3 Organization Comments and Responses

O-HCA

From: Healthy Children Alliance
To: Chindi Peavey; Joe Galligan; Wade Leschyn; Kati Martin; Kat Lion; Muhammad Baluom; Mason Brutschy; Ed Degliantoni; Peter Dejarnatt; Justin Evans; Paul Fregulia; Ross Graves; Chris Levin-Young; Claudia Mazzetti; Robert Riechel; Donna Rutherford; Joe Silva; D. Scott Smith; Glenn Sylvester
Cc: Healthychildrenalliance@gmail.com
Subject: PEIR Comment Lettter
Date: Tuesday, September 4, 2018 4:58:17 PM

September 4, 2018

Heathy Children Alliance

San Mateo County

To Dr. Chindi Peavey, SMCMVCD staff and board members:

We have reviewed the revised PEIR in response to our comments previously submitted and were disappointed to see the agency's overt dismissal our prior comment letter. 1

Error #1: Dismissing Glyphosate as a Probable Carcinogen

Our first warning sign of your lack of precaution for the effects of pesticide usage was your citation of Dr. Bill Williams, toxicologist, who concludes that the International Agency for Research on Cancer (IARC, the specialized cancer agency of the World Health Organization) makes outrageous claims that cannot be relied on. You and Dr. Williams claim that the IARC's declaration of glyphosate as "probably carcinogenic to humans" cannot be trusted. Dr. Williams's willingness to discredit an entire international agency over his dislike of the precautionary principle is a major red flag about his overall involvement in this project for the SMCMVCD. Your PEIR falsely claims that "Glyphosate exposure was not associated with cancer incidence overall or with most of the cancer subtypes studied by de Roos et al. (2005)." Dr. Williams fails to acknowledge any of the following in the link below from this summer: 2 3

https://www.kqed.org/science/1927142/san-francisco-jury-to-rule-whether-monsanto-caused-bay-area-mans-cancer

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Error #2: Potential Linkage of Pyrethroids to ASD and DD

Your revised PEIR also rejected scientific research provided in our previous letter's Exhibits 1 and 2, which documented the negative health effects of synthetic pesticide usage, especially on pregnant women and young children.

In our previous letter dated May 9, 2016 to your agency, we referenced both the 2014 UC Davis Charge study and 2016 research presented to the American Academy of Pediatrics. Both of these Exhibits documented the significant negative health risks associated with pyrethroid applications used to control mosquitoes. Dr. Robert M. Gould, M.D. and President of the San Francisco Bay Area Physicians for Social Responsibility submitted a comment letter to your agency dated May 8, 2016, expressing grave concern about the use of pyrethroids and pyrethroid-like compounds contemplated in the PEIR, calling "young children and pregnant women especially vulnerable to the negative health impacts with pesticide usage."

4

In your revised PEIR, you overwhelming cite the input of Dr. Williams. Dr. Williams attempts to discredit the entire UC Davis CHARGE study and 2016 research presented to the American Academy of Pediatrics by simply claiming that the studies do not acknowledge other factors that contribute to autism spectrum disorder (ASD) and developmental delay (DD). We do not dispute that other factors may contribute to ASD and DD. However, Dr. Williams misses the point of the Exhibits - the Exhibits suggest a link between pyrethroids used in mosquito treatment and ASD and DD. We have contacts with local toxicologists with PhDs and similar backgrounds from government agencies who, if asked, would come to very different conclusions on human health risks in this context.

5

We have a practical and moral responsibility to not ignore the risk of the potential impact of pyrethroids contributing to ASD and DD. As Manager, staff and board members you owe it to the public to at least acknowledge these risks in your PEIR, as well as before and after spraying pesticides to control mosquitoes.

6

Error #3: Decay Rate of Chemicals Used

We were equally unsettled to see the PEIR's dismissal of children coming into contact with pesticide residues after fogging operations. Your revised PEIR states,

"Products used in or adjacent to residential and intensive recreational areas are those that break down quickly due to exposure to air, light, and soil microorganisms.. Since the ultralow volume (ULV) applications of pyrethroids over surface water cannot be detected in the surface water (with only a few exceptions), then the ground surface would be similarly unaffected. The assumption that children would be exposed under the conditions indicated (i.e., binding to organic matter and sand/soils) is not applicable to the ULV and targeted application

7

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techniques for adulticides utilized by the District such that the concern is overstated." 7

According to the National Institutes of Health, the chemicals in question do NOT break down nearly as you have described: *"Pyrethroids are degradable in soils with half-lives ranging from 3 to 96 d aerobically, and 5 to 430 d anaerobically."* That means that children digging in sand or soils subject to fogging operations will likely come into contact with these chemicals for days to months going forward. Stop denying this and tell the public. (https://www.ncbi.nlm.nih.gov/pubmed/12132343) 8

Error #4: Fogging of Parks and Schools

Your revised PEIR also attempts to say that public parks and schools will not be affected by fogging operations:

"The assumption that young children will be adversely affected by such applications is flawed in that the District does not and will not likely apply pyrethroid (or generally any other) pesticides broadly to areas specifically designated for play by children. It is neither appropriate nor likely that such applications to playgrounds or sports fields will be considered or, excluding rodenticides, in nearby sites where children may play, or in residential areas, unless specific public health concerns warrant such actions." 9

This statement is simply false. When you fog in residential areas, your truck-mounted technology is designed to at least reach homeowners' backyards to achieve a more thorough application. In the last 3 years, your truck-mounted foggers have treated areas that include numerous public parks and public and private schools; in fact, playing fields and sandboxes were within approximately 25 feet of your fogging trucks in many cases.

Ask #1: Disclose the Potential Health Risks of Pyrethroids in Public Notifications
We are not, at this time, asking your agency to stop truck-mounted and aerial fogging operations with synthetic pesticides in residential areas. However, we believe it's crucial that you greatly expand and elaborate on notifications given to the public, both before and after fogging. Specifically, we ask that your public notifications: 10

- **include meaningful acknowledgement of the potential negative health risks associated with pyrethroid exposure as documented by Exhibits 1 and 2 in our previous letter dated May 9, 2016 to your agency.** 11

- **acknowledge that pyrethroid residues may persist in sands and soils for weeks or months after fogging operations.** 12

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- **acknowledge that children playing and digging in sand/soil within the fogged area may come into contact with known toxins that can cause developmental delays and disabilities.**

13

Only after robust and transparent disclosure of known health risks can families make their own decisions about whether or not to let their children play in their backyards or in public parks or schools that were recently fogged.

14

Ask #2: Use Emergency Alert System and Post Signage in Affected Areas

We assume that the number of households that have opted in to receive vector control email updates is a minority share of our county, especially given that opting in requires an individual to proactively go to your website to do so. We ask that you publicly disclose how many individuals receive your email updates. We also ask that you greatly increase the methods used to notify the public and that each of those messages contain those items in bullet points above. **Existing notification systems are not reaching many impacted individuals and families in our county that need to be warned. Therefore, we ask that you include your notifications through:**

15

1. the San Mateo County emergency alert system;

2. large, obvious signs posted at the entrance of public parks and schools within the fogged areas.

We hired the Law Offices of Stephan C. Volker to draft our previous comment letter and are prepared to do so again if the situation warrants it. We have a large network of concerned parents who will raise their voices loud and clear if your agency fails to follow through with the health warnings and transparent notifications described above. We believe the media would have significant interest in your lack of disclosure as well, although we would prefer to give you the chance to address these issues without media involvement.

Thank you for your attention to these matters.

Sincerely,

Healthy Children Alliance of San Mateo County

The Healthy Children Alliance is:

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- *A network of concerned parents for transparent disclosure of pesticide risks, especially on pregnant women and young children;*

- *Professionals with backgrounds in business, environmental science, and technology with strong allies in the medical and scientific communities.*

Comment Letter O-HCA **Healthy Children Alliance San Mateo County**

September 4, 2018

Response 1

The commenter ("HCA") is concerned that previous comments on the March 2016 Draft PEIR were "dismissed" in the revised Draft PEIR.

