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Office of Chemicals Safety and Pollution Prevention
Office of Pesticide Programs (OPP)
Environmental Protection Agency Docket Center
U.S. Environmental Protection Agency (EPA)

Subject: EPA and FDA Modernized Approach to Oversight of Certain Products (Docket ID No. EPA-HQ-OPP-2023-0103)

Dear Dr. Freedhoff:

On behalf of the National Association of Clean Water Agencies (NACWA)[1], the Bay Area Clean Water Agencies (BACWA)[2], Clean Water SoCal[3], the Oregon Association of Clean Water Agencies (ACWA)[4], the Association of Idaho Cities[5], the Pennsylvania Water Environment Association (PWEA)[6], and the Texas Association of Clean Water Agencies (TACWA)[7], we thank you for the opportunity to comment on the EPA and FDA Modernized Approach to Oversight of Certain Products. We take our responsibilities for safeguarding receiving waters seriously. We are especially interested in pesticides that are used in manners that have transport

[1] NACWA represents the interests of over 350 publicly-owned wastewater treatment agencies nationwide, serving the majority of the sewered population in the U.S. https://www.nacwa.org/
[2] BACWA's members include publicly-owned wastewater treatment facilities and collection system agencies serving 7.1 million San Francisco Bay Area residents. https://bacwa.org/
[3] Clean Water SoCal's members collects or treats the wastewater for over 18 million southern Californians in seven counties. https://cleanwatersocal.org/
[4] The Oregon Association of Clean Water Agencies represents over 126 wastewater treatment and stormwater management agencies in Oregon. https://oracwa.org/
[5] The Association of Idaho Cities serves Idaho's 199 cities. https://idahocities.org/
[6] The Pennsylvania Water Environment Association is a non-profit advancing Pennsylvania's water quality professionals through education and training, promoting sound sustainable water policies, and fostering public stewardship of our water resources. https://www.pwea.org/
[7] The Texas Association of Clean Water Agencies represents interests of major wastewater utilities throughout the State of Texas. https://www.tacwa.org/

pathways to the sanitary sewer, as even the most sophisticated wastewater treatment plants cannot fully remove complex chemicals like pesticides.

While we understand the need to modernize the regulatory approval process for pesticides used on pets, it is extremely important that EPA maintain its oversight of the use of topically administered pesticides. Pesticides used on pets are washed off when the pet is bathed, and are transferred to hands, clothing, and household surfaces, which are subsequently washed, transporting pet pesticides into the sewer system. Pet pesticides are known to pass through publicly owned treatment works (POTWs), ending up in the treated effluent and biosolids.

When treated effluent containing pet pesticides is discharged into receiving waters, the aquatic environment may be affected by these pesticides. This presents an additional challenge to POTWs as they strive to meet increasingly stringent Clean Water Act requirements, which include acute and chronic whole effluent toxicity (WET) tests. WET test results may be influenced by pesticides in the wastewater, and test failures can result in significant costs to utilities due to additional testing and evaluation requirements.

In addition, utilities across the country are expanding their efforts to recover the resources available in wastewater. Since water reuse and the beneficial reuse of biosolids may be adversely affected by pesticides, it is becoming more important to protect the quality of the wastewater that enters POTWs. POTWs in most states are not allowed to regulate pesticide use and cannot practically regulate FDA-approved products at the local level, so there is no way for utilities to prevent the discharge of pet pesticides into wastewater.

While FDA may be best suited to evaluate the safety of topically-applied pesticides for pets, it has exempted treatments for pets from environmental review. It is therefore necessary for EPA to maintain its oversight of topically administered pesticides by evaluating and mitigating the risks presented by pesticides. EPA must not abdicate its role in protecting the wastewater treatment process, the recovery of resources from wastewater, and the aquatic environment. We recommend that EPA and FDA coordinate their regulatory oversight of these products to protect POTWs, the environment, and pets and other animals.

Of the seven questions posed by EPA and FDA for this public comment, we are providing specific input on Questions 2 and 6.

QUESTION 2: Are there additional or different challenges that EPA and FDA did not identify in the whitepaper?

