July 2, 2020

Tracy Perry
Office of Pesticide Programs (OPP)
c/o Regulatory Public Docket Center (28221T),
U.S. Environmental Protection Agency
1200 Pennsylvania Ave. NW.
Washington, DC 20460–0001

Subject: Carbaryl – Draft Biological Evaluation (Docket ID No. EPA–HQ–OPP–2020–0090)

Dear Ms. Perry:

On behalf of the Bay Area Clean Water Agencies (BACWA), we thank you for the opportunity to comment on the Draft Revised Method for National Level Endangered Species Risk Assessment Process for Biological Evaluations (BEs) for pesticides. BACWA's members include 55 publicly owned wastewater treatment (POTW) facilities and collection system agencies serving 7.1 million San Francisco Bay Area residents. We take our responsibilities for safeguarding receiving waters seriously. We are concerned about pesticides entering our wastewater systems that may compromise effluent quality, biosolids reuse, and compliance with NPDES permit requirements.

The purpose of this letter on the precedent-setting carbaryl BE is to identify the POTW-related gap in EPA's BE procedures and to request that EPA modify its procedures to ensure that EPA does not overlook the presence of pesticides in POTW effluents in future BEs.

Why POTWs need to be addressed in BEs

An effective pesticide consultation system is important for POTWs and for nationwide compliance with the Endangered Species Act (ESA). The NPDES permits issued to BACWA's member agencies include requirements that effluent limits and receiving water limits protect the beneficial uses of waters of the State including protecting rare, threatened, or endangered species. Through these Clean Water Act (CWA) permits, water quality regulators make municipalities responsible for meeting ESA requirements.[1]

Since our member agencies – like POTWs across the US – do not have authority to control indoor or other upstream pesticide uses and have no practical control over subsequent discharges, we seek to ensure that the pesticides ESA Consultation process will lead to mitigations that will protect endangered species and their critical habitats. Because our responsibilities extend beyond endangered species to include all other beneficial uses in our receiving water – and we

[1] For example, see City of Palo Alto Regional Water Quality Control Plant and Wastewater System Permit, Order No. R2-2019-0015 (April 10, 2019), Attachment F, Page F-10, Paragraph C.8.

understand that EPA intends for BEs to replace its ecological risk assessments in the future – we also seek to ensure that Office of Pesticide Programs (OPP's) pesticide Registration Review process will lead to mitigation that will protect all beneficial uses of surface waters (not just endangered species).

The Carbaryl BE is the first to align with EPA's Revised Method for National Level Endangered Species Risk Assessment Process for BEs for Conventional Pesticides.[2] Our goals in providing comments on this precedent-setting BE are to support EPA's efforts to develop a solid, functional BE process, and to ensure that both the BE process and EPA's Registration Review appropriately evaluate risks associated with urban pesticide use — and do so in a manner consistent with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the ESA, and the CWA.

Overview of Comments

EPA's BE does not mention exposures to aquatic organisms associated with the presence of carbaryl in POTW effluents. We provide POTW monitoring data from the literature demonstrating that these discharges occur and the carbaryl concentrations sometimes exceed EPA's the BE's toxicity endpoints for some aquatic organisms (e.g., aquatic invertebrate prey for endangered salmonids). We request that EPA evaluate POTW effluent in its carbaryl BE, specifically considering the fact that POTW discharges are continuous. We explain that the BE evaluation must be POTW-specific to provide the information necessary for the Fish and Wildlife Service and National Marine Fisheries Service ("Services") to develop technically and financially feasible measures addressing pesticides that passes through POTWs. Based on this example, we request that EPA modify its BE preparation procedures to ensure that it does not overlook the presence of pesticides in POTW effluents in future BEs.

Carbaryl presence in POTW effluent

Concentrations of at least half a dozen pesticides reported in undiluted POTW effluents – including carbaryl – exceed the US EPA OPP benchmarks for chronic exposure to aquatic invertebrates (see Sutton et al. 2019,[3] enclosed). The "chronic" benchmark comparison is made because POTWs continuously discharge. Sutton et al. (2019) summarized carbaryl effluent monitoring data for 140 samples from 52 POTWs, with reported concentrations from <0.00049 to 0.663 µg/L. The highest of these measurements exceeds the sublethal effects thresholds for aquatic invertebrates identified in the BE (Chapter 2, Table 2-3). We have enclosed the two papers documenting carbaryl detections in effluent.[4] One of these papers (Fairbairn et al. 2015) documented increased carbaryl concentrations downstream from a POTW.

