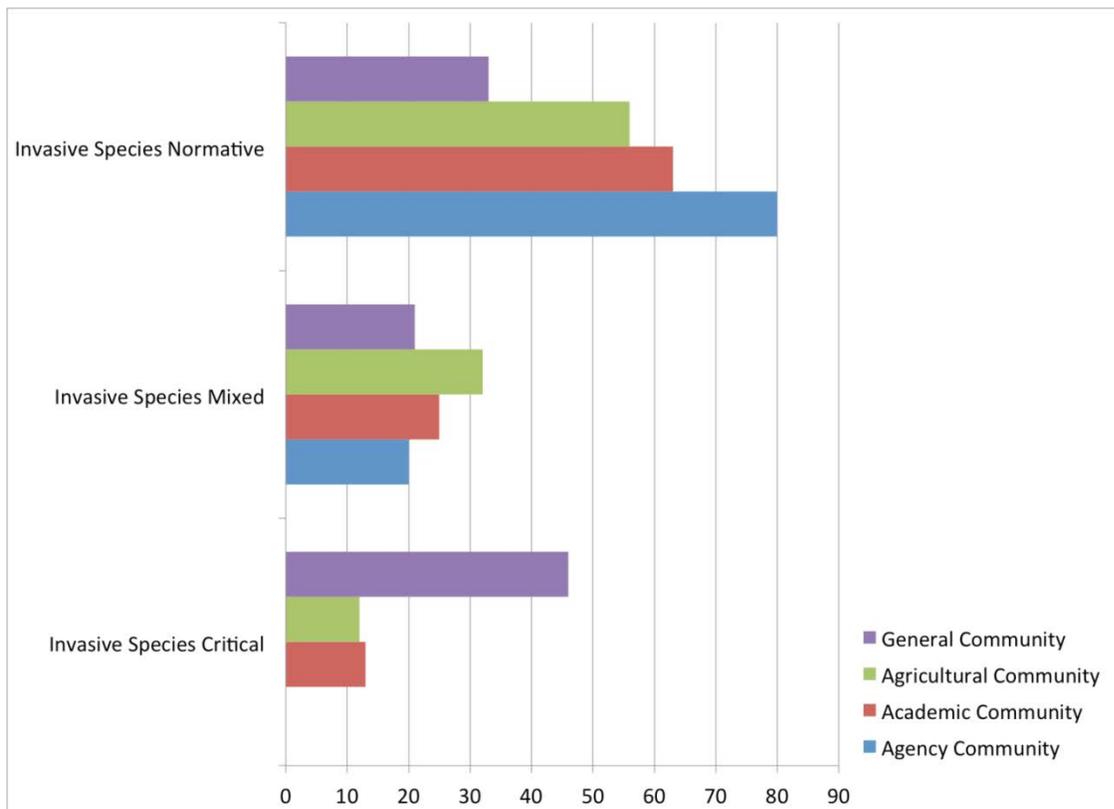


Figure 9: Definition of Invasive Species by Primary Code

Although nearly three quarters of all those interviewed gave a definition which was similar to the official definition, one-third of those then followed up to clarify that they did not perceive non-

²⁶ County of Napa. 2012. European Grapevine Moth. <http://www.countyofnapa.org/Pages/DepartmentContent.aspx?id=4294976293>

²⁷ Executive Order 13112. February 3, 1999. Invasive Species. Presidential Documents. <http://ceq.hss.doe.gov/nepa/regs/eos/eo13112.html>

native status as sufficient to unequivocally constitute harm (aggregated as 'Invasive Species Mixed' in A9). One quarter of all interviewees and approximately half of all interviews from the general community argued that because the term 'invasive species' has been so abused with such a vague threshold for what constitutes a 'good' and 'bad' species and many further clarified that with climate change it is difficult to predict which species will be most resilient (aggregated as 'Invasive Species Critical' in figure 9). These last two groupings, challenge for a re-think of how "invasive species" and "harm" are defined. On the one hand, some interviewed challenged for a re-assessment of where the threshold of harm is demarcated.

One interviewee from the health and environment communities, who had experience with the LBAM emergency response expounded (below),²⁸

We want our lawns with invasive grasses. We want our exotic foods, which I think is a little bit also, hypocritical from an agency perspective in that, the majority of the foods that we either subsidize or we grow and support as a government are exotics. So, an exotic is what we say an exotic is. Or a pest, is what we say a pest is - it has nothing to do with the biology.

On the other hand, there were those interviewed who argued that if we had more diversified food production systems and particularly if they followed a biodynamic philosophy, that the threat of invasive species would be minimized. While there is a changing natural landscape, there is also a cultivated agricultural landscape. The type of harm created by an introduced species is a function of how it interacts with its new environment. To give a brief example from the literature, "Experimental studies with recent invaders suggest that, all else being equal, increasing diversity decreases invasion success by decreasing resource availability".²⁹ Achieving consensus among scientists, among those in the agricultural community who hold different philosophies about agricultural practices, and among the diverse communities is a challenge. However, the challenge is also an invitation to assess where the boundaries of these concepts intersect with specific regions, both the human and physical. Considerations need to be site-specific. To give an example from the research focus group, whereas in Napa County EGVM is not a trade issue because the majority of wine grapes are processed within the county appellation, the same pest would be an international trade issue in Fresno because the table grapes grown there are exported to other countries. A species that is very harmful in one region may only be a minor nuisance in another.

²⁸ Health and environment communities, Monterey/ Santa Cruz Counties, LBAM, interviewed 2011-12, C35.

²⁹ p. 25, Stachowicz, J.J. and D. Tilman. 2005. Species Invasions and the Relationships between Species Diversity, Community Saturation, and Ecosystem Functioning. In *Species Invasions: Insights into Ecology, Evolution and Biogeography*. D.F. Sax, J.J. Stachowicz and S. Gaines eds. Sunderland, Massachusetts, Sinauer Associates Inc. pp. 41 - 64.

An academic interviewed described the complexity of these differentiations in the following way:³⁰

...there's the basic definition of a species that is not native to an area and that is having some significant impact... the definition of the term is perhaps evolving and the practical implications of the term are evolving as well as people are talking about novel ecosystems where — not only accepting that some non-native species or plants are there and we don't have the resources to do anything about it, but in fact we may start considering some of those non-native species to be advantageous with climate change, etc. for providing some ecosystem services or helping to transition... It's an incredibly important concept, but it's not simple, what's native and non-native is not simple, and what is harm is not simple. It's evolving... today we're more likely to say they're [invasive species are] altering the ecosystem and the judgment call of what's damage, I think people are more aware of the values inherent in the whole question.

As described, the values at stake are an important area where dialogue among the diverse communities living and working in a particular region could begin.

4) Emergency determinations need to consider values and priorities of communities.

Each pest has different biological characteristics and the interaction of these in different regions with different political, economic and cultural factors will alter the priority that is given to different approaches and will influence whether particular responses are considered acceptable or not. The following two quotes demonstrate different aspects of this issue. In the first quote ³¹ (right), a pest

Easy... As a pest manager, as a professional, leafrollers are not a problem. I can take a big infestation and take care of it. We have specific pesticides that are specific to Lepidopterous larvae... They don't affect the predators, they don't affect the biological control organisms. Leafrollers for me as a pest management professional are not an issue. But, that said, the numbers of LBAM are going up. Ok. Fine... I'll just handle it. I will spray early in the season, probably two three sprays and I am done. You know let's get some pesticides... So, you know, populations can never really build up. Well, will they build up to the point where they cause 15-20% damage? No. 5% damage? Yes. In an uncontrolled population. Is that devastation? No. But at 5% you are getting into the grower profit. That is what it is. It is not—are they going to be like locusts, biblical plagues and so forth? No. And the USDA has not managed it's message very well. See, that was the thing... the tendency to overplay the problem was very strong on the part of the regulatory agency. They needed it... It justified the expense of the actions. But again, for me as a pest manager person... I can deal with it. But don't give me a pest threshold of zero!