1. **Direct links between on-pet uses of pesticides and aquatic toxicity**. We have accumulated a wealth of peer-reviewed scientific studies demonstrating that topical on-pet pesticides are transferred post-application to the sewer system – both via pet washing and via washing of human hands, pet bedding, and other indoor materials and surfaces**.** This subsequently leads to pesticide concentrations in wastewater effluent that exceed EPA aquatic toxicity benchmarks. (See Appendix 1 for more information and references to peer-reviewed studies.)

2. **POTW compliance with the Clean Water Act.** While all POTWs must comply with the Federal Clean Water Act 100% of the time, we have no control over consumer products. Therefore, it is essential that we have a partner at the federal level that can participate in registration reviews. This includes an eye towards our compliance with the Clean Water Act and the ability to enact mitigation measures to prevent impacts to the beneficial uses of the receiving water (see Appendix 2). The FDA lacks the technical resources to assess potential conflicts with Clean Water Act compliance and develop mitigation strategies to minimize such impacts.

3. **POTW compliance with the Endangered Species Act (ESA).** When EPA or state agencies issue Clean Water Act discharge permits, ESA compliance is required and is therefore integrated into the permits. POTWs must ensure that pet pesticides in their effluent do not violate the ESA; however, POTWs have no way to prevent these pesticides from being discharged into their sewer systems and no practical methods for removing them.

   Following a lawsuit alleging violation of the ESA, EPA now has responsibility for ensuring ESA compliance associated with all pesticide uses and exposure pathways, including passing through POTWs. EPA is now seeking to identify impacts to listed threatened and endangered species and to develop mitigations to minimize such exposure. This requires complex coordination with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service (collectively referred to as the Services). Many registrations are in the midst of such reviews. A move to the FDA could open the FDA up to similar lawsuits unless they provide transparent and unambiguous plans to continue collaborating with the Services.

4. **Threats to municipal climate adaptation plans and water supplies**. Recycled water is developing into an essential water source for areas of the country with drought and other water supply issues. The continued use of on-pet pesticides could technically or financially limit a municipality's ability to recycle water for potable use, impacting a source of water that is essential to municipal climate adaptation plans (see Appendix 3). FDA has neither the authority nor processes in place to consider these types of downstream effects of on-pet pesticides.

QUESTION 6: How should EPA and FDA modify product oversight to better align with each agency's mission and expertise?

We recommend that EPA continue to provide oversight for pesticides with routes to the sanitary sewer. Only EPA has the necessary resources for this oversight, including scientists with in-depth knowledge of environmental fate and transport, environmental risk assessments, and aquatic toxicity benchmarks (with concentrations in the range of ng/L, well below values that FDA usually considers environmentally relevant). EPA also has a clear review process that includes:

- **"Down-the-drain" computer modeling.** Such modeling can be used to assess environmental risks that can then lead to developing mitigation to reduce POTW discharges and identifying the safest alternative for pet care.

- **Periodic re-reviews.** The EPA's current regulatory process provides for periodic re-reviews to incorporate mitigation measures as needed. This process allows the incorporation of new scientific information and subsequent incorporation of additional mitigation measures.

- **Public participation.** Public participation is a vital pathway for incorporating new scientific information about environmental risks.

We recommend that EPA and FDA revise their Memorandum of Understanding to set up a liaison for each agency. In that way, when one agency is informed about a possible risk, they can report this to their counterpart at the other agency and determine which agency is better equipped to respond.

If EPA does not continue its pesticide registration responsibility, we have the following questions:

1. How would this model fit in with EPA Registration Reviews that are currently in process?
2. How would EPA participate in FDA decisions, if at all?
3. Would FDA be prepared to assess environmental impacts of pesticides at concentrations of ng/L?
4. Would Endangered Species Act consultations be required for FDA approvals?
5. What would be the public participation process (e.g., for POTW input)?
6. Would State Lead Agencies (such as California's Department of Pesticide Regulation) gain any authorities if EPA made this shift?

In closing, we ask that EPA and FDA coordinate their regulatory processes to ensure that the health of humans, pets, and the environment are all considered, along with the impacts of products on wastewater utilities and their treatment processes.