Appendix F includes all of the comments and supporting documentation received on the initial Draft PEIR (March 2016) and responses to those comments. Several changes to the Draft PEIR were made in response to HCA comments and can be found in Chapter 7, Human Health, and are outlined below:

> Section 7.2.5.1.1 Glyphosate: The analysis was revised to include additional discussion of the potential for endocrine disruption.

> Section 7.2.7.2.2 Pyrethroids, Pyrethroid-Like Compounds, and Synergists: The analysis was revised to address the issue of potential for increased risk of autism spectrum disorder/developmental delay (ASD/DD).

> The impact determinations were updated where new information was available, including those concerning endocrine disruption, Weight of Evidence (WoE) conclusions for PBO, and pyrethrins.

For a summary of the substantive changes made to the 2018 Draft PEIR, see Section S.8. As stated in the introduction to these responses (Chapter 1), CEQA Guidelines Section 15204 requires persons and agencies reviewing an EIR to "focus on the sufficiency of the document in identifying and analyzing all possible impacts." All of the conclusions in the Draft PEIR are supported by substantial evidence reviewed by technical experts in the use of all of the chemical products included in the District's Draft IMVMP, including glyphosate and pyrethroids, which are the focus of the comments provided by HCA.

There is clearly disagreement between the commenter and the PEIR preparers on the hazards to human health associated/not associated with the use of the herbicide glyphosate, pyrethroids, and pesticide "residues" from aerial applications (fogging) of mosquito adulticides. The rationale for PEIR conclusions is provided in the Draft PEIR and below in the responses as appropriate to each comment to ensure that the decision-makers (Board of Trustees) have the relevant information prior to certifying this PEIR and then approving the IMVMP Plan.

Response 2

The commenter disputes the expert analysis of Dr. Bill Williams, toxicologist, and indicates that his analysis of glyphosate (including the IARC declaration and precautionary principle) "cannot be trusted."

The qualifications of Dr. Bill Williams, who led the preparation of the Draft PEIR chapters and appendices dealing with human and ecological health, are provided as Attachment A to this response. Dr. Williams is considered an expert in the field of toxicology of pesticides and is more than qualified to analyze the project's impacts on human and ecological health, particularly impacts associated with the use of glyphosate.

CEQA does not require experts to agree, and the District may rely on the substantial evidence presented in the Draft PEIR. A court's "limited function" under CEQA is to determine if there is "substantial evidence" supporting the agency's conclusions, that is, "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached." (*Neighbors of Cavitt Ranch v. County of Placer* (2003) 106 Cal.App.4th 1092, 1101, quoting *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 393 and CEQA Guidelines § 15384(a); see also, § 21080(e); CEQA Guidelines

§§ 15064(f) and 15384(e) ["substantial evidence" includes not only facts, but also reasonable assumptions and expert opinion based on facts].)

Moreover, there is substantial evidence in the Draft PEIR supporting the glyphosate-related conclusions. The Draft PEIR includes review of numerous studies of the effects of glyphosate use over decades and other material, in particular as reported in Section 7.2.5.1.1 Glyphosate (pp. 7-21 through 7-24). For example, Draft PEIR Section 7.2.5.1.1 provides, in part, the following discussion on the issues of toxicity, carcinogenicity, and endocrine disruption:

> "The lack of a definitive, or more positive statement about linkage of glyphosate to cancer by the WHO panel (2015) is due, in part, because the information and data provided in the updated reports contain numerous confounding factors (such as interactions with personal care products, medications with estrogenic activity, and even the estrogenic activity in some foods and vegetables) that could contribute to the reported results. Because the WHO publication has received so much attention, this claim should be considered, but it is clearly not supported by the work of several other researchers (Rhomberg and Goodman. 2012; Mink et al. 2012) who do not attribute any carcinogenic effects to humans from potential exposure to glyphosate." (p. 7-21).
>
> "The conclusions of the independent panels are in sharp contrast to those of the WHO report. This new panel of experts reviewed all relevant information pertaining to glyphosate exposure, including animal carcinogenicity, genotoxicity, and epidemiologic studies…. As a result, following their compiled results of the review of the evidence, the panels concluded that "the data do not support IARC's conclusion that glyphosate is a "probable human carcinogen" and, consistent with previous regulatory assessments, further concluded that glyphosate is unlikely to pose a carcinogenic risk to humans." (p. 7-22)
>
> "While no reports or information have demonstrated relevant toxicity, endocrine disruption, or carcinogenicity, it is likely that USEPA will continue to provide updated reviews of the potential risks in the next several years, but current data indicate that glyphosate is nontoxic to humans. Concerns about adverse human health effects at high doses are not applicable to the District's proposed activities because those doses would not be replicated under the Program and the herbicidal activities would not occur for any substantial amount of time in any one location, such that the amount of exposure would be negligible. Therefore, the acute and chronic impact on both healthy and physiologically sensitive populations would be less than significant." (p. 7-24)

Further, the commenter states that the Draft PEIR's analysis of the IARC's glyphosate conclusions cannot be trusted. Again, as explained in Section 7.2.5.1.1, there is substantial evidence supporting the Draft PEIR's conclusion that impacts to human health from the use of glyphosate are less than significant. A concept condoned by the IARC panels is the adherence to the "Precautionary Principle" which has been problematic in much of the scientific reporting in Europe. This concept assumes that where the information about a specific risk is contrary or lacking, the societally correct decision might be to declare there is likely an adverse effect without validation. Although this concept could be appropriate in some instances, this concept may actually elicit an unnecessary response that itself results in an unwarranted adverse impact. Its use is not appropriate here because there are decades of peer reviewed published data and reports indicating the safety of approved uses of glyphosate. USEPA and many other regulatory agencies have archives of these data. The IARC inappropriately suggested the use of the Precautionary Principle stating the panel did not have all possible data on glyphosate. There is sufficient information about glyphosate (and other products used by the District) that the potential for an adverse impact can be ameliorated by controlling the characteristics and locations of product applications.

Further, a 2018 report by Tarone, who is an accredited statistician, was critical of the IARC findings of glyphosate being a probable carcinogen and indicated that a re-examination of the animal studies cited by IARC resulted in a contrary finding. The author concluded that the data used was scientifically deficient and could not corroborate the finding by the WHO panel on glyphosate. Tarone reported that the IARC panel highlighted certain positive results from the rodent studies, they relied upon in the deliberations but dispelled or ignored contradictory negative results from the same studies and an inappropriate statistical test was used. The author concluded that when the use of all relevant data from the rodent carcinogenicity studies of glyphosate relied on by the Working Group are evaluated together, it is clear that the conclusion that there is not sufficient evidence that glyphosate is an animal carcinogen is warranted. Even a conclusion that there is limited evidence of animal carcinogenicity would be difficult to support. (Tarone 2018)

The process of evaluation and registration of herbicides and pesticides used by the District is overseen by the USEPA, which released a draft risk assessment in December 2017 concluding that "glyphosate is not likely to be carcinogenic to humans." (USEPA 2017a, available at https://www.regulations.gov/document?D=EPA-HQ-OPP-2009-0361-0068)

As with the potential use of any chemical by the District, if new information about the potential risk of a product becomes available, and it is shown that a scientific consensus indicates that a credible or even a hypothetical risk may be related to the use of the product could present a significant human health risk, it would be re-evaluated for use by the District. Generally, new information is provided and evaluated by any of the regulatory agencies that oversee the registration of these products. Historically, many products have been used, then retired, for use as public health pesticides, when the state of the science has evolved. However, after decades of laboratory and field testing of glyphosate, the best available evidence does not currently support the carcinogenicity of glyphosate.