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[2] US EPA OPP EFED (2020). *Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides.*

[3] Sutton, R. et al. 2019. Occurrence and Sources of Pesticides to Urban Wastewater and the Environment. In Goh et al.; *Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management*, ACS Symposium Series 1308; American Chemical Society: Washington, DC, 2019; pp 63-88.

[4] Hope, B. K.; Pillsbury, L.; Boling, B. A State-wide Survey in Oregon (USA) of Trace Metals and Organic Chemicals in Municipal Effluent. Sci. Total Environ. 2012, 417, 263–272; Fairbairn, D. J.; Arnold, W. A.; Barber, B. L.; Kaufenberg, E. F.; Koskinen, W. C.; Novak, P. J.; Rice, P. J.; Swackhamer, D. L. Contaminants of Emerging Concern: Mass Balance and Comparison of Wastewater Effluent and Upstream Sources in a Mixed-use Watershed. Environ. Sci. Technol. 2015, 50, 36–45.

While POTW effluents are often diluted, some are not. Throughout the US, about 23 percent of POTWs have a permitted dilution factor less than 10; in some geographic areas zero or low dilution is very common. For example, treated wastewater effluent makes up more than 90 percent of stream flow for 49 percent of a representative sample of major POTWs in Texas, Oklahoma, New Mexico, Arkansas, and Louisiana.[5] Where multiple POTWs and urban or agricultural runoff discharge into the same water body, the "diluting" waters may also contain the pesticide.

Estimating aquatic exposures to pesticides in POTW effluents

In response to a question during the April 16 webinar on this BE, EPA staff stated that POTW discharge analysis is unnecessary because agricultural discharge would be representative of POTW discharge. We fail to understand how modeling agricultural carbaryl applications and subsequent runoff from a treated agricultural field could provide any scientific insights on the discharges of carbaryl into the sewer system and its subsequent passage through POTW treatment processes.

To illustrate the differences between agriculture and POTWs, please see the table on the next page, which provides an overview of pesticide uses, pathways to surface waters, and management approaches for both agriculture and POTWs (from Moran et al. 2020).[6] A key aspect of POTW modeling that differs from agriculture is that POTWs discharge continuously. EPA's POTW modeling approach specifically considers the fact that POTW discharges are continuous.

Despite a statement by EPA staff during the April 16 webinar suggesting that that modeling POTW discharges of pesticides is infeasible, US EPA has been evaluating POTW discharges from indoor pesticide use and discharges to the sewer system in its pesticides risk assessments since the late 1990s. As described by a US EPA scientific team (Shamim et al. 2014), US EPA uses simplified models like its Exposure and Fate Assessment Screening Tool (E-FAST) in combination with monitoring data and benchtop studies to estimate POTW effluent concentrations.[7] As EPA noted in its pyrethroids ecological risk assessment,[8] *this modeling approach is imperfect, but in combination with monitoring data it has been useful in understanding aquatic risks*.

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[5] Brooks et al. (2006). Water quality of effluent-dominated ecosystems: ecotoxicological, hydrological, and management considerations. *Hydrobiologia* **556:**365–379

[6] Moran, K., Anderson, B., Phillips, B., Luo, Y., Singhasemanon, N., Breuer, R., & Tadesse, D. (2020). Water Quality Impairments Due to Aquatic Life Pesticide Toxicity: Prevention and Mitigation in California, USA. *Environ Toxicol Chem*, **39**(5), 953-966. doi:10.1002/etc.4699

[7] Shamim, M. et al. 2014. Conducting Ecological Risk Assessments of Urban Pesticide Uses. In Jones et al. *Describing the Behavior and Effects of Pesticides in Urban and Agricultural Settings*; ACS Symposium Series 1168; American Chemical Society: Washington, DC, 2014; pp 207-274.

[8] US EPA OPP EFED (2016). Preliminary Comparative Environmental Fate and Ecological Risk Assessment for the Registration Review of Eight Synthetic Pyrethroids and the Pyrethrins. Part I. Assessing Pyrethroid Releases to POTWs of Pyrethroids and Pyrethrins (DP Barcode D425791).