³⁰ Academic, CA general, LBAM/EGVM, interviewed 2011-12, D59.

³¹ Academic, Monterey/ Santa Cruz, LBAM, interviewed 2011-12, D54.

The bureaucracy is declared justified because of the need for compliance with international trade but then it gets into again - are the issues with international trade what should be driving how we make decisions at the county level? And to what extent should, let's say, aerial spraying take place to guarantee me the ability to sell my product across the state line or to another country or something? I don't know. Those are questions you don't really hear debated. What different communities or different regions want for themselves. And to infringe and to have our industry in order to protect its ability to do that and to impose something on the community in general.

management professional describes how LBAM is manageable outside of an emergency framework and particularly when there is not a zero threshold on-farm.

In the next quote (left),³² the grower with experience of the LBAM emergency response, describes the ethical dilemma posed between personal profit from the emergency program and the ability to move product internationally and the health and environmental outcry from urban residents in the county.

The answers to the questions posed by these two different interviewees begin to unfold the complex questions that must be ascertained before an emergency is declared, whether it is a pest which can be eradicated or controlled in the first place, whose role it should be to take action, what types of actions might be considered acceptable in the context of who benefits and who might be most vulnerable to the actions taken?

5) Communities will work together for or against a plant health emergency response depending on if proposed actions are perceived to be necessary or unnecessary relative to the threat posed by the pest.

With LBAM individuals described the creation of community through shared opposition to the program. With EGVM individuals described the strength of their community because they were able to work together to reduce the pest densities.

The following quote³³ is from an individual with experience primarily with the LBAM emergency response:

³² Agricultural communities, Monterey/Santa Cruz, LBAM, interviewed 2011-12, G87.

³³ Health and environment communities, San Francisco/ East Bay, LBAM, interviewed 2011-12, C42.

I am definitely part of a community, and the growth of this community was the most astounding, positive consequence of the entire LBAM situation. It is composed of countless members of the public of all economic and political sectors—Democrats, Republicans, Independents—astonishing—and from all walks of life, all of whom are thoughtful, aware, and all of whom are tired of the constant assault of toxic chemicals on us and our shared environment. And the community includes those independent scientists, teachers, farmers, nursery growers, health officials, physicians, and others who have the courage to speak the truth and stand up to the intimidation tactics of the CDFA and other government agencies. And I would say that our community is defined by an unwillingness to continue accepting the misrepresentations by government agencies both state and federal. And we—all of us—also consider our community to be the larger environment—not just humans—but, all the creatures that inhabit this planet as well as our soils, air, and water bodies... And, you know, far from our concerns being considered, the needs of our community are dismissed and disrespected during emergency responses for invasive species. You know the agencies treat us as if we are uneducated children. It's really amazing... I have met the most incredible people in my entire life through this... There is an incredible solidarity amongst all of us. It's a wonderful feeling.

The next quote (below)³⁴ is from an individual with experience with emergency responses for EGVM, and other pests:

I think on a local level, the community needs are heard and worked with... Which is honestly how it should be on the local level. You see less of that at the state and federal level, of course. But on a local level... as long as it is logical and we can present a sound case, they hear us for the most part... And I think, working together, one of the things we really... tried to work with, was... I would call it moving away from an STD [Sexually Transmitted Diseases] concept to more of an AA [Alcoholics Anonymous] meeting concept. So, everyone was freaked out when they first got [a pest], they didn't want anyone to know—it was a big dark dirty secret, and, “Oh—the winery is going to cancel my contract, and you know, nobody can know”. And I approached it... saying, “Look, it is only a matter of time before our own vineyards have this—Realistically, right now.”... We can work together on this. And, we began to have these neighborhood meetings in which we discussed the fact that, “Hi, my name is __, and I have[this pest]”... And so, it became this group of being able to share with each other where these finds were, getting everyone to do pheromone trapping and sharing those results so that we could hopefully find an infestation before it became an economic issue and you had an entire loss... We did similar effects with EGVM, in that it was not as widespread as LBAM, sort of a non-issue, more focused issue. Where when those positive traps showed up in the neighbors’, he called me up and we got it, let's go. And I called the other neighbor, “Have you got it?” “Let's go.” Getting the rigs in, so having that ability to dialogue is important. It is not going to happen—you don't see it as much with the big wigs obviously, it is the people interior, lower that can start that dialogue more-so, and it is effort. And a lot of people—even I got tired of making the call, “Oh yeah, we have got it again...” To have to make that call... So, as much as you can foster that sense of community, the better. It gets better results overall.

³⁴ Agricultural communities, Napa/Sonoma, EGVM, interviewed 2011-12, G74.

Both interviewees illustrate how community was built through the process of dealing with an invasive species emergency response—for and against the EGVM and LBAM emergency programs respectively.

6) Aerial spray programs must only be enacted with support from affected communities.

One of the big lessons in the “Post-LBAM era”, and arguably the “Post-Medfly era” in California is that aerial spraying will provoke community opposition. Considering this, aerial spraying should only be considered if the emergency is deemed important enough by the affected communities. Some argue that aerial spraying should never be considered because there isn’t a way for individuals to ‘opt-out’ of the treatment.

A mother from the general community with experience from the LBAM emergency response and who remained involved with the issue as evidence by the example with the Japanese Beetle, expressed the following thoughts about toxicities in the environment and the ability to ‘opt-out’ (right):³⁵

From this perspective, whether a substance is aurally applied or not, the capacity for the general public to exercise choice as to what they are exposed to is paramount because of the spectrum of vulnerabilities of different

I think that communities should be fully informed about the true threat from the pest... I think they should have the real information in front of them about what the threat is from the pest and they need to know what is in the formulas that they are going to be using—if they are going to be using pesticides and the inert ingredients should be disclosed along with the active ingredients.... For example, they are going to be spraying in Sacramento... for a Japanese beetle and they are not disclosing all of the health issues connected with the pesticides that they are planning to use. I am really upset about it. They are going to be using pesticides that impact the human nervous and reproductive systems; can cause cancer, cause genetic damage, reduce survival of newborns, are linked to birth defects and miscarriage, poisonous to aquatic life, toxic to honey bees, and the state isn't disclosing any of that before they want to spray tomorrow in Sacramento—a hundred houses. And they are not letting people opt-out even if they have serious health issues. I just think that is like Gestapos.... I think people should always have the option to opt-out, should always be fully informed, and they have [only] seen two beetles. There are other ways to deal with this—USDA actually has posted ways to deal with this beetle on its website that are far less toxic and why isn't CDFA using the approaches that are less toxic?... If my [child]—if this happened in our house. Really, we would have been in huge trouble with my [child]'s health. It really impacts people's lives and I don't think that they really get it—how serious it is to people... How can you spray when we already have sick children from all the toxins that are in the environment that are going into the fetus, going into the breast milk, going into the food, from day one and then you are adding to that? With these chemicals and not telling people what is in them? I think it is criminal.

³⁵ Health and environment communities, San Francisco/ East Bay, LBAM, interviewed 2011-12, C23.

people's bodies. The precautionary principle is particularly emphasized with regard to the potential interconnections with developing fetuses beyond what can currently be operationalized in scientific studies.

7) Agencies lose credibility and trust from communities when they undertake actions against the will of the people.