Response 3

The commenter provides a link to an article (Ahmed 2018) describing a recent court case involving glyphosate and states that Dr. Williams failed to acknowledge the case in his analysis.

The commenter's article was reviewed; and it does not contain scientific evidence, studies, or expert analysis that would change the conclusions in the Draft PEIR.

Recently, the possible association of glyphosate exposure to a specific type of cancer, non-Hodgkin's lymphoma (NHL), has been in the news. The claim of causal connection of glyphosate exposure and this form of cancer is the basis of a lawsuit against Monsanto, the primary producer of glyphosate. The lawsuit contends that an individual contracted this form of cancer after his continued exposure to glyphosate products, as the person responsible for weed control in his workplace. During the trial, he indicated that he was inadvertently drenched with Roundup/Ranger Pro after an equipment malfunction and was exposed to windblown sprays, a possible misuse of the product based on label guidance. It can be argued that the reports cited and exposures were not sufficient to establish that the individual's cancer was caused by glyphosate. The correlations presented by the prosecutors do not clearly provide causality. A universal premise in science is "correlation is not causation." "Weak correlations between the sporadic exposure to glyphosate and onset of Hodgkin's lymphoma are insufficient to assign a finding of reasonable certainty of the source of the cancer." (National Association of Wheat Growers et al. v. Lauren Zeise [Director, OEHHA] and Xavier Becerra [California State Attorney General]).

Many factors aside from chemical exposures are associated with the development of cancer, and the exact cause can be impossible to determine. The American Cancer Society statistics list non-Hodgkin's lymphoma as approximately 4 percent of all cancers and lists the following risk factors as contributing to development of this cancer: age, gender, ethnicity, geography, family history, as well as possible exposure to certain chemicals and drugs.

> "Some studies have suggested that chemicals such as benzene and certain herbicides and insecticides (weed- and insect-killing substances) may be linked to an increased risk of NHL. Research to clarify these possible links is still in progress. Some chemotherapy drugs used to treat other cancers may increase the risk of developing NHL many years later. For example, patients who have been treated for Hodgkin's lymphoma have an increased risk of later developing NHL. But it's not totally clear if this is related to the disease itself or if it is an effect of the treatment." (American Cancer Society 2018)

Furthermore, a trial court case, especially one decided by a jury, is not the same as scientific consensus. Jurists are not scientists and are dependent upon the information and material provided by the attorneys in court. The US Environmental Protection Agency's current draft risk assessment for glyphosate states:

> "The draft human health risk assessment concludes that glyphosate is not likely to be carcinogenic to humans. The Agency's assessment found no other meaningful risks to human health when the product is used according to the pesticide label. The Agency's scientific findings are consistent with the conclusions of science reviews by a number of other countries as well as the 2017 National Institute of Health Agricultural Health Survey." (USEPA 2017b)

As concluded in the Draft PEIR, analysis of the current scientific evidence available demonstrates that the District's proposed use of glyphosate would result in less-than-significant impacts to human health.

Response 4

The commenter states that the two studies provided with their comments on the previous Draft PEIR present evidence to support the commenter's claims that pyrethroids used for mosquito control pose significant negative health risks, and cites the previous Draft PEIR letter from Dr. Robert M. Gould, M.D. on risks to young children and pregnant women.

These letters are contained in Appendix F of the revised Draft PEIR. Appendix F fully responds to this comment, and the District emphasizes again that exposures to chemicals used for vector control by the District are not analogous to exposures to chemical use for agriculture. Unlike agricultural applications, the District may use pesticides for control of adult mosquitoes when no other tools are available and if specific criteria are met, including species composition, population density (as measured by landing count or other quantitative method), proximity to human populations, and/or human disease risk.

Again, Section 7.2.7.2.2 (pp. 7-31and 7-32) of the Draft PEIR provides substantial evidence demonstrating that the District's proposed use of pyrethroids will result in a less-than-significant impact to human health. Table 7-4 of the Draft PEIR explains that pyrethrins and pyrethroids in the District's IMVMP Plan are all considered to have human toxicity effect thresholds that are nontoxic to very low.

Finally, the previous response to Dr. Robert M. Gould includes the following (Appendix F, O-PSR):

> "The District's objective is to reduce or minimize the possibility of unwanted nontarget effects in the local environment while addressing the need for vector control. These considerations and how unwanted effects can be eliminated or reduced are embodied in the Program objectives, in product label instructions, and in each of the applicable BMPs that guide all pesticide applications by the District. By restricting chemical applications to times when nontarget insects are not active and using care to treat only vector larvae and adults in locations where they are concentrated (i.e., population is high enough to warrant chemical control) and in close proximity to human activities, impacts to other species are eliminated or substantially reduced. Once a pesticide has been released into the environment, it can be broken down by exposure to sunlight (photolysis), exposure to water (hydrolysis), exposure to other chemicals (oxidation and reduction), microbial activity (bacteria, fungi, and other microorganisms), and other plants or animals

> (metabolism). Pesticide labels set out safety and use guidelines that usually focus on three aspects: rates of application (single and cumulative) for registered crops and pests, timing of application, and restrictions on areas of application (including required buffer zones).” (p. 3-2)

Dr. Gould’s (and the commenter’s) concerns about nontarget exposure are also addressed by District practices (i.e., BMPs, as described on pages 7-15 through 7-17 of the Draft PEIR), including public notifications for fogging.

Response 5

Commenter does not dispute that other factors may be involved, but asserts that pyrethroids pose risk of potential impact to human health by contributing to ASD and DD and cites the UC Davis CHARGE study (Shelton et al 2014).

See Response 4 above. The District notes that, the authors of the UC Davis CHARGE study do not provide likely exposure timing and relative distance of applications to specific cases of onset of ASD/DD. Without the important direct links of application and demographic information, the epidemiological conclusions cannot be validated by the District’s experts.

As explained in Sections 7.2.7.2.1 and 7.2.7.2.2 of the Draft PEIR, applications resulting from typical District vector control operations using pyrethrin and pyrethroid products are appropriate for District vector control, and the District’s BMPs minimize the amount of exposure such that impacts to human health are less than significant. The actual potential exposures are far below the levels resulting from agricultural applications.

Finally, as stated in Response 1, CEQA allows disagreement among experts, and any such disagreement does not invalidate the PEIR. There is substantial evidence in the Draft PEIR to support the conclusions pertaining to District use of pyrethrins and pyrethroids.

Response 6

Commenter states that the District should not ignore the risk of the potential impact of pyrethroids contributing to ASD and DD.

See Response 4 above. The District evaluated and analyzed the potential impacts associated with pyrethroid use and found that the risk of impacts to human health is less than significant.

Response 7

The commenter states that the PEIR “dismissed” the fact that children could come into contact with pesticide residues after fogging operations.

The amount of pyrethroids or other pesticides contacting the ground surface as a result of fogging using the Ultra Low Volume (ULV) method is a small fraction of the fogging material concentration and is below any meaningful level of concern, as determined by USEPA risk assessments (USEPA 2008). Therefore, using the published values for the half-life in soil is not likely to be a meaningful metric of safety. The degradation rate assumes a lack of exposure to sunlight, which will rapidly break down the active ingredient into its less active constituents (Meyer et al. 2013). When applied to the air using the ULV method, pyrethroid products are unlikely to reach the soil surface in meaningful amounts. Due to the low amount of product reaching the surface, it is not likely to be adequate to penetrate the soil surface below the level that would be subjected to breakdown by sunlight.

In support of a realistic estimate of the breakdown of a pesticide, USEPA conducted an Occupational and Residential Exposure/Risk assessment for etofenprox in 2008. This study was used to quantify the amount of residue likely to be deposited on turf after a public health mosquito fogging. The results of the study provided a conservative Margin of Exposure (MOE) after a ULV application combined (inhalation

and incidental oral from ground residue) exposure to toddlers which was an MOE of 240,000. An MOE of >100 is generally considered safe by USEPA. (USEPA 2008)

The simple assumption that young children will be exposed and adversely affected by mosquito fogging applications is not supportable in that the District does not, and will not, likely apply pyrethroids (or generally any other pesticides) broadly to areas specifically designated for play by children, unless specific public health concerns warrant such actions.