TABLE 1: Overview of agricultural and urban pesticide uses, pathways to surface waters, and management approaches

	Agricultural	Urban	
	Runoff, irrigation tailwater, and drift	Runoff	Municipal wastewater
Pesticide user	Grower; professional applicator, often assisted by pest control advisor	Professional applicator, maintenance gardener, facility manager, building product manufacturer, mosquito abatement agency, or resident	Professional applicator, facility manager, consumer product manufacturer (impregnated materials), sewer collection system agency, or resident
Types of pesticides commonly used	Insecticides, herbicides, fungicides, rodenticides	Insecticides, herbicides, fungicides, rodenticides, antimicrobials	Insecticides, herbicides, antimicrobials
Common pest control examples	Crop pest control, weed control	Structural and landscaping pest control; mosquito abatement; rodent control; swimming pool, spa, and fountain microbial and algae control; building material protection	Pet flea control, indoor insect control, cooling water systems protection, swimming pool and spa microbial and algae control, sewer system root control liquid product preservation, sanitizers and disinfectants, insecticide and antimicrobial fabrics
Pathway	Direct runoff, tile drain, or drainage ditch, drift	Pesticides washed by rainfall or other outdoor flows (e.g., irrigation runoff) into gutters and storm drains that flow through pipes (sometimes ditches) to surface water (no treatment)[a]	Pesticides are washed off (e.g., animals, clothing) or pesticide-containing solutions are discharged to indoor drains that flow through sewer system to municipal wastewater-treatment plants
Water quality regulation requirements	Limited US federal regulation under CWA. Under California state law, many farms are being required to implement management practices for water quality protection	US federal law requires most cities to implement management practices to address pesticide pollution to the maximum extent practicable. Pesticide TMDLs require achievement of the numerical target.	US federal law requires permits that prohibit effluent toxicity. Pesticide TMDLs may establish monitoring conditions which include pesticide and/or toxicity permit limits.

[a]Some older cities have "combined" systems that collect both urban runoff and sewage; these flow to wastewater-treatment plants except when the system is overwhelmed (usually because of rain). During these occurrences, the stormwater/sewage mixture can flow directly into surface water. A small fraction of all urban runoff flows through swales, basins, or other "green infrastructure" (see text).
CWA = Clean Water Act; TMDL = total maximum daily load.

Table Source: Moran et al. 2020

Since the mid-2010s, BACWA has been in dialog with EPA scientists to improve the accuracy of EPA's POTW modeling approach, focusing on improvements that can be made with relatively small investments of EPA's scientific staff resources. We have attached the list of recommended improvements that we have previously shared with EPA on multiple occasions. These include recommendations for estimating POTW discharges, as we agree with EPA scientists that EPA's default approach (assuming 100% of the sales of a pesticide active ingredient is discharged to POTWs) is inappropriate. We appreciate that some of our recommendations, (e.g., effluent dilution factors that recognize the prevalence of "zero dilution" discharges) have been implemented in the current version of the E-FAST model.

POTW modeling is needed to inform POTW-specific mitigation measures

Because local agencies in most states (including California) lack the statutory authority to regulate pesticide use in urban areas, it is essential that EPA and the Fish and Wildlife Service and National Marine Fisheries Service employ the pesticide consultation processes to assess and prevent urban water pollution as defined by the CWA and our NDPES permits. EPA BEs provide information to the Fish and Wildlife Service and National Marine Fisheries Service ("the Services") that forms the basis of their ESA Biological Opinions ("BOs"). When these agencies' scientific evaluations predict that endangered species will be jeopardized or their habitat adversely modified, BOs must identify reasonable and prudent alternatives or measures ("RPAs/RPMs") available for avoiding impacts on endangered species.

If the pesticides ESA Consultation process fails to identify and implement RPAs/RPMs implemented by pesticides users to prevent toxic releases of pesticides to the aquatic environment, an undue burden to address the problem is placed on local governments. Often, there are few ways for a POTW to mitigate a toxic pollutant problem other than extremely costly treatment plant upgrades. In addition, wastewater facilities may be subject to additional requirements established as part of Total Maximum Daily Loads (TMDLs) set for the water bodies by US EPA and state water quality regulatory agencies. The cost to wastewater facilities and other dischargers to comply with TMDLs can be up to millions of dollars per water body per pollutant. It is therefore essential that BEs, pesticide registration, and pesticide registration review processes adequately consider potential impacts to wastewater quality, so that such impacts to the beneficial uses of the receiving water are prevented (i.e., uses and/or discharges associated with endangered species impacts do not occur).

