October 30, 2014

Laura Petro, Senior Environmental Scientist
California Department of Food and Agriculture
1220 N Street, Suite 221
Sacramento CA 95814

Re: Comments on the Pollinator Analysis in the Statewide Plant Pest Prevention and Management Programmatic Environmental Impact Report

Dear Ms. Petro:

I have been asked by the California Environmental Health Initiative and MOMS Advocating Sustainability to review the pollinator analysis sections in the California Department of Food and Agriculture (CDFA) Statewide Plant Pest Prevention and Management Draft Programmatic Environmental Impact Report (DPEIR). I am currently Professor Emeritus at The Pennsylvania State University and throughout my 43-year career have been an active researcher and administrator in both land grant universities and as a senior scientist with DuPont Agricultural Products. I have published numerous articles on pesticide impacts on bees and on insect chemical senses and behavior. In addition I have served on several international and national committees dealing with pesticide risk assessment and pollinator health, and served as science advisor to the National Honey Bee Advisory Board since its inception. Please consult the enclosed abbreviated CV for additional details.

The DPEIR proposed plan has been reviewed with respect to potential impacts on pollinators and pollination-dependent cropping and special plant communities for its adequacy of exposure and risks, proposed mitigation methods, and adequacy of reducing significant impacts to a non-significant level. This reviewer finds the plan severely limited on several points as indicated below.

CDFA Plan Goals for DPEIR

While the CDFA task of preventing insect-induced losses to agriculture is an enormous one for which they have a rich and outstanding history of success, it seems ironic that the stated program goals do not contain any mention of protection or conservation of honey bees and native bees so critical to the sustainability of both agricultural production and the health of native plant communities. The closest goal to this is the last one on the list: "Develop a checklist evaluation tool to assess the potential environmental impacts of proposed activities that can be understood and reviewed by the public. "

The currently documented bee crisis and the declining native pollinators and associated plant communities would seem to dictate that a major goal of the agency be created to address this critical aspect. Documented declines in pollinators and the associated plant communities in the UK and Holland provide a grim foretelling if this is not given a higher priority in sustaining our agricultural/ ecosystem health across the US. (Biesmeijer et al., 2006). A world view in agricultural systems indicates the importance of native bee species to agricultural productivity and the interactions of crops, their surrounding plant communities, and land use patterns (Garibaldi et al., 2014).

Adequacy of Assessing Pollinator Exposure to Pesticides

DPEIR Appendix J and Attachment 1 indicate that pollinators may have significant exposure to pesticides if applied during crop blooming, through pesticide drift, and on blooming groundcover, all of which are true, but by not including the unique known hazards of systemic pesticides like the neonicotinoids, the report is focused on only short-term exposure and not the true season-long exposure resulting from current neonicotinoid use. The large amounts of pesticides used to treat GMO seeds and the toxic dust produced during planting are well documented exposure routes of bee poisoning (Tapparo et al., 2012; Girolami et al., 2013). Further, the drift of these chemicals onto field borders renders all members of the associated plant communities likely sources of further systemic neonicotinoid exposure whenever each species blooms, thus contributing to a season-long exposure of contaminated pollen and nectar. The long-lasting soil residual for neonicotinoids can be up to six years in some soil types, and routinely can provide enough soil residual that a following year's crop, even if untreated, can contain significant neonicotinoids (Sunflower Bayer Study). The extremely high levels of neonicotinoids registered for use on ornamental woody species, relative to agricultural use rates, and their documented 6-year residual, provides another serious exposure route in residential/urban environments not considered here (http://www.domyownpestcontrol.com/msds/original_12-Month-Tree-Shrub-Insect-Control-II.pdf). Thus the DPEIR risk analysis and proposed mitigation plans should account for the higher levels of use and residues in woody ornamentals in agricultural, urban, nursery, public and recreational lands as well as water levels.

A recent study of surface waters in California agricultural areas indicated that 89% of sampled water sites from 3 agricultural areas contained imidacloprid and 19% were above U.S. Environmental Protection Agency (EPA) invertebrate aquatic benchmark limits (Starner and Goh, 2012), which suggests that surface water contamination is a significant route of exposure for all bees. No mention is made of these exceptionally long-lasting consequences of systemic pesticides to bees, yet a recent study has shown that an average of 6 different pesticides are in each pollen sample bees collect, and nearly 60% of samples contained at least one systemic pesticide (Mullin et al., 2010). It would thus seem that the special environmentally pervasive and long-lasting impacts of systemic neonicotinoids should be accounted for in the DPEIR exposure assessments for honey bees and other native bees especially.

Native species of bees are not well studied for pesticide sensitivities, but a recent paper indicates that, in eastern apple production, commonly used pesticides have a range of a 1,000-fold difference in toxicity between honey bees and the Japanese Hornfaced bee *Osmia cornifrons* without any predictability as to which species is more sensitive to a given pesticide (Biddinger et al., 2013). A meta analysis of 150 studies further revealed the inadequacy of using the honey bee as a surrogate for native bees (Arena and Sgolastra, 2014). This raises serious doubts about the adequacy of using the honey bee as a surrogate for native bee species or as a more sensitive species than the 18 species of concern as has been done in Table J-3.