If adult mosquitoes are invading residential areas in close proximity to mosquito breeding sites, or if they are breeding in underground storm drains because water ponds and does not drain properly, then the District's IVM principles would require using nonchemical methods first to control the breeding population, followed by the use of larvicides. ULV fogging or aerial applications to control adult mosquitoes are infrequent and done to protect public health and only occur after all other methods of mosquito control have occurred. Aerial adulticiding is often the only means available to cover a very large area quickly in case of severe mosquito outbreaks or vector-borne disease epidemics. The District has not needed to do any large scale aerial adulticiding to date and would only do so in the case of an extensive outbreak of disease or other commensurate public health risk in an area larger than what could be covered by trucks in a few days. The combination of ULV applications of pyrethroids to the air and direct application of the adulticide to foliage of the target vegetation would markedly limit or prevent contact with soil, eliminating any direct exposure to children in outdoor play areas.

Response 8

The commenter cites NIH as a source of data on persistence of pyrethroids and focuses on degradation in soils. See https://www.ncbi.nlm.nih.gov/pubmed/12132343.

The commenter incorrectly cites a study by the NIH on permethrin persistence in soil and, in fact, the study is not by NIH but by Laskowski (2002). It provides a range of persistence values on soil and in water with specific conditions of the tests at the time. The report by Laskowski includes some specific half-life data with the explanation of test conditions associated with the study. The results are within the wide range of values reported by many other scientists and do not suggest that his data is representative of all conditions.

The scientific literature is filled with studies that evaluate the persistence of chemicals on soils, and USEPA is a repository of these studies submitted in pursuit of product registration. A source for this information is the USEPA documents in the Science Inventory. As in all studies that evaluate the persistence and half-life of chemicals after direct application to soils, persistence varies from a few hours to days. The variable that drives the differences are based on the specific physio/chemical characteristic of the soil and the sunlight reaching the product (Washington et al. 2017).

The comment that the half-life of the pyrethroids in soil suggests that the potential for significant exposure to the pesticide occurs after fogging is problematic. The primary issue in this assessment is that the exposure is key, and the concentration in the soil at the point of exposure is an extremely small fraction of the fogging concentration. In fact, the amount of pyrethroids contacting the ground surface as a result of fogging using the ULV method is likely to be so minimal as to be below any meaningful level of concern. Therefore, the half-life of original product in soil does not provide a realistic estimate of the concentration of product on the soil after fogging. The published degradation rate cited in the comment assumes a lack of exposure to sunlight. The pyrethroids used break down much faster when exposed to sunlight than when below the ground surface in soil as indicated in a TEACH database of Toxicity and Exposure Assessment for Children's Health (USEPA 2007). When applied using the ULV method, pyrethroid products are unlikely to penetrate the soil surface and so would not remain available for an extended period.

As explained in Response 7 above, USEPA risk assessments have determined that public health applications of pyrethroids for mosquito control are unlikely to result in a level of residue that presents a

health risk to children. Additionally, the District does not apply pyrethroids broadly to areas where children play, unless specific public health concerns warrant such actions.

Response 9

The commenter states that the District's fogging technology is designed to reach homeowners' backyards, and that public parks and schools are in areas that have been treated.

As explained in Section 2.3.5.1.2 of the PEIR, the District's technology employed for ground adulticiding is designed to appropriately dispense material in amounts safe for human health, and it is performed as follows:

> "The most common form of adulticide application is via insecticide aerosols at very low dosages. This ultralow volume method is commonly referred to as the ULV method. This method employs truck-mounted, handheld or backpack sprayers for ground applications. Barrier or residual treatments for adult mosquitoes consist of an application using a material generally applied with a compressed air sprayer to the preferred foliage, buildings, or resting areas of the mosquito species. Cold aerosol generators, cold foggers, and ULV aerosol machines were developed to eliminate the need for great quantities of petroleum oil diluents necessary for earlier fogging techniques. These units are constructed by mounting a vortex nozzle on the forced air blower of a thermal fogger. Insecticide is applied as technical material or at moderately high concentrations (as is common with the pyrethroids), which translates to very small quantities per acre and is, therefore, referred to as ULV.…As with all applications, staff follow label requirements and District protocols and BMPs to guide the decision-making process. The optimum sized droplet for mosquito control with cold aerosols applied at ground level has been determined to be in the range of 5 to 20 microns." (p. 2-49)

Moreover, as stated in the Draft PEIR the District does not apply pyrethroids broadly to children's play areas (see, e.g., Section 7.2.7.2.1); however, the District has at times fogged in the vicinity of such play areas. The District only fogs in residential areas when specific public health concerns warrant such actions.

Response 10

The commenter asks the District to "greatly expand and elaborate on notifications given to the public, both before and after fogging."

The District's standard notification procedures for adult mosquito control are as follows:

> Notify city manager or designated alternate contact of affected city/cities Issue media release and distribute to media contacts and media release subscribers

> Send alert to Adult Mosquito Control and Public Health Alerts subscribers

> Post on District website (front page and adult mosquito control updates section)

> Post on District social media accounts (currently Facebook and Twitter)

> Post on Nextdoor.com in affected neighborhoods

> Add a pre-recorded message to the overnight voicemail on the main phone line

> Coordinate with communication staff or other contacts at affected city/cities for additional notifications as feasible and desired, including:

  - signage in the treatment area (District signs and/or the city's signs)
  - email contact lists or e-newsletters used by affected city/cities

- other email or phone alert systems used by the city/cities
- posts to city/cities social media accounts
- posts by city/cities on Nextdoor.com
- posts to social media groups or message boards covering affected city/cities
- other outreach methods used by the affected city/cities

The District's ability to post signs on the street or by the entrances to parks and schools as requested by the commenter is sometimes curtailed by city or landowner ordinances, policies, or requests. In one adult mosquito control operation performed this year, staff posted large conspicuous signs at the major entrances and exits to the treated neighborhood. This signage was done in response to HCA comments on the initial Draft PEIR.

Response 11

Commenter wants public notifications to acknowledge potential negative health risks associated with pyrethroid exposure and cites prior Exhibits 1 and 2 to its previous letter, which are contained in Appendix F, Responses O-VOL 38 and 39.

See Responses 4 through 9 above. The commenter's prior Exhibits 1 and 2 in Appendix F, Comment letter O-VOL Response 38 and 39 have been addressed, and the District does not agree with the commenter's conclusions regarding its use of pyrethroids.

Response 12

Commenter wants public notifications to acknowledge that pyrethroid residues may persist in sand and soils for weeks or months after fogging.

See Responses 4 through 9. In addition to the information provided in Responses 4 through 9 above, as well as the conclusions contained in the revised Draft PEIR, the claim that pyrethroid residues may persist in sand and soils for weeks or months after fogging is not relevant to the fogging approach used by the District. The studies indicating extended availability on soil are lab/field studies that apply the active ingredient (depending on the specific pyrethroid and conditions) directly to the soil and timed collections of samples evaluated. Under these test conditions, the persistence of these products can vary from hours to several days. However, the applications in those tests were not conducted using fogging methods. The amount of product that reaches and persists on soil and sand surfaces after fogging is an extremely small fraction of the product concentration. Fogging is essentially a mist applied in the air and not directly to the ground, and droplets that reach the ground are not similar to the direct application to soils as is in the listed persistence values. In the presence of sunlight, pyrethrins break down rapidly in water and on soil and plant surfaces. Half-lives are 11.8 hours in water and 12.9 hours on soil surfaces. Pyrethrins also adhere to soil and have a very low potential to move through soil towards ground water. In field studies, pyrethrins were not found below a soil depth of 15 centimeters. Soil half-lives of 2.2 to 9.5 days have been reported by Meyer et al. (2013) when applications have been directly to soil surface.