Many individuals interviewed described a desire for the agencies involved to recognize that trust had been broken with the LBAM emergency response and needed to be re-built. Furthermore, the

But when the LBAM thing started and they announced in the newspaper that they were going to spray, I didn't think that it was going to be that big of a deal. I just figured that I would close the windows and wait for it to go away, and that they wouldn't do anything that would be unsafe to us. So I was sort of trusting the government at that point to be able to protect our health. And that was the wrong assumption... I got sick, then I found out that there were many other people that got sick as well. Then I became an activist in fighting to stop aerial spraying.

creation of a climate of mistrust regarding eradication has also led to less support for prevention and the concept that invasive species detections are enough to constitute an emergency. For example, some individuals ultimately chose to leave the Monterey/ Santa Cruz area for another state because of fear of being exposed to repeated aerial spray for LBAM (see quote below right).³⁶

The reverberations of the lack of trust extend beyond the specific program. In addition to an acknowledgement or an apology, there are individuals who demand monetary compensation for the damages that they described, such as for doctor's visits and relocation costs.

8) Agencies gain credibility and trust through a willingness to engage and effect change

Agencies gain credibility and trust through a willingness to listen to concerns of communities and effect change, which includes responding to their concerns and adapting new information from science as appropriate. This does not mean doing the same thing and changing public relations firms or just investing in a more expensive advertising campaign. This latter type of change is perceived of as manipulative and perceived as further undermining of trust. A number of individuals interviewed from the health and environment communities made sure to specify that they did not want the information gathered from these interviews in this research to be used for the purposes of creating a more persuasive advertising campaign. They did want the recommendations

³⁶ Health and environment communities, Out of State (Monterey/Santa Cruz counties), LBAM, interviewed 2011-12, C27.

that they offered to be used for substantive change in the approach towards invasive species, emergency responses and relationships with community stakeholders. For example, the following two quotes illustrate this difference with reflection on the LBAM emergency response and outreach including the first Hungry Pests advertising campaign. The first (below left)³⁷ is from an individual in the health and environment communities and the second (below right)³⁸ is from an individual in the agricultural communities.

But they keep on insisting that the problem with the LBAM program was a communications problem. It is that they didn't get their message across well and that is what the problem was. They got their message across fine. We just didn't agree. And they keep on saying this kind of thing like our community relations were bad or our communications outreach was terrible, no—actually, it wasn't. We understood totally what you were trying to do. We didn't agree. Your science was bad. Your methodology was flawed.

I think they feel like they failed, not in hurting people, but they failed in their PR, they failed in reaching out to the community to tell them how serious LBAM was. And they haven't failed in that way. They did a pretty okay job on letting people know. They failed in not having the community participate and ramming it down their throats. But they think they failed in a totally different way. And it baffles me, it totally baffles me, that they only see that they failed, not communicating with people to support their program. So to me they've doubly failed. They've hurt people and now they're trying to figure out a different way of approaching things so that they let the community know next time in a better way. It's like you don't need to let them know, you need to let them participate in the decision-making.

An individual from the general community primarily with experience of LBAM offered the following comment after a long list of recommendations:³⁹

I don't want my comments to come across as not positive, because I think that in some ways, although I am pointing out the negative, I mean, we have been working, sometimes day and night to head off what we thought was a mistake. Our intentions are, to make this a better place for all of us, so speaking just for myself, I think that I hope that when you summarize these comments that the reader would not be left with the impression that I don't see that the glass is half full. I think that there's a lot that we could be doing and we have a great opportunity to not only address invasive species and make the way we conduct agriculture in the state smarter, healthier and more economically viable. It's a question of will and leadership on the part of the state to make that happen.

³⁷ Health and environment communities, Monterey/Santa Cruz, LBAM, interviewed 2011-12, C36.

³⁸ Agricultural communities, Sonoma/Napa, LBAM/EGVM, interviewed 2011-12, G77.

³⁹ Health and environment communities, San Francisco/ East Bay, LBAM, interviewed 2011-12, C41.

The exchange of critical dialogue can be seen as an opportunity for improvement and engagement. As evidence by the first two quotes, an insistence on re-packaging the same message and the same program in a more targeted and persuasive campaign will not address these fundamental issues.

9) Sustainability factors increase with well-coordinated and effective programs.

Well-coordinated emergency programs such as with EGVM might actually lead to a decrease in pesticide use for three different reasons. One, because growers are less likely to hap-hazardly apply hard chemicals for similar 'worms' and other pests when they are receiving precise information from the Agricultural Commissioner's office, Cooperative Extension, and industry trade groups. A number of individuals from the agricultural community mentioned that they had already applied 'hard chemistries' prior to the identification of EGVM for the sudden appearance of worms that were unknown to them. Two, if the eradication program is successful, then growers do not need to permanently add control practices which for conventional growers means an increased pesticide load and for organic growers means increased costs associated with Bt or other types of organically-acceptable applications or other control measures. The third reason why a well-coordinated emergency program leads to increased sustainability is that if the program successfully integrates the needs of diverse peoples in the community then it is less likely to be a program that creates unnecessary actions. Likewise, a poorly-managed emergency program can have devastating consequences on sustainability factors by dramatically increasing pesticide use such as when agencies choose to apply chemicals that have side effects on naturally-occurring beneficial organisms that result in outbreak of endemic secondary pests, or when farmers feel like they must apply hard chemistry pesticides for pests that they do not even have on their farms only in order for their products to comply with a regulatory mandate or to insure that the products pass through the quarantine inspections.

I don't believe I actually found them in any of our vineyard properties that I recall, but a lot of those little Tortricid moths—EGVM, LBAM, OLR, they are fairly similar in how they look - to me, at least they are... I think that it kind of got everybody on board to a) having that information was crucial. I was able to also, at the local level to attend the monthly meetings that were held for PCA's [Pest Control Advisor's] and other interested parties... I think that was crucial to the success of the program cause had that information not been distributed, I think—if growers, or PCA's — had to rely on themselves to make those treatment decisions, I think there would have been a lot of material applied at the wrong time... If growers had to do that on their own... you are busy doing other things and when you are having to monitor traps. If you had to do that on your own and then make those decisions on your own, I think that the end result would not have been as successful.

A grower (above right)⁴⁰ described the following of the EGVM emergency response and the perception that the information provided through the program helped to decrease the use of pesticides. Another grower (below)⁴¹ offered the following example of how regulations during the LBAM emergency response increased pesticide exposures including for consumers in retail settings.

Accepting feedback from those affected by regulatory requirements is necessary for ensuring that the regulatory requirements are appropriate and effective for various contexts. That feedback process is necessary from agricultural industry groups, independent growers, and environmental groups and from the diverse communities in a region.

When... CDFA decided to go after retail customers and they actually did spray chlorpyrifos in a couple of retail environments and I was outraged at that... It is an exotic pest and it has the monetary effect on commodities, but you are subjecting children, families to chlorpyrifos in a retail environment—you can't do that... And we were adamant about it. We were upset about it. And eventually I think they only required a couple of sprays and we were able to put enough pressure on them and put enough facts out there that they backed off it. But, they still kept chlorpyrifos in the retail setting and those people like myself... and a host of others that don't use those chemicals and live on our property and we made a choice a long time ago for our employees, for our families, that we didn't want to use those types of things that had question marks after them. We wanted to use caution materials and less toxic materials and now we were forced—to stay in business—to make a choice to do something that we considered extraordinarily obnoxious or go out of business, and that was ugly.

SUGGESTED ACTIONS

Many recommendations became clear from the duration of the interview process. However, the last question, “Do you have recommendations regarding community-agency relationships before, during and after emergency responses to invasive species?” specifically elicited a wide gamut of responses, as represented in figures 10 - 11 with the broad categorizations listed along with the percentage of interviewees who offered a recommendation in each category.