Only with POTW-specific information will it be possible for the Services to develop practical, and technically and financially feasible RPAs/RMPs to address (as necessary) the major uses and discharges of pesticides that pass through POTWs. If, as EPA staff have suggested, agricultural discharges were used to "represent" POTW effluent, the Services would not have the information they require. This would likely lead to inadequate RPAs/RMPs.

Since OPP controls pesticides labels, even our state pesticide regulatory agency cannot readily address pesticide water pollution and compliance with our NPDES permit if the pesticide discharges stem from consumer pesticide products. OPP action is imperative.

BACWA requests that EPA modify BE procedures to ensure POTWs are addressed
Based on this example, we request that EPA modify its BE preparation procedures to ensure that it does not overlook the presence of pesticides in POTW effluents in future BEs. There are two procedural changes that EPA can make:

> (1) EFED can use the detailed label analysis tables developed by BEAD to identify uses with pathways to POTWs. The comprehensive conceptual model on the next page (from Sutton et al. 2019) can be used as the basis for this analysis. It identifies the pathways between pesticide uses and POTWs and illustrates how pesticides used indoors flow to the sewer system, to POTWs, and ultimately into the environment via effluent, air emissions, and biosolids.
>
> (2) When developing a BE, EPA scientists should always be provided the time and resources to:
>
> a) conduct basic scientific literature reviews (a basic review can be accomplished using online resources such as Google Scholar and PubMed) and
> b) consult with EPA's agency partners (e.g. California Department of Pesticide Regulation, USGS) to obtain POTW monitoring data for pesticides.