Response 13

Commenter wants public notice to acknowledge that children playing and digging in sand/soil within the fogged area may come into contact with known toxins.

See Responses 4 through 9, 11, and 12 above.

Response 14

Commenter provides a statement that parental decisions on allowing children into play areas can only be made with robust and transparent disclosure of known health risks.

Responses 4 through 13 address this concern. The District provides public notice of its actions pursuant to Response 10.

Response 15

Commenter is concerned that the District should increase the number of methods used for public notifications. Commenter states that current methods are reaching a minority of County residents and asks the District to include public notices via the County Alert system and large signs at public parks and schools.

Response 10 describes the myriad of measures taken by the District to inform the public of vector control activities. Some statistics on the use of these, and additional outreach activities, are provided below:

> The District currently has 436 Twitter followers and 313 Facebook subscribers to their social media posts.

> The District often utilizes Nextdoor.com to share targeted public health and vector control information to residents who reside in areas affected by current vector conditions or District operations. In October 2018, the District sent an informational post about standing water and mosquito prevention to the entire Service Area. This post was viewed by more than 30,000 users and received nearly 200 “Thanks” from Nextdoor.com subscribers.

> District representatives staffed information booths at 11 public events (festivals, farmers markets, fairs) during Fiscal Year 2017/18.

> Presentations were given at 14 community group or city government meetings during Fiscal Year 2017/18.

> The District website received nearly 30,000 visits during Fiscal Year 2017/18.

> The District maintains its own email alert system for residents who would like to specifically receive mosquito treatment and public health alerts. There are currently over 700 email list subscribers. Residents are encouraged to sign up to receive these alerts on the District website at www.smcmvcd.org.

The District does not use the SMC emergency alert system (SMC Alert) to announce adult mosquito control operations for the following reasons:

> Adult mosquito control applications are not considered an emergency by the County, even though they are conducted as a part of control efforts to defend against an existing public health threat.

> These alerts are typically used to communicate urgent public safety announcements such as fires or floods, wildlife alerts, or unplanned road closures due to accidents. Adult mosquito control events do not fit into these categories.

> There is no particular action or precaution being requested or required of residents who live in an adult mosquito control area.

> SMC Alert is an opt-in, subscription service; it does not reach residents who have not already expressed interest in receiving emergency alerts.

References

The following references are in addition to the PEIR references contained in Chapter 17 of the Draft PEIR or its appendices:

Ahmed, Amel. 2018. Monsanto Found Guilty in Landmark Cancer Case Trial. KQED Science, August 10. Available at https://www.kqed.org/science/1927142/san-francisco-jury-to-rule-whether-monsanto-caused-bay-area-mans-cancer.

American Cancer Society. 2018. Non-Hodgkin Disease, Causes, Risk Factors, and Prevention. Available at https://www.cancer.org/cancer/non-hodgkin-lymphoma/causes-risks-prevention.html.

Laskowski, D.A. 2002. Physical and chemical properties of pyrethroids. Rev Environ Contam Toxicol.174:49-170.

Meyer, B.N., C. Lam, S. Moore, and R.L. Jones. 2013. J Agric Food Chem. May 22;61(20):4702-8. Laboratory degradation rates of 11 pyrethroids under aerobic and anaerobic conditions.

Tarone, R.E. 2018. On the International Agency for Research on Cancer classification of glyphosate as a probable human carcinogen. *European Journal of Cancer Prevention* Jan; 27(1):82-87.

US Environmental Protection Agency (USEPA). 2007. Permethrin & Resmethrin (Pyrethroids), TEACH Chemical Summary. Available at https://nepis.epa.gov/Exe/ZyPDF.cgi/P100BNR5.PDF?Dockey=P100BNR5.PDF.

US Environmental Protection Agency (USEPA). 2008. Etophenprox: Occupational and Residential Exposures/Risk Assessment for Proposed Section 3 Uses on Rice and as ULV Mosquito Adulticide. Available at https://www3.epa.gov/pesticides/chem_search/cleared_reviews/csr_PC-128965_9-Jun-08_a.pdf.

US Environmental Protection Agency (USEPA). 2017a. Glyphosate, Draft Human Health Risk Assessment in Support of Registration Review. Available at https://www.regulations.gov/document?D=EPA-HQ-OPP-2009-0361-0068.

US Environmental Protection Agency (USEPA). 2017b. EPA Releases Draft Risk Assessments for Glyphosate. Available at https://www.epa.gov/pesticides/epa-releases-draft-risk-assessments-glyphosate.

Washington, J., T. Jenkins, J. Jones, C. Stevens, and E. Weber. 2017. Efforts to estimate pesticide degradation rates in subsurface vadose and aquifer materials. Environmental Modeling Public Meeting, Washington DC, June 28, 2017.

The following references were in Draft PEIR Chapter 17 or its appendices:

Mink, P.J., J.S. Mandel, B.K. Scheurman, and J.I. Lundin. 2012. Epidemiologic studies of glyphosate and cancer: a review. *Regul Toxicol Pharmacol*. 63(3): 440-452.

Rhomberg, L.R., and J. Goodman. 2012. Low-dose effects and nonmonotonic dose responses of endocrine disrupting chemicals: has the case been made? Regul. Toxicol. Pharmacol. 64: 130-133. Available at https://www.sciencedirect.com/science/article/pii/S0273230012001262.

Shelton, J.F., E.M. Geraghty, D.J. Tancredi, L.D. Delwiche, R.J. Schmidt, B. Ritz, .R.L. Hansen, and I. Hertz-Picciotto. 2014. Neurodevelopmental Disorders and Prenatal Residential Proximity to Agricultural Pesticides: The CHARGE Study. *Environmental Health Perspectives* 122 (10): 1103-1110.

World Health Organization (WHO). 2015. Carcinogenicity of tetrachlorvinphos, parathion, malathion, diazinon, and glyphosate. International Agency for Research on Cancer Monograph Working Group, IARC, Lyon, France. March 20.

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Attachment A – Resume of Bill A. Williams

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Bill A. Williams PhD

Current Position
Senior Consultant & Risk Assessor

Discipline Area
- > Ecological & Human Health Risk Assessments
- > Natural Resource Damage Assessments
- > Environmental Site Assessments
- > Probabilistic Risk Assessments
- > Toxicology
- > Biomarker Research
- > Mitigation Strategies

Years' Experience
40 Years

Joined Cardno
2009

Education
- > National Academy of Sciences Post-Doctoral 1968-1970
- > PhD, Physiology & Biophysics, University of Illinois, Urbana, 1968
- > MS, Physiology & Biophysics, University of Illinois, Urbana, 1965
- > BA, Physiology & Biophysics, University of California, Berkeley, 1963

www.cardno.com

Summary of Experience

Dr. Williams has more than 40 years of experience and expertise in environmental risk assessment and toxicology including CERCLA, NRDA, NEPA, and CEQA projects ranging from upland to sediment to freshwater/marine projects. Dr. Williams has been a member of numerous international, National Academy, and federal committees and workshops to define risk assessment guidelines, test procedures, field study approaches, and avian and mammalian test protocols, and provide other technical assistance utilized by USEPA regulators. He helped develop USEPA's Framework for Ecological Risk Assessment and USEPA's risk assessment of 2,3,7,8 TCDD. He has been a member of several past USEPA Science Advisory Panels and will support the FIFRA SAP for 2019. He was a charter member of the Avian Dialogue Group, convened by the Conservation Foundation (RESOLVE) to bring industry, academia, and government regulators together to resolve conflicts between the groups. Dr. Williams has led and supported dozens of successful projects that were acceptable to the Washington Department of Ecology, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, US Environmental Protection Agency, Region X, and numerous other USEPA regions nationwide. Dr. Williams has served on several Oregon DEQ advisory science committees and workshops. He has been a member of several national and regional EPA Science Advisory Panels, including the SAP panels on endocrine disruptors, uncertainty in risk assessments, and the panel on use of laboratory data in estimates of risk to wildlife.