Overall, suggested actions have been separated in three main process-oriented recommendations 1) invest in relationships and support networks 2) community involvement/ public as partners and 3) re-assessment of organizational framework. Lastly, four recommended areas of emphasis are presented.

⁴⁰ Agricultural communities, Napa/Sonoma, EGVM, interviewed 2011-12, G75.

⁴¹ Agricultural communities, Monterey/ Santa Cruz, LBAM, Interviewed 2011-12, G76.

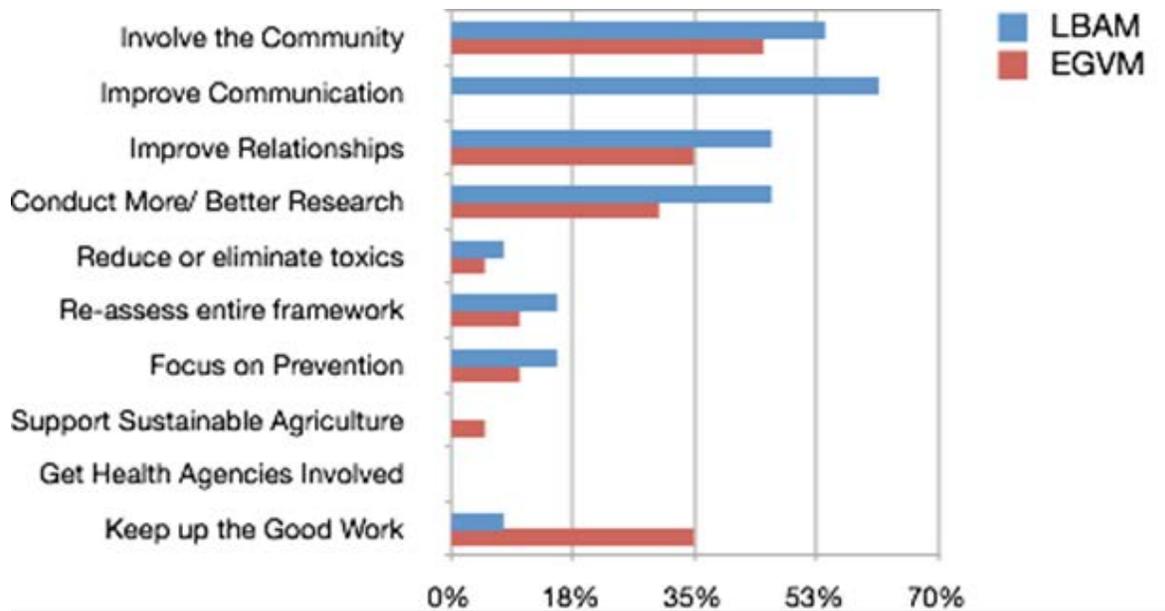


Figure 10: Recommendations from individuals in the agricultural communities with experience of either LBAM or EGVM: “Do you have recommendations regarding community-agency relationships before, during and after emergency responses to invasive species?”

General recommendations for community-agency relationships center on best practices for how to involve the community. For example, respect, communication and cooperation between communities and agencies were at the forefront. Words that came up frequently across the different groups as integral for productive relationships were ‘trust’, ‘honesty’, ‘transparency’, and ‘good faith’.

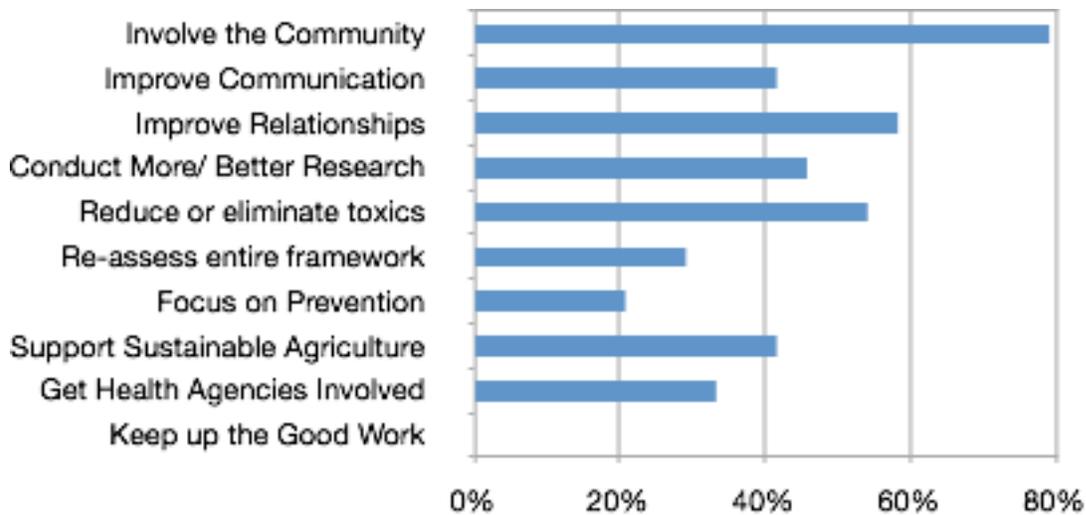


Figure 11: Recommendations from individuals in the health and environmental community primarily with experience of the LBAM emergency response to the question “Do you have recommendations regarding community-agency relationships before, during and after emergency responses to invasive species?”

Those who were interviewed that had experience primarily with the LBAM emergency response tended to offer recommendations on how to improve community-agency relationships and often individuals interviewed who had experience primarily with the EGVM emergency response tended to describe what it was that made for generally positive community-agency relationships in their context. Some of the individuals who primarily had experience with the EGVM emergency response also reflected that they had observed the LBAM emergency response as detrimental to community-agency relationships.

I. INVEST IN RELATIONSHIPS AND SUPPORT NETWORKS

The success of the EGVM emergency response was based on a foundation of strong relationships between the local regulatory officials, UC Cooperative Extension (UCCE) and diverse community, environmental and industry groups. There was additional benefit to the program when the local regulatory officials could effectively engage state and federal regulatory officials for practical policy and resource allocation issues. The strong network of organizations was interlinked with relationships between people. Maintaining support networks means that there is movement of important information and trusted relationships in place that can be called upon in the case of a situation such as an emergency that may require rapid coordinated actions.

Maintaining this strong fabric of connection is the frequent example of UCCE’s role in education. In the EGVM and LBAM emergency responses UCCE was universally lauded by interviewees from the agricultural community. This education included information and instruction on biology, how to identify life stages, flight patterns and how to meet quarantine regulatory requirements. Educational campaigns included workshops, blogs, and an automatic release e-newsletter to

communicate. These types of support networks are able to get information out quickly and, as many growers interviewed expressed, because they are trusted people that they work with regularly, when they get information from them about preventative practices to avoid an invasive species that might be on the horizon, or when they get information from them about the regulatory process, that they are more likely to act on the information because it comes from a trusted source with a track record for scientific rigor and reliability. Although UCCE came up frequently, industry groups, agricultural advocacy organizations, and certifying bodies also came up as being a part of that integral social cohesion in the agricultural sector. Although this is a well-established finding, the groups that provide this type of framework for outreach to the general community need to be further developed over time. Environmental organizations, volunteer groups, inter-faith organizations are just a few examples of citizen groups that could also assist in outreach. Each region will have unique community networks.