Adequacy of Mitigation Measures in Proposed Plan

The DPEIR plan indicates several new collaborative efforts among CFDA, State Apiary, and a newly developed Pollinator Working Group. These are laudable efforts and the increased cooperation and educational efforts can contribute significant improvements to pollinator protection and conservation in the future. Similar advances at border inspection stations to provide water for cooling bees in transport and in reducing the inspection time with digital technology and on-call expertise have been a positive factor for large-scale migratory beekeepers. While these educational efforts need expansion, their main payoff would be if they were implemented as binding mitigations rather than voluntary practices and added details were made available for scrutiny and understanding.

The DPEIR lists in section 7.1 alternatives considered to those proposed in the plan, but after indicating that lower-risk pesticides are one alternative, the following discussion only uses reduced amounts of current pesticides with no mention of whether reduced-risk alternatives are available or have really been considered. Misuse of pesticides is currently widespread and has major impacts on beekeepers, yet no mention of this or plans to address or improve it are contained in the current draft.

The plan correctly states that the average foraging distance for a honey bee colony is 3.5 miles, but fails to adequately include the magnitude of this in any mitigation plans listed. A foraging distance of 3.5 miles encompasses nearly 27,000 acres of potential blooms to be visited by a single colony in a single day; increase nutritional stress on the colony, and this increases to over 77,000 acres (Seeley, 1995). This indicates that the average exposure area for a single colony is 27,000 acres, which may often include a treated crop, nursery, or residential/urban area as indicated in the plan. It may also regularly include recreational areas, public lands such as forests, or protected lands; thus, it is not realistic to exclude these from consideration of potential exposure to bees from agricultural or residential use of pesticides as the current draft does. Likewise, the buffer areas designated around the above pesticide-use areas need to include some consideration of these known foraging areas for honey bees. How this can be practically achieved is an open question, but for meaningful reduction of exposure to pesticides and the sustainability of honey bees for pollination, this must be incorporated into the plan for effective mitigation of pesticide impacts. To ignore these aspects means that any statements of risk analyses or mitigation impacts having been reduced to non-significant levels is without any factual basis. This same foraging space issue also brings potential impacts on plant communities well beyond the site of pesticide usage in agricultural or urban sites, since pollinators share overlapping areas and can spread contaminated pollen by visiting the same flowers. Thus the voluntary agency practice of knowing where individual hives are located and not spraying adjacent to them (Appendix J, p. J-16) is not a significant hazard reduction. Likewise requiring beekeepers to move their hives prior to intended spray is possible for small-scale beekeepers but certainly not for large beekeepers who often have multiple sites miles apart while they are engaged in other, e.g., pollination, efforts.

Almond pollination is the largest single pollination event in the world, and as the DPEIR indicates, 1.2 million bee colonies, representing nearly half of all bees in the US, are required. Thus, what happens to bees in California almond pollination impacts the entire US food system's pollination, since many of these bees are then used throughout the US following almond pollination. To this reviewer, this demands a special consideration of almond pollination mitigation measures and impacts assessments, none of which are contained in this draft. This past almond pollination season in 2014 resulted in the loss of over 80,000 bee colonies, with untotaled impacts throughout the season for colonies weakened during almond exposure, that never reached pollination potential throughout the season, (http://www.twobeekeepers.com/wp-content/uploads/2014/04/2014-04_Pesticies_Kill_Bees_Polinating_Almonds.pdf: http://www.washingtonexaminer.com/17-billion-honey-bees-injured-killed-threatening-apple-berry-veggie-crops/article/2546800?custom_click=rss: http://pollinatorstewardship.org/?p=2192.

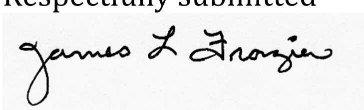
This was the result of tank mixing an insect growth regulator (IGR) pesticide with a fungicide and applying during bloom. Tank mixing of multiple chemicals without knowing their interactions on non-target species and inadequate label language without proper regulatory involvement are contributing to multiple bee kills throughout the US on an annual basis. The plan indicates that site-specific measures will be developed, but it seems that almond pollination is so central to bee health for the US, that this plan should be significantly well developed and with documented impact measures for the 2015 almond pollination season.

Measurements of Reduction in Impacts from Significant to Non-Significant

There are no specific measures given in any scenario of the draft plan that would document the reduction of impacts to non-significant levels for honey bees or for native pollinators with the current level of detail. Also, there is no indication of whether such measures are voluntary, required, or if the results are to be monitored. While statements are made about site-specific plans, none are actually given either as a model of the approaches to be used or of the actual plan(s) to be implemented. The current plan is thus not able to be assessed for adequacy of impact mitigation, even though it claims success will be achieved throughout the plan. This reviewer recognizes that quantitative methods to document pollinator community changes are not currently in place for routine monitoring, but quantitative measures of pest insect populations and current specific research studies with bees offer many possibilities (Garibaldi et al., 2014; Saunders et al., 2013; Scheper et al. 2013; Korpela et al. 2013; Winfree et al., 2011). In addition, there are many options to be borrowed from the USGS National Water Quality Assessment Program, including the Watershed Regressions for Pesticides (WARP) Models for Predicting Stream Concentration of Multiple Pesticides (water.usgs.gov/nawqa). None of these current studies or the currently used methods of the USGS dealing with mixtures of pesticides in the aquatic portion of the landscape are referenced in the draft plan, but should be incorporated for terrestrial and aquatic exposure assessments as well as the proposed mitigation plans.

The EU is well ahead of the US in recognizing pesticide/pollinator environmental impacts broadly and providing policy level changes to address these in a more sustainable manner (EFSA 2013). This can serve as a valuable model for the further refinements needed to the current DPEIR proposed plan.

Respectfully submitted



James L. Frazier
Professor Emeritus