Significant Projects

Expert Witness-Senior Consultant- Ecological Risk Estimates and Development of Integrated Pest Management Guidance for Pesticides for Mid-Peninsula Open Space District, Los Altos, California.

Dr. Williams provided strategic and scientific support in the development of an Integrated Pest Management (IPM) system for use by the Mid-Peninsula Open Space District. The IPM is tailored to the vectors of concern, the pesticides and herbicides used by the District, and potential risk to the non-target aquatic and terrestrial species. Pesticides incorporated into the IPM were based on evaluations of the use of more than 20 herbicides (with emphasis on use of glyphosate in regional wildland areas for control of over 60 invasive plant species), dozens of insecticides, structural and nuisance agricultural and urban pests, and selected regional wildlife pests. The IPM developed for the District included control of ants, cockroaches, wasps and flies, ticks, and mosquitoes. The IPM plan included recommendations for establishing and conducting pest identification, conducting damage assessments, establishing tolerance levels and several tiers of proposed vector control that addressed top to bottom elements of implementation strategies. The IPM delivered to the District included more than 120 pages of evaluations and recommendations, including extensive quantitative Ecological and Human Health Risk assessments. Dr. Williams prepared and supported draft and final documents and graphics for use in public meetings relating to the results of the studies.

Affiliations

- Society of Environmental Toxicology & Chemistry
- Pacific Northwest Society of Environmental Toxicology & Chemistry

Expert Witness-Senior Consultant- Ecological Risk Estimates and Development of Herbicide Risks to Non-target vegetation and Wildlife in California Wildfire Areas for the California Department of Forestry & Fire Protection (CAL FIRE).

Dr. Williams provided scientific reviews and risk assessments addressing the potential adverse effects of CAL FIRE herbicide use to reduce the potential for and mitigation of wildfires in California. The Vegetation Treatment Program (VTP) project included evaluation of potential adverse impacts of herbicides used in forestry and rangeland to control brush and grasses and for maintenance of areas that have been previously cleared of heavy vegetative fuels. The primary herbicides of concern in the evaluation were the numerous products containing glyphosate as the active ingredient. Glyphosate was one of the most effective herbicides for control of the vegetation that provides potential fuel for wildfires. Control of this vegetation is the target of the CAL FIRE VTP management process statewide. Because vegetation control treatments are not appropriate in all locations and can cause environmental impacts, the recommendations were designed for site specific conditions in the wide range of wildfire environments in the State. In response to the need for their VTP, comprehensive guidelines were developed for the practical management and operation of the VTP including prioritization, selection, assessment, and mitigation of appropriate vegetation treatments. The reviews and documents provided to CAL FIRE for its Vegetation Treatment Program provides the framework that is being used for the implementation of appropriate fuels treatments across non-federal lands in California.

Senior Consultant- Ecological Risk Estimates of Pesticides for Nine Mosquito/Vector Control Districts, Northern California

Dr. Williams is providing strategic and scientific support in the development of the ecological and human health assessments of commercial pesticide product applications (46 active ingredients and adjuvants) for the control of mosquitoes and other vectors of human diseases and discomfort in nine counties of California. Providing impact analyses for both chemical and nonchemical treatment methods of control in Programmatic Environmental Impact Reports (under CEQA) for the nine districts/agencies in the San Francisco Bay Area and Monterey County. . The impact analyses considered the toxicity and fate and transport of the active ingredients based on a literature review including ultra-low volume (ULV) spray applications. Also included were herbicides for the control of mosquito-breeding habitat.

Senior Consultant/Technical Advisor/Ecological Risk – Passaic River Project, Newark, New Jersey, Passaic Coordinating Partners Group (CPG)

Providing strategic and conceptual support to a member of the CPG for their Passaic River facility. Developing strategy and proactive approaches to CERCLA and NRDA mitigation and restoration options. Working with CPG member to define their potential risk, and strategy for acceptable allocation within the Consortium of PRPs on the Passaic River. Providing comprehensive evaluation of Ecological and Human Health risks. Providing on-going technical review of all on-going work, including existing work plans, schedules, and work elements to develop new plans and approach to streamline the schedule and to reduce costs.

Senior Consultant- NRDA-Gulf of Mexico

Dr. Williams is on the Cardno NRDA team responding to the Deepwater Horizon accident and oil spill in the Gulf of Mexico on behalf of BP Exploration & Production Inc. (BP). Bill has provided support to the Terrestrial Mammal and Bird Technical Working Groups (TWG) and participated in the design or implementation of the cooperative NRDA studies included in those TWGs.

Senior Consultant- Ecological Risk Estimates of Contamination at a Golf Course in Southern California

Dr. Williams provided strategic and scientific support in the development of the risk estimates of commercial use and application of herbicides for the control of unwanted vegetation of California. Prepared documents and graphics for use in discussions and public meetings relating the results of the studies. Confidential Client.

Senior Scientist – Evaluation of Mercury and Other Contaminants in Outfall Plumes, Port Gamble, Washington and Mare Island Site, City of Vallejo

Evaluated and critiqued contaminants detected in facility outflow, and estimate risk to aquatic and terrestrial resident and endangered species. Prepared presentation approaches and materials for discussions with U.S. Environmental Protection Agency (EPA) Region 10.

Senior Project Manager – Ecological Risk Assessment, Whitefish River, Montana, Burlington Northern Santa Fe

Developed an ecological risk assessment for a river adjacent to a railroad fueling facility. Reviewed results of initial sampling of sediment in the river to identify preliminary chemicals of potential ecological concern, and then prepared a sampling and analysis plan for additional studies needed to conduct the risk assessment, including co-located sediment and benthic samples. Compared the results of the benthic community analysis with chemical data for co-located sediment samples to evaluate whether chemicals in sediment were resulting in toxicity to the benthos or whether physical conditions were responsible for changes in the benthic communities. The risk assessment estimated potential risks to resident and endangered ecological receptors, and identified protective sediment concentrations of PAHs and PCBs for the most sensitive ecological receptors.

Senior Project Manager – Probabilistic Risk Assessments, Southeastern U.S.; FMC Corp. and American Cyanamid, Princeton, New Jersey; and Novartis, Inc. and Rhone Poulenc, Durham, North Carolina

While employed by Kennedy Jenks, conducted probabilistic risk assessments to assess potential risks from application of pesticide to agricultural crops in southeastern United States. This risk assessment was conducted to evaluate numerous application and exposure scenarios that might result in risk to aquatic and terrestrial resident, endangered, and other non-target wildlife. Results from these studies are being used to evaluate the potential use of probabilistic risk assessment to evaluate the appropriateness of EPA restrictions on the labeling of the pesticide.

Senior Risk Assessor – Human Health and Ecological Risk Assessments, Spokane, WA, Teck Cominco America

Provided strategic support and risk assessments for a potential Superfund listing for Lake Roosevelt, Washington Presented approaches to EPA Region 10 for the development of the characterization, RI/FS, and potential NRDA for Lake Roosevelt. As Senior NRDA advisor and risk assessor, provided strategic support and risk assessments in support of a potential Superfund listing for Lake Roosevelt. Aquatic, sediment, and upland sources in the lake were being characterized for the potential cleanup of metals and other contaminants.