In addition to these support networks, it is helpful for plant health emergency responses to engage neutral, independent, non-regulatory parties to convey information such as Cooperative Extension⁴² and Grower Liaisons, for example. It is imperative that their neutrality be respected and that they are not always expected to agree. This neutrality was described as important for opening channels of communication by growers and crop consultants, particularly in new or evolving situations where there might be fear of communicating if that communication could trigger an inspection that could create delays during harvest for days or weeks while lab results were awaited. In this way, the non-regulatory individuals such as UCCE or the Grower Liaison could bridge the spaces between the regulatory process (including the local, state and federal) and the growers' realities.

II. COMMUNITY INVOLVEMENT: PUBLIC AS A PARTNER

Community involvement can take many forms, but what is critical is that the public be brought into program development and decision-making as a partner. 'Working together we can all accomplish more' was an often-repeated sentiment in the interviews. More than half of all of the people interviewed for this project recommended that more community involvement would be beneficial for community-agency relationships before, during and after emergency responses for invasive species. This community involvement ranged from: community involvement with implementation, community involvement through responsive consideration of their feedback when making agency decisions, and community involvement through shared decision-making. The last of these three forms of community involvement - shared decision-making - is a more radical shift than the first two listed.

⁴² UCCE – University of California Cooperative Extension for California. Other states have different names for their cooperative extension programs.

The following recommendations predominantly emerged from individuals with experience of LBAM. For those who primarily had experience with EGVM emergency response many of the items were already considered normative, and so were then described in the context of why the program worked well. For example, the following quote (below left)⁴³ from an individual primarily with experience of the EGVM emergency response, offers reflection on the LBAM emergency response as well.

Instead of effective community engagement, multiple lawsuits were lodged against the California Department of Food and Agriculture, such as when the City of Santa Cruz sued on the basis of the

...and making sure that the community is involved in making all those decisions. I mean we have a really good model here in Napa County. Is that the same model that's in Marin County or in Santa Cruz? I mean, if they're spraying without telling people, what kind of communication do they have? I mean, it doesn't sound like it's very strong. I think that taking a look at what happened with LBAM and the lack of community buy-in and the real anger that went on in regard to that pest, and the lack of dialog that took place, that it took a Senator to really pull people into place to really discuss it- should be analyzed and looked at and compare it to the results that we're having with the EGVM would be a really great way to look at how dialog is working.

legality of the emergency order. One interviewee wryly added that 'the agencies will have their input whether they like it or not - either welcomed into the process from the outset - or through lawsuits in the courts'. Although an agency official described that there was more outreach done for LBAM than for any other pest, there is a difference between one-way communication and a two-way dialogue. It was recommended for agencies to avoid having to 'fix public relations,' but rather to 'fix the approach instead' by listening and integrating community feedback. A lot of ire was provoked by a perception among the interviewees in the health and environment communities when they described agencies as only seeing a need for better public relations rather than a

fundamental shift in how programs are organized and how agencies relate to the diverse communities with which they interact.

Bringing community groups together for dialogue early in the decision-making process is key for effective community engagement. It is recommended to take input from affected communities seriously and to recognize that the range of individuals who comprise the public include those who can offer substantive feedback. Some proposed that it would be helpful to ask leaders from local government to host dialogues on the issues instead of being solely hosted by the agency implementing the program. Affected communities should be involved in determining the priorities and values for when the threshold of harm merits their involvement in or exposure to control measures. Responsive consideration of community feedback when making agency decisions is a form of involvement in decision-making for emergency response to an invasive species concern. Recommendations in this category tended to focus on the integration of public feedback into agency planning and response. Interviewees emphasized how involving the public throughout the process as much as possible would help to avoid unilateral agency actions imposed on communities and

⁴³ Agricultural communities, Napa/Sonoma, LBAM/EGVM, Interviewed 2011-12, G85.

thus help maintain productive community-agency relationships. An aspect of this that was emphasized to foster respectful relationships was to approach critical feedback as an opportunity to improve a response or an opportunity for education rather than something to be thwarted at all costs.

At the core, community involvement is important for creating an effective plant health emergency response. Many members of the public feel the need to engage in dialog about issues that are important to them. An issue that has become important to communities in areas affected by the LBAM and a few for the EGVM program is whether eradication is really a viable goal or whether a suppression or alternative certification program could be sufficient to meet regulatory objectives. Other issues that the interviewees from the health and environment communities listed as important related to the philosophy of agriculture from biodynamic poly-cropping to monocultures, and power dynamics between agencies, growers benefiting from export and residents. Similarly, the philosophy of how much intervention citizens want the government to use in stewardship of shared natural resources and how much things should be “left as nature” to evolve with climate change. Because these issues get into ontological differences that are not reconcilable, then the question becomes what is the role of government? The discussion is ongoing.

Many of the strongest recommendations for community involvement came from individuals with negative experiences during the LBAM emergency. Many described their experience of the aerial spray as an abuse of power on the part of the agencies involved for a moth which left them unconvinced that it was truly a serious threat. Because of this combination, interviewees recommended integrating a stronger role for the community. Some recommended requiring a vote prior to an aerial spray application to determine consent. However even a vote, wouldn't necessarily protect those who are most vulnerable in a population who might still be in a minority. Those who may be vulnerable are the elderly, mothers, children, those with compromised immune system and those who describe themselves as having Multiple Chemical Sensitivities (MCS). MCS is a complex condition with elusive diagnosis that is associated with exposure to environmental toxins so that the body of an individual gets triggered by doses of chemicals at lower levels than the general population. As photojournalist Thilde Jensen describes it, “People with this condition have extreme reactions when exposed to small amounts of commonplace chemicals like those found in perfume, cleaning products, car exhaust, construction materials, pesticides and even printed matter like magazines and books”⁴⁴ People with MCS were very angry about what they described as being dismissed as an acceptable risk. Interviews in this research project included people who uprooted from communities because moving out of state was perceived as the only way to avoid being sprayed. The following quote (below)⁴⁵ is an example of one of these cases.

⁴⁴ Jensen, T. September 17, 2011. Canaries. New York Times. [online] Available at: <http://www.nytimes.com/interactive/2011/09/18/opinion/sunday/20110918_OPINION_ALLERGYGOBIG.html#2>

⁴⁵ Health and environment Communities, Moved from California, LBAM, Interviewed 2011-12, C37

In Santa Cruz when I found out, I had only one month time to prepare to leave when they sprayed. When the ingredients were published in the Santa Cruz Sentinel, it was very alarming... How do we know if we will be sprayed there? The community asked the public officials at the public meeting, "Can you tell us where you won't spray?" The officials just sat there and didn't say anything... And we - the people - realized that we won't know. The whole state is targeted. So I left the state. Which is very inconvenient! The experience of moving to another state. I was not happy. I had loved California and had lived there for thirty years. This was a very painful decision. So, I was affected financially. I was separated from my [grown children] who chose to stay in California. And the spraying made me very sick. I had gone up into the Santa Cruz mountains during the time of the spraying thinking that I might be able to avoid it there, but the rain triggered it. The spray re-activated my [MCS] symptoms. I had not travelled out far enough. I went back to [Santa Cruz] for six days. Then left for one month. I stayed away for one month after the spraying because the time release is supposed to last for one month. Not only myself, but my whole family experienced coughing and respiratory problems. And they do not normally have cold and flu symptoms lasting 6 - 8 weeks. Do you think that it could be from the spray?

Broaden the concept of stakeholders to include more of the general public, including people with limited incomes, urban dwellers, non-agricultural people, children, the elderly and people with disabilities including Multiple Chemical Sensitivities (MCS). This was described as a way of getting a more calibrated perspective attuned to the needs of a diverse cross-section of the general community. Some interviewees specifically contrasted this with the perception that the current system gives advantage to lobbyists and people who have ties to the industrial agricultural system. There was particular concern that there be a mechanism for including consideration for people who might be more vulnerable due to proposed actions.