Thank you for your consideration of our comments. If you have any questions, contact information is listed below for the co-signers of this letter:

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Respectfully Submitted,

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Appendix 1

On-Pet Flea Treatments: Evidence for the Pathway to the Sewer

There is mounting evidence that pesticides from pet flea control products (spot-ons and collars) have exposure pathways to the sewer.

Evidence from POTW Influent and Effluent

Recent scientific studies have measured fipronil and imidacloprid in POTW influent and effluent, and have examined sources, per-capita loadings, and the reasons that fipronil and its degradates pass through POTW treatment processes.

(1) Sutton et al (2019)[8] completed a state-of-the-science review of occurrence and fate of fipronil, its degradates, and other current-use pesticides in North American wastewater, finding that at 40 sampled POTWs, both fipronil and its sulfone degradate were detected in treated wastewater effluent at levels exceeding EPA OPP chronic invertebrate aquatic life benchmarks. Reported median fipronil concentrations, from 30-104 ng/L, all exceeded the EPA risk assessment's invertebrate chronic toxicity endpoints for both fresh water (11 ng/L) and salt water (7.5 ng/L).

(2) A study conducted by the San Francisco Bay Regional Monitoring Program in collaboration with California Department of Pesticide Regulation and Arizona State University[9] measured imidacloprid and fipronil, as well as fipronil degradates, in the influent and effluent of 8 urban California POTWs (see Figures 1 and 2). The results indicated that fipronil, its degradates, and imidacloprid were ubiquitous in the influent sewage and final treated effluent of all 8 participating POTWs, and suggested that pet flea control products may be the primary source of both chemicals in wastewater. Pet washing is likely a major discharge pathway for fipronil from pet flea control products.[10] Based on data from Bigelow Dyk et al (2012)[11] characterizing topical flea control active ingredient transfer to owners' hands and per capita pet population data, study authors found that owner hand washing could potentially explain the entire influent load of POTWs sampled in their study, suggesting that indirect transfer is also likely to be a discharge pathway.

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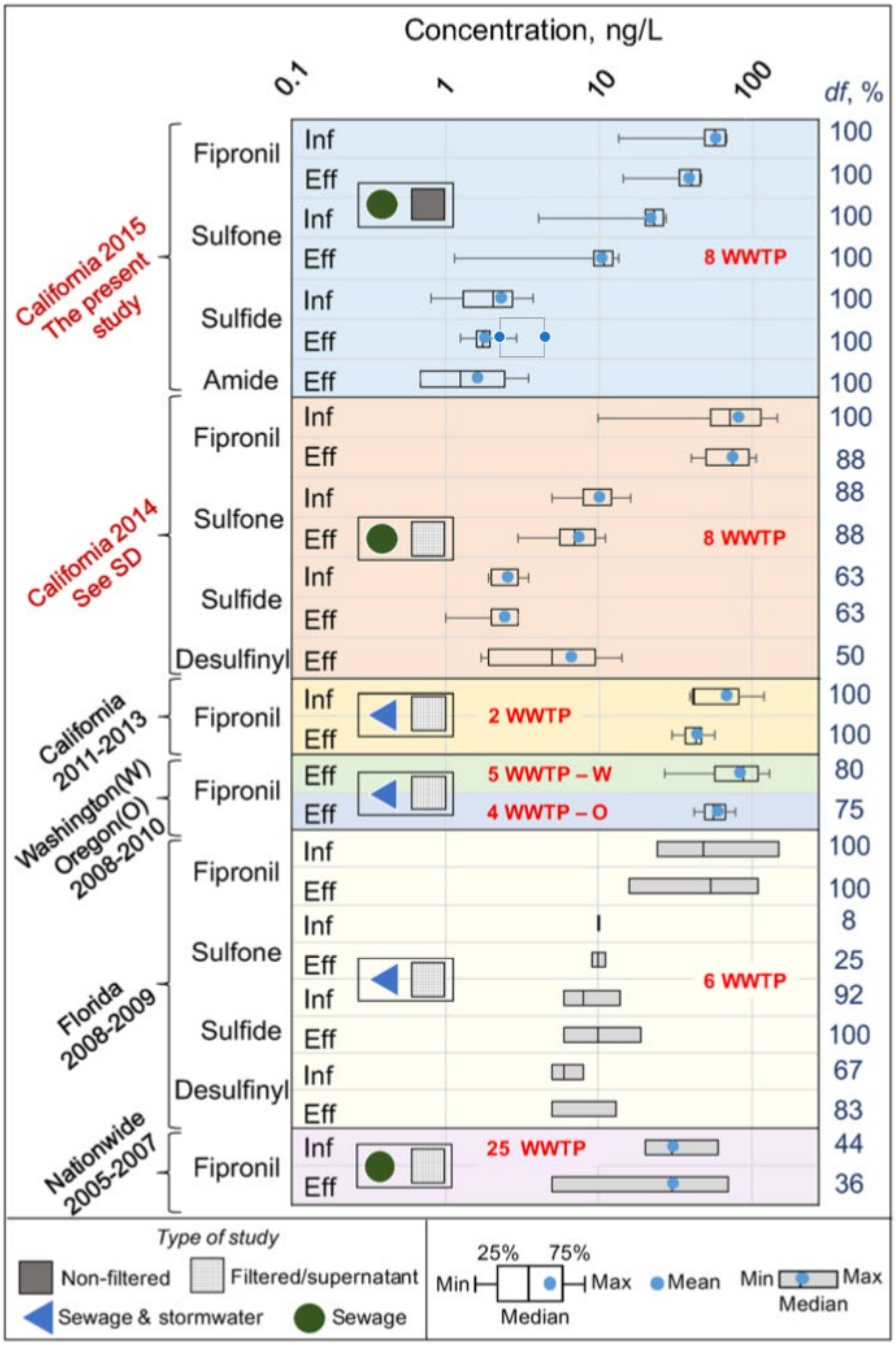
[8] Sutton, R., Xie, Y., Moran, K., & Teerlink, J. (2019). Occurrence and Sources of Pesticides to Urban Wastewater and the Environment. In K. Goh (Ed.), *Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management* (pp. 63-88). Washington, DC: American Chemical Society.