Expert Witness – Ecological Risk Assessment, Columbia River Basin, Bellevue, Washington, Northwest Pulp and Paper Association,

Provided expert evaluation and testimony concerning the impact of pulp and paper effluents, including dioxin and other organochlorines, on populations of Bald Eagles in the Columbia River Basin. The focus of the project was to determine the extent of potential exposure and possible effects of pulp mill operations on the Bald Eagle population in the Columbia River Basin. An ecological risk assessment was conducted that focused on the

reproductive success and population dynamics of resident and endangered species, especially the Bald Eagles in the region. As a result of the assessment, it was concluded that the number of nesting pairs of Bald Eagles in the region had far surpassed the U.S. Fish and Wildlife Service Recovery goals, and that the population of eagles in the region was actually vigorous and strong. The results of the study were presented at open congressional hearings and to the Department of Interior. Shortly thereafter, DOI changed the listing from Endangered to Threatened with caveats for several regions.

Consultant – Human Health Risk Assessments, Klamath Falls, Oregon

Provided strategic support and risk assessments for a site contaminated with asbestos and heavy metals. Developed sampling and analysis protocols, data objectives, and soil risk triggers for adults, children, and pets. Provided several risk scenarios for exposure to both the buried and surface asbestos, including evaluation of ACM and inert moieties. Provided expert testimony and presentations for the plaintiffs.

Senior Risk Assessor – Ecological Risk Assessment, Eugene, OR, L.D. McFarland, Colorado

Provided an ecological risk assessment of pentachlorophenol and copper on freshwater fish and other aquatic species. Provided study plan, sampling plan, and fish residue testing oversight. Provided complete review of aquatic residue data, including hazard and exposure data for use in the preliminary ecological risk assessment. The focus was the impact of a spill of lumber treatment products on fish and benthic invertebrates in two small sport-fishing ponds. The spill included products containing creosote and substantial amounts of PCPs. Although there was substantial mortality of some fishes, it was determined that the impact would be short-lived, and that the ponds could be used for sport fishing after a period of a few months without additional mitigation. The results and recommendations of the project were accepted by the Oregon Department of Fish and Wildlife.

Senior Risk Assessor – Environmental Risk Assessment, Refinery Terminal Site, Willamette River, Portland, Oregon, Texaco/Equilon

Conducted human health and ecological risk assessments focusing on the potential risk of upland operations and river sediments at a refinery terminal site on the Willamette River. Constituents of concern included benzene, toluene, ethylbenzene, and xylene (BTEX); metals; and PAHs. The project was conducted according to the Oregon Department of Environmental Quality Risk Assessment guidelines.

Senior Risk Assessor – Environmental Risk Assessment, Nine Navy Bases in the San Francisco Bay Area, San Bruno, California, U.S. Navy

Conducted human health and ecological risk assessments for nine Navy bases in the San Francisco Bay area. Developed and instituted guidance for Feasibility Study Design, and provided mitigation strategies based on protective concentrations of contaminants acceptable to the Regional Boards, the U.S. Navy, and other regulators. Project involved use of innovative approaches to refining ecological estimates of exposure to higher trophic level receptors. Approach included site-specific and realistic estimates of doses to receptors using probabilistic techniques, and resulted in the innovative approach to development of "protective chemical levels" (PCLs) still in use by regulators and other environmental assessors.

Senior Risk Assessor – Environmental Sampling and Risk Assessment, Walnut Creek, California, Carollo Engineers

Provided project and sampling plan oversight and scientific support to a risk-based analysis of the contribution of publicly owned treatment works (POTW) effluent to waterways, including risk to aquatic organisms and birds at sites in northern California. Risk assessment has focused on effluents and contamination according to the National

Toxics Rule, the California Toxics Rule, and EPA Ambient Water Quality Criteria guidelines. Constituents evaluated included organics, metals, and PAHs.

Senior Risk Assessor – Ecological Risk Assessment, Washington, DC, U.S. Environmental Protection Agency (EPA)

Produced a series of wildlife toxicity profiles for PCBs for use by EPA as guidelines for acceptable exposure levels of PCBs to birds and mammals. In addition to acute toxicity profiles, the report also presented thresholds and acceptable exposure levels for reproduction, growth, and immunological endpoints. The report was used as a preliminary guideline, and was incorporated into EPA wildlife exposure handbooks

Senior Risk Assessor – Ecological Risk Assessment, Washington, DC, EPA

Developed position documents for the EPA Office of Toxic Substances for the risk of dioxin to terrestrial wildlife methods to provide predictive impacts on birds and mammals. In addition to acute toxicity profiles, the report also presented thresholds and acceptable exposure levels for reproduction, growth, and immunological endpoints. The report was used as a preliminary guideline, and was incorporated into EPA wildlife exposure handbooks for dioxin.

Senior Risk Assessor and Expert Witness – Ecological Risk Assessments, Various Locations, Multiple Clients

While at EP&T, developed a series of comprehensive ecological risk assessments for new agricultural chemicals proposed for registration and chemicals due for re-registration according to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Risk assessments included predictive risk to non-target aquatic and terrestrial wildlife. The results of the studies were prepared in formats acceptable to the state and EPA regulators. Clients included American Cyanamid, Princeton, NJ; Rhone-Poulenc, Durham, North Carolina; Ciba Geigy Company; and Dow Chemical.

Workshops and Invited Panel Member

> Invited Speaker, "Implementing Probabilistic Ecological Assessments: A Consultation". National Academy of Sciences Advisory Panel to USEPA. Washington, DC. April 5-7, 2001.

> Invited Instructor. "Ecotoxicology for Hazard Communication". Society of Chemical Hazard Communication Annual Meeting. Washington, DC. October 3, 1999.

> Invited Panel Member, "Review of Probabilistic Risk Assessment for Chlorfenpyr". National Academy of Sciences Advisory Panel to USEPA. Washington, DC. September 23-24, 1999.

> Invited Panel Member, "Uncertainty Analysis in Ecological Risk Assessments" SETAC Workshop. Pellston, Michigan. August 1995

> Invited Panel Member, Session Chair, SETAC/OECD Joint Workshop on Avian Toxicity Laboratory Testing. Pensacola, Florida. December 4-7, 1994.

> Program Chair. Ecotoxicological Principles for Avian Field Studies. SETAC Pellston Workshop on Radiotelemetry for Avian Field Studies. Asilomar, California. January 1993.

> Invited Panel Member, "Wildlife Criteria External Advisory Panel". Washington State Department of Ecology. Olympia, Washington. 1994-1998

> Invited Panel Member, "Environmental Effects Assessment Workshop", USEPA, Office of Hazardous Waste. Seattle, Washington. July 24-28, 1988.

> Invited Charter Member, "Avian Field Testing Dialogue Group", The Conservation Foundation. Washington, DC. 1988-1992.

> Invited Panel Member, "Risk Assessments for Land Application of Pulp and Paper Mill Sludge", USEPA Workshop on Dioxin. Baltimore, Maryland. September 1991.
> Invited Panel Member, Session Chair, SETAC Pellston Workshop on the Population Ecology and Wildlife Toxicology of Agricultural Pesticide Use: A Modeling Initiative for Avian Species. Kiawah Island, South Carolina. July 1990.
> Panel Member, "Standing Committee on Ecotoxicology of the Risk Assessment Council, USEPA, Washington, DC. 1987-1988.
> Invited Panel Member, "Terrestrial Environmental Risk Assessments" in the Organization of European Council of Development" Conference, Wash, DC. June 13-17, 1988.
> Chair and Panel Member "Critical Ecosystems of Concern," Oregon State University. September 1987.
> Invited Panel Member, SETAC Conference, "Research Priorities in Ecological Risk Assessment," Breckenridge, Colorado. August 1987.