A number of interviewees from the general community and academics described a need for a county-level diverse committee for dialogue and local decision-making about invasive species outside of the context of emergencies. The facilitation of dialogue with diverse segments of the community along with independent scientists was encouraged. From all of the recommendations listed, our research team has identified a need for a Community Working Group (CWG) to be formed when a new pest find is identified, or even in advance. Similar to the recommendation for transparency in the selection process of individuals for the Technical Working Groups (TWG), individuals chosen to participate in the CWG would also need to be chosen through a fair and transparent process. The role of the state and federal agencies would be to integrate this step as part of the official process and then to provide funding for the formation of the CWG. This approach recognizes that there is a distinction between technical advisers and community advisers. A Train the Trainer's model could also be developed with a series of questions that could be used to facilitate dialogue among communities.

Increased negotiating influence for those at the local level was deemed critical to the success of EGVM. This was described as a recommendation to encourage more input from local agency all the way to their 'boots on the ground people'. An increased role for local-level decision making was described as important across academic, agency, health and environment communities and agricultural communities. During the LBAM experience, some interviewees from the health and environment communities described having better rapport with the people who came to inspect and monitor traps and they had a perception that things might be better if there was more of a channel for ideas to be communicated between ranks in the agency.

III. RE-ASSESSMENT OF ORGANIZATIONAL RESPONSE FRAMEWORK

Very broadly, the organizational approaches to determining plant health emergencies and subsequent responses need to be reconsidered. The EGVM response demonstrates one way that this can be accomplished within the current framework. However, many of the elements that made the EGVM emergency response successful could be structurally encouraged. Other critiques would require a more substantial re-organization to accomplish. The diverse focus group described this as being open to a paradigm shift.

The types of recommendations for re-assessment of organizational response were quite different from individuals with experience with either the LBAM or EGVM program and so are grouped accordingly. The recommendations emerging from the LBAM interviews represent a fundamental re-structuring in the approach to invasive species emergency responses. The recommendations emerging from the EGVM interviews affirm what can be done as a model within the current framework to encourage more consideration of local decision-making.

LBAM

Individuals interviewed who primarily had experience with the LBAM emergency response had recommendations that get at the very structure of the categorizations of invasive species, emergencies, quarantines, and what to do about them. For example, the recommendation to reconsider the threshold for harm for an introduced species to be considered invasive arises out of the frustration that was expressed about how LBAM specifically did not exhibit the type of voracious feeding that had been described by the agencies in declaring the emergency response of aerial spraying. It was more likely that individuals interviewed from the general community were to describe themselves as not supporting the idea that any exotic species should automatically be regarded as an invasive with the potential for harm. Those interviewed from the agricultural community did not typically define their understanding of invasive species as a native/ non-native dichotomy, and so the need to make this clarification did not arise.

Because many of the individuals interviewed from the health and environment communities, agricultural communities and some of the academics were outraged that the declaration of emergency was used in a way that closed further dialogue - with the frequently referenced "You have no vote" statement, a lot of attention was paid to the process through which emergencies with regard to invasive pests are declared. Upon scrutiny, many individuals interviewed expressed dissatisfaction with the process and shock that it seemed too easy. Again the court cases brought up

the distinction of condition of emergency versus event of emergency and also what the implications of that are in terms of the California Environmental Quality Act (CEQA) which mandates a particular process for public engagement and how these should not be waived in an emergency. Some individuals said that at most, they should be expedited, but not annulled. Because of the numerous subjective determinations that need to be made when declaring an emergency - between the biology of the pest, the cultural, economic, and technological parameters, the agency needs to define 'emergency' or perhaps establish a clearer and transparent process for determining it. Further, reconsider the feasibility of eradication as a goal. If eradication is not feasible, how can control and suppression methods be effectively approached that would satisfy regulatory mandates? If the different answers to this then do not elevate a situation unduly to an 'emergency', structurally there needs to be an examination of the funding consequences for less ambitious, but perhaps more realistic control and suppression (depending on the pest and situation). Some questions that arose in the diverse focus group related to this topic were, "Is it possible to establish acceptable thresholds for populations of insects - and IPM approaches? Does an actionable pest have to be eradicated in an agricultural setting to meet certification standards or just prior to shipment? Is area-wide IPM an acceptable approach?" and finally "What is an emergency? Answers differ by economic, cultural and political geographies. What is the decision-making that results in a determination? Who decides? By what criteria? How vetted? Using what evidence? Communicated how?"

There was definitely a cynicism that was entrenched from the LBAM emergency response, that the declaration of emergencies were used solely for the bureaucratic purpose of unlocking certain pools of funds - making the problem fit the funding parameters rather than having a realistic dialogue. What is possible structurally to change the incentive structures for the decisions that are made?

Re-consider risk assessment models as some members of the community perceive that their health is threatened by being grouped as an 'acceptable risk'. This was brought up by both individuals with Multiple Chemical Sensitivity (MCS) and individuals who described themselves as allies of people with disabilities such as MCS. This was often also followed by a comment that any of us could 'tip to the other side' from over-exposure to environmental toxins.

Consider how these issues need to be re-negotiated at the international trade level. There was frustration among individuals from the health and environment communities and the agricultural communities about why a problem that was defined from international trade parameters rationalized actions that were perceived as irrational locally. A question brought up by many had to do with what would it take to declassify a pest such as LBAM at the international level? If the scientific understanding of a pest changes from the 1990's to the present, how can this be taken into consideration?

EGVM

Allow for more negotiating leverage at the local level to enable greater communication of local context for consideration during the creation of regulatory specifications. Coming on the heels of

the LBAM emergency response, perhaps more weight was given to local considerations than would have previously been the case. Although these negotiations often happen at the individual level with a variety of different personalities in the mix, what opportunities might there be to integrate greater local-level leverage in terms of structural organization? How much of it can be integrated in practice by individuals within the current structuring of organizational response through the approach to relationships that those individuals choose to enact in their professional interactions?

Create a context in which individuals and communities are more likely to want to contribute of their own energy, resources, and commitment towards program success by ensuring the appropriateness and effectiveness of the regulatory requirements. When requirements are considered reasonable and effective, there is less resentment of the increased burden of fulfilling the requirements.

Improve transparency and timeliness of communication (such as with the e-mail blasts from UCCE and weekly breakfasts held by the EGVM Grower Liaison). The difficulty of getting out correct information when what is known about the pest biology and how it interacts with the new environment is changing and the associated regulatory specifications of how to meet compliance agreements is changing. The description (below)⁴⁶ by an academic involved with LBAM and EGVM offers the following perspective on the challenges faced by growers:

And what is even... more critical, is that I see growers affected by it and... It is a very sad process to see that happen. It takes [growers] away from doing things that—or spending their time in areas that I think would be more beneficial for them or addressing areas that they should be—issues that they should be addressing, but "Oh, no. I have got to go to a class and wrap my head around this". And people, generally as a clientele as a cohort of human beings, growers, at least the ones that I am familiar with—want to do the right thing. It was hard for them because the right thing was a moving target... The rules associated with those compliance agreements were changing for several months during the growing season last year and so, when you got your information affected what you thought you had to do. Checking websites for a lot of people—this is an aging population—that was difficult too. So yeah, I mean, I am seeing more and more people of a generation that is older than mine with their smart phones, because they said, "I just had to do it"... I saw people react to that saying "Ok, I need to really get in the loop. My computer at home doesn't work. I want to figure out how to do it and I need to at least read the e-mails and know what the websites are—and I can do that with an iPhone." One grower made a joke, and this is a grower, who you know looks as he acted when he said, "Can you imagine me, stopping the tractor and looking at my phone?" And, he said it so well. And, you are right, I couldn't imagine... And he was holding his iPhone while he was talking about it... So, there was a lot of - enormous amount of time directed towards this pest by stakeholders as well as Cooperative Extension Advisors. Enormous.