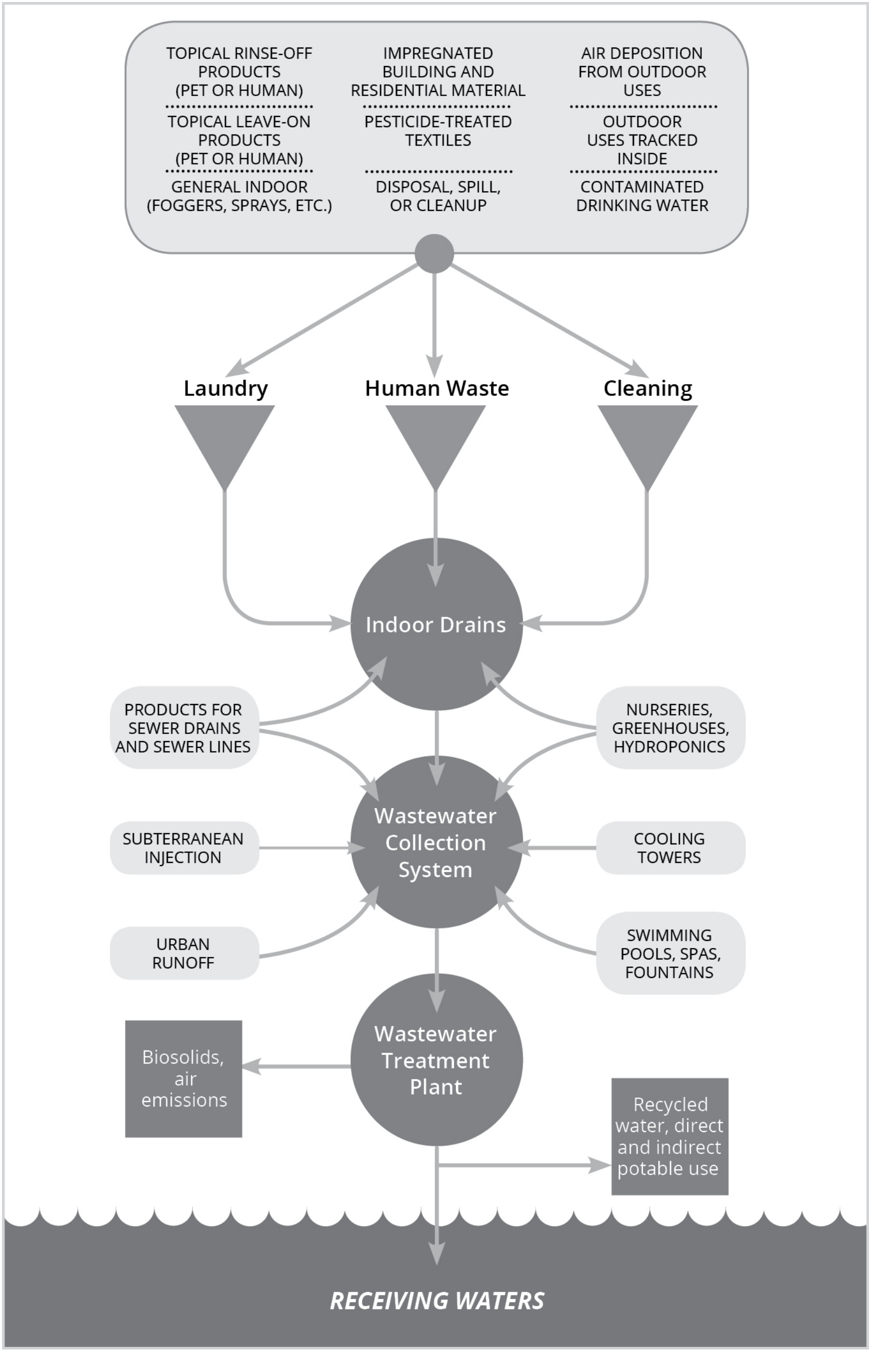

Figure Source: Sutton et al. 2019.

Thank you for your consideration of our comments. If you have any questions, please contact BACWA's Project Managers:

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Respectfully Submitted,

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Attachment: Wastewater Discharge ("Down-the-Drain") Modeling Refinements

Enclosures:

1. Sutton, R. et al. 2019. Occurrence and Sources of Pesticides to Urban Wastewater and the Environment. In Goh et al.; *Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management*, ACS Symposium Series 1308; American Chemical Society: Washington, DC, 2019; pp 63-88.
2. Hope, B. K.; Pillsbury, L.; Boling, B. A State-wide Survey in Oregon (USA) of Trace Metals and Organic Chemicals in Municipal Effluent. Sci. Total Environ. 2012, 417, 263–272. (Both paper and the author's supporting information are enclosed).
3. Fairbairn, D. J.; Arnold, W. A.; Barber, B. L.; Kaufenberg, E. F.; Koskinen, W. C.; Novak, P. J.; Rice, P. J.; Swackhamer, D. L. Contaminants of Emerging Concern: Mass Balance and Comparison of Wastewater Effluent and Upstream Sources in a Mixed-use Watershed. Environ. Sci. Technol. 2015, 50, 36–45. (Both paper and the author's supporting information are enclosed).

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Attachment

These 2016 recommendations have previously been shared with EPA (e.g., see appendix 2 of BACWA Comments on the Preliminary Ecological Risk Assessment for the Pyrethroid Insecticides, EPA docket # EPA-HQ-OPP-2010-0384-0177). BACWA is pleased that some of these recommendations (e.g., addressing zero dilution effluents) have been implemented in the current version of the E-FAST model.

Wastewater Discharge ("Down-the-Drain") Modeling Refinements

BACWA recommends the following refinement for the modeling of indoor pesticide discharges and transport through a sanitary sewer to a water body:

1) Adjust consumer product discharge estimates to reflect geographic and seasonal use
2) Update per capita water use to reflect today's conditions and account for conservation
3) Assume zero dilution
4) Improve POTW removal estimates
5) For pesticides likely to partition to sediment, include a biosolids analysis

1) <u>Adjust Consumer Product Discharge Estimates to Reflect Geographic and Seasonal Use</u>

For the discharge of consumer products to a sewer, the default approach for the E-FAST down-the-drain (DTD) model involves assuming 100% discharge of the annual manufacturing production volume of the chemical and equal discharge throughout all US households. While this approach could be useful for screening purposes, it is unreasonable for many categories of products.

In the case of flea control products, usage is not consistent throughout the year or across the nation, as flea pressure differs based on geography and by season. For example, flea pressure is low during freezing winters and highest in late summer. Geographic areas with climates most conducive to flea reproduction (e.g., mild weather coastal areas) experience the highest flea pressure. And, while veterinarians typically recommend regular use of topical treatments, consumers often seek treatments upon identifying a flea outbreak.