[9] Sadaria, A.M. et al. 2017. Passage of Fiproles and Imidacloprid from Urban Pest Control Uses Through Wastewater Treatment Plants in Northern California. *Environmental Toxicology and Chemistry*. 36 (6), 1473-1482.

[10] Teerlink, J., J Hernandez, R Budd. 2017. Fipronil washoff to municipal wastewater from dogs treated with spot-on products. Sci Total Environ 599-600: 960-966.

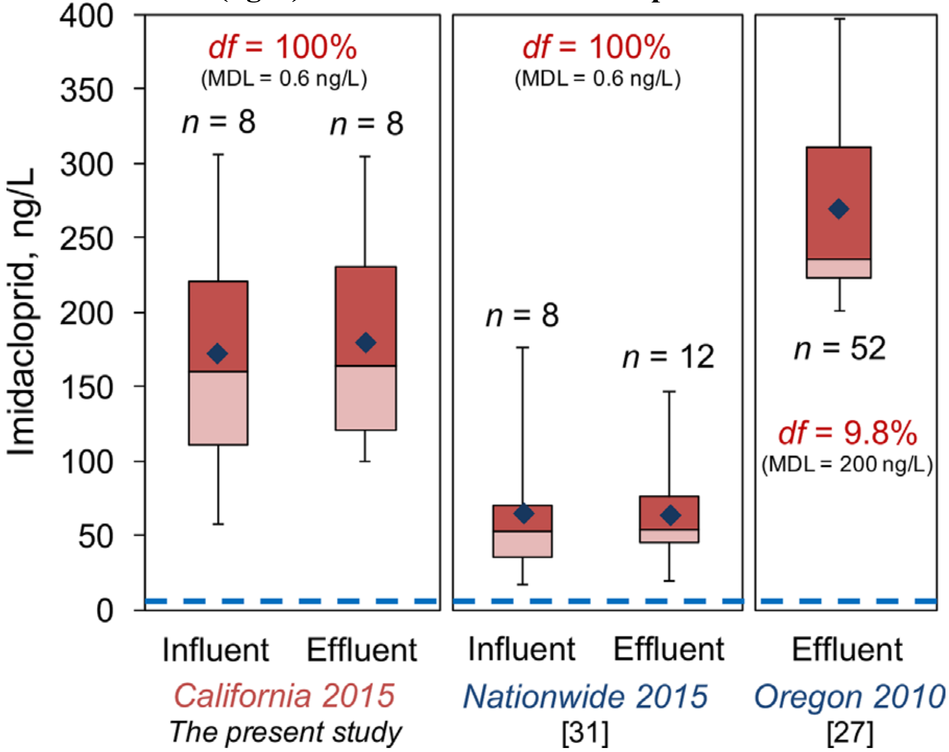
[11] Bigelow Dyk, M. et al. (2012). Fate and distribution of fipronil on companion animals and in their indoor residences following spot-on flea treatments, *Journal of Environmental Science and Health, Part B: Pesticides, Food Contaminants, and Agricultural Wastes*, 47(10): 913-924