⁴⁶ CA general, LBAM/EGVM, interviewed 2011-12, D53.

As our interviews indicated the conceptual structure of what is determined to be an invasive species and when and whether or not it is even possible to have an emergency with regard to invasive species—and then how an emergency is declared needs to be fundamentally reconsidered. This includes, for example, the process through which a species is grouped as a “Class A” actionable pest and the selection of members of Technical Working Groups. Bring community groups to the table as early as possible to offer input, allowing for differences of position while building bridges to work toward the same goals. Again, the following recommendations are what emerged from the interviews with individuals from the general community, agricultural community, academics and some agency officials. Who makes decisions to eradicate?

Overall, beyond the two specific case studies of LBAM and EGVM, a comment and question that came up in our diverse focus group, how can a re-assessment move emergency responses from decisions made during crisis and towards novel or long-term solutions? There was concern in the focus group, and some interviews, that with increasing pests and related increased management loads, that a less profitable agriculture might open the door for more urban sprawl instead of agriculture. Likewise, at the focus group, the idea of the sustainability of approach came up in the context of how can we create a structure that is most realistic to our changing environment and simultaneously avoid putting unnecessary chemicals into the environment? The multiple complex questions that arise from an analysis of plant health emergency response programs defy simple answers. As one interviewee from an agricultural community said it, “So more work ahead of time with the agencies, academics, agricultural interests, and community (consumer) representatives needs to be done, especially with the “actionable” pests and potential “emergency response” pests as well, to prevent disasters like the LBAM program in the future.”

And an interviewee from a health and environment community said, “There's got to be a way to not make it an emergency. Find ways to not elevate things to a crisis level. This is going to be increasing. Have our methods or thought processes around this changed? We are still using a 1970's approach to a contemporary problem.”⁴⁷

INVEST IN PREVENTION

More resources should be allocated or redirected toward prevention of entry by invasive species. Prevention was an area where people with the most divergent views overall seemed most likely to concur. This includes prevention at the border for inspections and monitoring, prevention through public awareness about the importance of not transporting stowaway pests, and increased public participation for early detection. Once a pest is found to be in an area, there are more areas for potential disagreement in terms of prioritization of resources, which actions are deemed appropriate, etc.

⁴⁷ Agricultural communities, Monterey/Santa Cruz, LBAM, Interviewed 2011-12, G79.

Not only are pests more difficult to contain once they are established in the territory of the U.S., but it is more difficult to gain consensus among different groups of people living in an area about how to resolve their presence. Many individuals with very divergent views expressed an interest in having more prevention work done at the border to stop the pests from arriving in the first place and some listed examples of how to accomplish this. Although some of the individuals who took an approach of ‘climate change happens, we need to adapt and learn to live with new pests’, might consider prevention efforts to be futile, there were many who considered it an important role for the federal government to be fulfilling. There were some dissenting opinions regarding prevention, with those interviewees expressing the perception that the existence of an emergency for invasive species indicates the failure of prevention. Considering that prevention was the area with the broadest degree of consensus among different groups, the case can be made to invest more funding in prevention. There were also a subset of interviewees, particularly academics interviewed, who discussed the role of research as part of prevention.

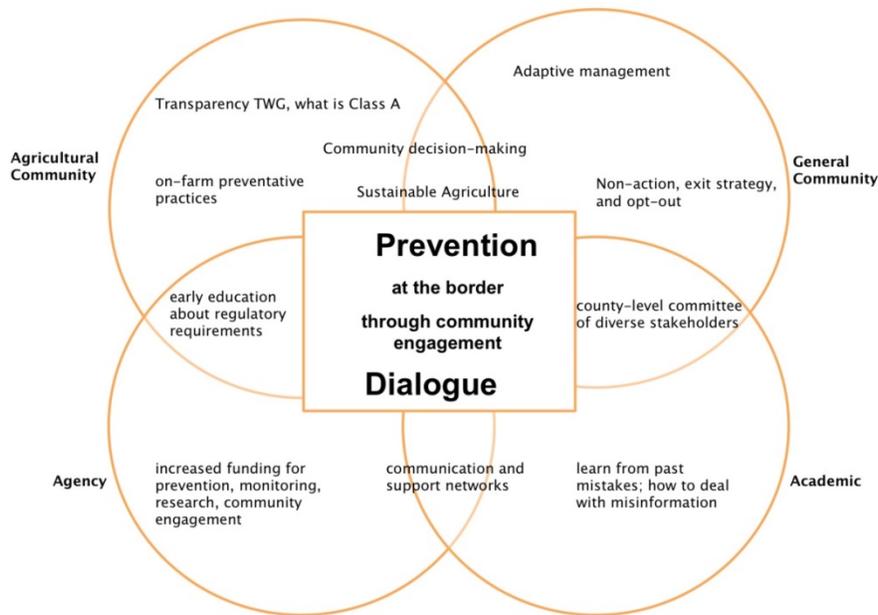


Figure 12: Responses for “What do you think that the role of individuals and/or communities should be during an emergency response?”

The top recommendation among the individuals from the general community that we interviewed was to invest in creating a more resilient food system through sustainable agriculture as a form of prevention of invasive species emergencies. Specifically, the vulnerability of mono-cropped agricultural systems was emphasized. At the core, this type of approach challenges us to change our relationship to food as a society along with the very political economy of current agricultural systems. Soil health and beneficial insects, bats and birds came up frequently as examples.

Sustainable agriculture and biodynamic farming were described by individuals in the general community in a way that goes beyond even organic agriculture. It is this critique of the conventional food system that links many of the individuals from the general community who chose to become active with organizing against the LBAM spray.

A few growers specifically asked why there aren't more people involved as Western Plant Diagnostic Network (WPDN) First Detectors and many others, from both agricultural and general communities both more vaguely described wanting there to be more awareness among the general public to at least know who to call or report to if they were to see something that was out of the ordinary. One person from the agency side, described wanting more announcements on international flights about invasive species regarding the importance of correctly filling out declarations forms for agricultural inspections. The example was given that on Korea Air this was already common practice. This might be a good target of 'public communication' goals. Interviewees from the general community as well as academics urged the use of border crossing stations (a California-specific recommendation) as an opportunity to educate the public about how they can help prevent the movement of plant pests and plant diseases.

Several among academics who were interviewed recommended increasing investment in improved prevention planning with more research for risk analysis, modeling of possible pest pathways, etc. Agency officials who were interviewed also described how having an idea about what possible pests might be on the horizon, was helpful to their process of getting educational materials ready ahead of time and starting conversations about possible treatment methods. The description of this prevention planning research spanned from more investment in agency research on the topic to funding independent scientists through grants etc.

MORE SUPPORT FOR SUSTAINABLE AGRICULTURE

Sustainable agriculture (which includes Integrated Pest Management strategies) was described as a form of prevention overwhelmingly by individuals in the health and environment communities and some from the agricultural communities already involved in organic agriculture. Sustainable agriculture including biodynamic agriculture, permaculture, and organic agriculture was put forward by some interviewees as a way to move away from vulnerable mono-crops.