2) <u>Update Per Capita Water Use to Account for Conservation</u>

The overall daily water use in a household dilutes the concentration of chemicals entering the sanitary sewer. The water use default in the E-FAST DTD model appears to be significantly greater than currently observed per capita water use in many of the nation's urban areas. Particularly in regions of the US that are impacted by drought, the influent flow volume to POTWs has reduced significantly since the 1990s, due to conservation, national and state code requirements for installation of low-flow toilets and showerheads, and new high-efficiency washing machines (see table below). BACWA recommends that U.S. EPA consider using 5th or 10th percentile per capita flows to be sufficiently conservative in the model analysis.

Daily Per-Capita Water Use Comparison

Location	Per Capita Daily Water Use (Liters)	Source
E-FAST DTD Model	364 (original) 388 (current)	1990 and 1996 U.S. EPA POTW surveys[9]
California, January 2016 (includes outdoor uses)	230 (statewide) <190 (many cities)	California State Water Board[10]
Texas, 2012	230	Texas Water Development Board[11]

3) <u>Assume Zero Dilution</u>

The 2007 E-FAST model manual notes that a range of dilution factors may be employed when analyzing POTW impacts to receiving waters: "Measured dilution factors are typically between 1 (representing no dilution) and 200 and are based on NPDES permits or regulatory policy."[12] BACWA recommends that the spot-on modeling analysis assume no dilution.

In California, approximately 20 percent of NPDES permits provide for no dilution. Throughout the US, about 23 percent of POTWs have a permitted dilution factor less than 10. Further, treated wastewater effluent makes up more than 90 percent of stream flow for 49 percent of a representative sample of major POTWs in Texas, Oklahoma, New Mexico, Arkansas, and Louisiana.[13] In the case of multiple sanitary sewer systems and/or urban and agricultural runoff discharging into the same water body, the "diluting" waters may also contain the pollutant.

4) <u>Improve POTW Removal Estimates</u>

Because there is variety in POTW treatment trains, with different types and levels of treatment, and different detention times, pesticide removal rates are expected to vary from facility to facility. Rather than use an average removal rate, consider using a range of removal rates to determine whether certain treatment trains might be more at risk of permit violation.

It is important to avoid estimating POTW removal rates from grab sample data. This is why the data from Markle et al study of pyrethroids at California POTWs (which we participated in)[14] are inappropriate to use as the basis for development of POTW removal estimates.

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[9] Versar (1999). Exposure and Fate Assessment Screening Tool (E-FAST) Beta Version Documentation Manual prepared for U.S EPA OPPTS; Versar (2007). Exposure and Fate Assessment Screening Tool (E-FAST) Version 2.0 Documentation Manual. Prepared for U.S. EPA OPPTS.

[10] California water usage data are available online: http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/conservation_reporting.shtml January data, which are during the rainy season in California's Mediterranean climate and thus reflect minimal outdoor water use, are typically used to estimate indoor water use and wastewater discharges.

[11] Hermitte, S.M. and Mace, R.E. (2012). *The Grass Is Always Greener…Outdoor Residential Water Use in Texas*. Texas Water Development Board, Technical Note 12-01.

[12] Versar (2007). Exposure and Fate Assessment Screening Tool (E-FAST) Version 2.0 Documentation Manual. Prepared for U.S. EPA OPPTS. Page 3-33.

[13] Brooks et al. (2006). Water quality of effluent-dominated ecosystems: ecotoxicological, hydrological, and management considerations. *Hydrobiologia* **556:**365–379

[14] Markle, J.C., van Buuren, B.H., Moran, K.D., Barefoot, A.C. 2014. Pyrethroid pesticides in municipal wastewater: A baseline survey of publicly owned treatment works facilities in California in 2013. Technical Report

5) <u>For Pesticides Likely to Partition to Sediment, Include a Biosolids Analysis</u>

Given the low volatility and the octanol-water coefficient for pyrethroids, they are likely to partition into biosolids. Therefore BACWA requests that U.S. EPA include an evaluation of the adsorption and partitioning to the POTW biosolids. The E-FAST DTD model assumes that the biosolids (referred to as "sludge") are landfilled. This assumption does not reflect the routine use of biosolids as a soil amendment in agriculture, gardens, parks and reclamation sites. POTWs have come to consider biosolids to be valuable resource. It is important to understand how the partitioning of industrial insecticides into biosolids could impact the value and end uses of this resource.

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sponsored by the Pyrethroid Working Group. January 22, 2014.