Chair/Session Organizer Technical Meetings

> Session Chair: Emerging Pollutants. Society of Environmental Toxicology and Chemistry. November 14-18, 2004. Portland, Oregon.
> Organizational/Program. Pacific Northwest Society Environmental Toxicology and Chemistry. April, 2004. Port Townsend, Washington.
> Session Chair: Applications of Ecotoxicology to Real World Problems. Society Environmental Toxicology and Chemistry. November 7-12, 2003. Austin, Texas.
> Session Chair. Exposure and Effects Endpoints. Society Environmental Toxicology and Chemistry. Austin, Texas. November 7-12, 2003.
> Organizational/Program Co-Chair. Pacific Northwest Society Environmental Toxicology and Chemistry. Portland, Oregon. May 2002.
> National Academy of Sciences Risk Assessment Task Force (1988-1990)
> Wildlife Toxicology Special Session on Acetylcholinesterase Assays in the Field. 10th Society Environmental Toxicology and Chemistry. Toronto, Canada. October 29-November 3, 1989
> ASTM Committee on Field Protocols for Wildlife Population Studies (1987-1990)
> ASTM Committee on Acetylcholinesterase Determination in Field Studies (1988)
> Wildlife Toxicology Session Chair, 8th Society Environmental Toxicology and Chemistry, Pensacola, Florida. November 9-12, 1987.
> Wildlife Toxicology Session Chair, 7th Society Environmental Toxicology and Chemistry, Washington, DC. November 3-6, 1986.
> Acetylcholinesterase Assay Symposium Chairman, VII Society Environmental Toxicology and Chemistry, Washington, DC. November 3-6, 1986.
> Wildlife Toxicology Session, 6th Society Environmental Toxicology and Chemistry, St. Louis, MIssouri. November 8-22, 1985.
> General Conference Chairman, Wildlife Toxicology Symposium, Portland, Oregon. January 1984.

Publications

Selected Book Chapters

- Kapustka, L.A., B.A. Williams, A. Fairbrother, J. Glicken, and R. Bennett. 1996. "Environmental Risk Assessment for Sustainable Cities -- A Position Paper." United Nations Environmental Programme-International Environmental Technology Centre Special Publication # 3. Osaka, Japan.
- Williams, B.A., and J.M. Emlen. 1994. "Population Models as a Research Tool: An Empirical Perspective." In: Wildlife Toxicology and Population Modeling: Integrated Studies of Agroecosystems, pp. 501-508. Kendall, R.J, and T.E. Lacher, eds. Lewis Publishers.
- Williams, B.A. 1993. "Biomarkers in Avian Field Studies: Environmental Toxicology and Risk Assessment." In: ASTM Volume 2 STP 1216, Gorsuch, J.W., F.J. Dwyer, C.G. Ingersoll, and T.W. La Point, eds. American Society for Testing and Materials. Philadelphia.

Selected Journal Publications (Of 55)

- Fairbrother, A., L.A. Kapustka, B.A. Williams, and R.S. Bennett. 1997. "Effects - Initiated Assessments Are Not Risk Assessments." Human and Ecological Risk Assessment: (3), No. 2, pp. 119-124.
- Fairbrother, A., L.A. Kapustka, B.A. Williams, and J. Glicken. 1996. Ecological Risk Assessment Benefits Environmental Management. Sandia Report SAND94 3062 UC - 630. Sandia National Laboratories, Albuquerque, NM.
- Kapustka, L.A., B.A. Williams, and A. Fairbrother. 1996. "Evaluating Risk Predictions at Population and Community Levels in Pesticide Registration - Hypotheses To Be Tested." Environ. Toxicol. & Chem. 15(4), 427-431.
- Williams, B.A., et al. 1994. "Assessing Pesticide Impact in Birds. Final Report of the Avian Effects Dialogue Group (1988-1993)." Resolve, 156 pp., Washington, DC.
- Williams, B.A., and J.M. Emlen. 1994. "Population Models as a Research Tool: An Empirical Perspective." In: Wildlife Toxicology and Population Modeling: Integrated Studies of Agroecosystems, pp. 501-508. Kendall, R.J., and T.E. Lacher, eds. Lewis Publishers.
- Williams, B.A. 1993. "Biomarkers in Avian Field Studies: Environmental Toxicology and Risk Assessment." In: ASTM Volume 2 STP 1216, Gorsuch, J.W., F.J. Dwyer, C.G. Ingersoll, and T.W. La Point, Eds. American Society for Testing and Materials, Philadelphia, Pennsylvania.
- Williams, B.A., et al. 1991. "Assessing Pesticide Impact in Birds. Discussions of the Avian Effects Dialogue Group (1989-1991)." Resolve, Washington, DC.
- Kilbride, K.M., J.A. Crawford, K.L., Blakely, and B.A. Williams. 1992. "Habitat Use by Breeding Female California Quail in Western Oregon." J. Wildl. Manage, 56(1):85-90.
- Bennett, R.S., B.A. Williams, D.W., Schmedding, and J.K. Bennett. 1991. "Effects of Dietary Exposure to Methyl Parathion on Egg Laying and Incubation in Mallards." Environmental Toxicology and Chemistry, 10(4): 501-507.
- Buerger, T.T., R.J. Kendall, B.S. Mueller, T. DeVos, and B.A. Williams. 1991. "Effects of Methyl Parathion on Northern Bobwhite Survivability." Environmental Toxicology & Chemist, 10(4) 527-532.

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Selected Recent Abstracts (Of 105)

> Williams, B.A., J.Q. Word, and W. Gardiner. 2007. Detecting the Presence and Effects of Pharmaceuticals and Personal Care Products in Water Samples. WEFTEC Annual Conference. October 11-17 and September 2007. San Diego, California.

> Williams, B.A., J.Q. Word, and W. Gardiner. 2007. Reducing Effects of Endocrine Disrupting Compounds: Effluent Blending. Water Reuse Assoc. Conference. July 29-30, 2007. Providence, Rhode Island.

> Williams, B. A., J.Q. Word, and W. Gardiner. 2007. Tiered Risk Estimates for Water Reuse: Retrospective estimates of Risk for Industrial Applications. Use of Environmental Benefit Approaches to Estimate Risks. Water Reuse Assoc. Annual Conference June 4-5, 2007. El Paso, Texas.

> Williams, B. A., J.Q. Word, and W. Gardiner. 2007. "It Ain't the Sediment, Dummy": Relative Contribution Of Sediment And Water To PCBs In Fish Tissue. PNWSETAC, April 14-15, 2007. Port Townsend, Washington.

> Williams, B.A., Fuji, T., T.P. Pinit, and L.J. Kennedy. 2005. "Using Relative Risk Assessments to Address Perceived Adverse Environmental Risks." 26th SETAC Baltimore, Maryland. November 13-17, 2005.

> Williams, B.A., L.J. Kennedy, and Taku Fuji. 2005. "Using Risk Assessment To Address Perceived Environmental Risks Associated with Railroad Operations." Railroad Conference, Urbana, Illinois. October 25-27, 2005.

> Williams, B.A., L.J. Kennedy, J.A. Nedoff, and T. Fuji. 2005. "Risk Assessment as a Tool for Emerging Contaminants and Water Quality Decisions." PNW AWWA Meeting, Portland, Oregon. May 4-6, 2005.

> Williams, B.A., J.A. Nedoff, and L.J. Kennedy. 2005. "Risk Assessment as a Tool for Water Reuse Projects: Assessing Emerging Contaminants and Other Water Quality Concerns." Water Reuse Meeting, San Diego, California. February 28 - March 1, 2005.

> Williams, B.A., L.J. Kennedy, and J.A. Nedoff. 2004. "Should Ecological and Human Health Endpoints Be Based on Similar Endpoints?" Society for Risk Analysis Annual Meeting, Palm Springs, California. December 5-8, 2004.

> Kennedy, L.J., J.A. Nedoff, and B.A. Williams. 2004. "How Risky Is Fish Consumption?" Society for Risk Analysis Annual Meeting, Palm Springs, California. December 5-8, 2004.

> Nedoff, J.A., L.J. Kennedy, and B.A. Williams. 2004. "How Few PCB Congeners Can Estimate Total PCBs in Aquatic Biota?" Society for Risk Analysis Annual Meeting, Palm Springs, California. December 5-8, 2004.

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