For example, one individual from the health and environment communities offered the following

At this point, the depth knowledge of how to farm organically it has been in California... we have the advantage of great research universities that can help us. We have the knowledge. It could be capitalized on—this is not something new. I remember when I was visiting the Pacific Northwest and produce just isn't as good there and I turned to my friend and I said, "You know, we have been doing it better and longer in California, with all this sustainable ag. stuff and so there is just a lot more knowledge about how to do it and we have been at it longer. And it is like, APHIS should be capitalizing on that. As opposed to fighting it.... why are we throwing away that lead?"

argument for using sustainable agriculture to California’s advantage (above right).⁴⁸

Another individual (below)⁴⁹ from the general community contextualized the idea of prevention through sustainable agriculture as a counter to the notions of emergency and risk as associated with invasive species (particularly with LBAM):

...the risk assessment model is not one that we in any manner support. And it is central to these programs, these so-called emergency programs that are based on a risk assessment model, in terms of use and we cannot possibly support that—and I think that the basic outlook is—if there were actually a problem of imbalance, you are never going to get a good solution using pesticides in terms of these toxic synthetic pesticides. That is not the solution. The solution is always going to be a longer and slower one. If a problem develops—if there is a problem that develops that is a large problem, in fields or vines or etc., It is usually going to be a long-time problem in the soil, you know not having been supported the way it needed to be—you are not going to get an overnight panacea... You need it to subsidize people if that's what is needed, you know in getting their soil back into health. There needs to be money to help people transition.

Like in the previous section on finding funding for prevention, these recommendations also support more funding for diverse forms of sustainable agriculture that includes Integrated Pest Management.

LESS TOXICS/ NO TOXICS

The category ‘Less Toxics/ No Toxics’ includes both people who described the importance of combating invasive species as a way of reducing pesticide use by conventional growers to people who hold a no tolerance position for any pesticide use. Although these on the surface are in the same category, there are deep schisms between these two perspectives exemplified by the following two quotes:

The first quote (right)⁵⁰ is from an individual in an agricultural community with experience of the EGVM emergency response among others:

It is, and nobody wants to spray anything that we don't have to, and like I said we got so close to being organic, we were almost organic, and I think maybe the word—that's part of the take-away message is that if invasive species get here because they're brought in, the consequences are chemicals and that's just ugly.

⁴⁸ Health and environment communities, Monterey/Santa Cruz, LBAM, Interviewed 2011-12, C36.

⁴⁹ Health and environment communities, San Francisco/ East Bay, LBAM, Interviewed 2011-12, C28.

⁵⁰ Agricultural communities, Napa/Sonoma, LBAM/EGVM, Interviewed 2011-12, G86.

So, you know, the ways the agencies have played this up in the media, it's like 'oh, my gosh—these insects are going to take over—and they are going to ruin industry and we just have to do this. And the line is always, we have to do this now—they have got this down enough, to say—we have got to do this now, to avoid more pesticide use later. So, that is directly the result of decades of people organizing around pesticide use.

The second quote (left)⁵¹ is from an individual in the health and environment communities with experience of the LBAM emergency response among others:

Although there were growers who did describe applying “hard chemistries” quickly onto vineyards “for worms” before EGVM was even correctly identified as a new invasive species, those same growers also credited reduced pesticide use to the outreach efforts of Cooperative Extension and the Ag. Commissioner’s office for supplying information with a wide range of options, differing classes of chemistries as well as organic options all timed to the life cycle of the pest specific to the region. Simultaneously growers would describe having two to three times the cost per acre “for product” including mating disruption pheromones etc.

Certainly even those who chose the “hard chemistries” would have preferred not to apply any additional materials from what they had been doing previous to the discovery of EGVM.

The most broadly encompassing recommendation taking these into consideration is reduce the use of toxins as much as possible. However, a further recommendation offered was to integrate a more holistic approach to consider more of the inter-connections, some of which are beginning to be measurable by scientists, but not all. The ‘No toxics’ group would further recommend integrating the pre-cautionary principle into decisions about actions against a pest when an emergency is declared.

An individual (above)⁵² in the general community expressive of the ‘No Toxics’ position ends with the following comment.

The pesticide industry in my opinion needs to be shut down. And, as long as the USDA is in the service of the pesticide industry, I don’t think it’s a useful agency. But, if there’s going to be an Ag. Department, I think what they should be doing is to help people establish organic, bio-diverse, poly-crops in their own gardens, in their own window boxes, everywhere. But, of course that cuts into the profits of, of the Ag. I don’t think the USDA is going to go for that. I’d like them to surprise me.

⁵¹ Health and environment communities, San Francisco/ East Bay, LBAM, Interviewed 2011-12, C28.

⁵² General community, San Francisco/ East Bay, LBAM, Interviewed 2011-12, C29.

INVEST IN RESEARCH

Almost half of those interviewed for this research project brought up an aspect of science and research as part of their recommendations for community-agency relationships before, during, and after emergency responses to invasive species.

Some of the points that were brought up by the interviewees included: 'Increase the role of independent scientists', 'That science should shape policy, but not the politicization of science', 'That efficacy data on any proposed action (ex. before LBAM, efficacy data on the use of sprayable formulations of pheromone should have been done)', 'Shift from the concept of eradication to control', 'Invest in more prevention at the border', 'Education that knowing the biology of a pest is really important for reducing the use of harsh chemicals', 'Education on resistance issues with insecticides', 'Making sure not all growers use the same class of chemistry', 'Ease restrictions on doing research within quarantine areas on Class A pests so that there is better information available', 'There should be more research on invasives systematically and holistically', 'More risk analysis of pests for better pest prioritization', 'With globalization, invasive pests are an increasing problem and research needs to be done on how to best approach it', 'More funding for Cooperative Extension, more entomologists, resources to work with different materials to control', 'More research on organic pest control methods (ex. if Bt and Spinosads lose effectiveness)', 'More pre-analysis of possible future pests', and 'Studies on the effect of the inert ingredients in formulations regardless of designation as benign or non-toxic'. The research team recognizes that some of these are already being done by APHIS, but they are still presented as concerns addressed by those we interviewed.

Example ideas that emerged from the interview process are as follows. To avoid a situation like the LBAM response, research articles need to be written describing when a pest problem is solved, not just when it is a problem and there is funding to deal with the problem. Some interviewees noted that this may well have been the case with the LBAM articles of the '90's when it was indeed a concern, and before Integrated Pest Management strategies were developed that allowed growers to manage it effectively on their own farms. Visioning forward, some interviewees recommended creating a think tank and fellowships to foster research on healthy food systems. An example given regarding more funding for research was 'like the Defense Advanced Research Project Agency came up with the internet, where critical components [of the program] were to allow researchers to fail, allow them to take risks, and ultimately enable them to succeed'. Additionally, interviewees described that 'there needs to be more research on long term environmental toxicology of pesticides as well as economic research on the cost of suppression, eradication'.

For example an individual from the agricultural community with experience of both LBAM and EGVM offered the following assessment (below):⁵³

⁵³ Agricultural Communities, CA general, LBAM/EGVM, Interviewed 2011-12, G80.

I want to see risk analysis of these pests and public policy better served. I want to see the science used appropriately. I don't want to see agencies cherry-pick science then be less than honest with the stakeholders about the basis of what they're doing. When you've got a mandate to eradicate, you've got to move quick. And, that's hard when you're trying to develop public input and consensus, and I know that. But, that said, the agencies need to be more responsible with public funds and be better with the science.

From entomology to political economy and culture, there are many aspects of research which can constructively contribute to better solutions.

CONCLUSION

This research synthesized differing experiences of individuals from health and environment communities, agricultural communities, academia and agencies who had experience with the plant health emergency responses for the light brown apple moth and/or the European grapevine moth. Process-oriented recommendations are to invite the public into program development and decision-making as a partner, to invest in relationships and effective support networks, and to reconsider organizational approaches for determining plant health emergencies. The areas of emphasis that emerged are for more prevention, more support for sustainable agriculture, reduce and/or eliminate the use of toxics, and to increase support for research.