Figure 1. (from Sadaria et. al. 2017) Summary of detected concentrations of fipronil (ng/L) in wastewater treatment plant effluent



df = detection frequency; data sources in Sadaria et al. 2017

Figure 2. (from Sadaria et. al. 2017) Summary of detected concentrations of imidacloprid (ng/L) in wastewater treatment plants



Note: Dashed blue horizontal line indicates European Union freshwater predicted no-effect concentration value (close to the chronic aquatic invertebrate toxicity endpoint value used in the PARA). df = detection frequency; MDL = method detection limit. "Nationwide 2015" data from Sadaria et al. 2016; "Oregon 2010" data from Hope et al. 2010.

(3) Sadaria et al (2019)[12] conducted the first U.S. nationwide, longitudinal study of sewage sludges for fipronil and its degradates, which revealed fipronil's ubiquitous occurrence in US municipal wastewater. A geospatial analysis showed fipronil and degradate levels in municipal sludges are uncoupled from agricultural use of fipronil on cropland surrounding sampled municipalities, thus pointing to urban uses (e.g., pet flea control) as the major source of fipronil loading to wastewater. Fipronil sewage sludge concentrations increased significantly between 2001 and 2006-2007, the time period when fipronil spot-on products developed significant market share as replacements for chlorpyrifos pet flea shampoos.

Additionally, EPA scientists reported that municipal wastewater was the primary pathway by which fipronil flows to surface water in North Carolina (McMahen et al. 2016; Heidler and

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[12] Sadaria, A. M., Labban, C. W., Steele, J. C., Maurer, M. M., & Halden, R. U. (2019). Retrospective nationwide occurrence of fipronil and its degradates in U.S. wastewater and sewage sludge from 2001 - 2016. *Water Res*, 155, 465-473.

Halden 2009; and Supowit et al. 2016)[13,14,15] also documented fipronil and degradate presence in municipal wastewater and fate and pass through at POTWs.

Direct Linkages of On-Pet Products Transfer to POTWs

California Department of Pesticide Regulation has completed two studies that confirm the linkage between companion animal topical treatments and POTWs:

(1) Washing fipronil-treated dogs. Dogs were washed at 2, 7, or 28 days after application of a fipronil-based topical flea treatment (Teerlink et al. 2017).[16] The rinse water was analyzed for fipronil and its degradates. The mass of fipronil and its degradates in the rinse water ranged up to 86% of the mass applied. Average percentage of fipronil and its degradates detected in the rinse water generally decreased with increasing time from initial application: 21 ± 22, 16 ± 13, and 4 ± 5% respectively for 2, 7, and 28 days after application. Results confirm a direct pathway of pesticides to municipal wastewater through the use of spot-on products on dogs and subsequent bathing.

(2) A collection system ("sewershed") study with the City of Palo Alto's Regional Water Quality Control Plant (Budd et al. 2023). [17] Results from the pet-grooming sampling site contained elevated concentrations of active ingredients like fipronil in pet flea control treatments, providing evidence that pet washing is a pathway for fipronil discharges to sewer systems. Figure 3, reprinted directly from that study, showcases direct links from on-pet pesticides to POTW influent.

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[13] McMahen, R. L., Strynar, M. J., McMillan, L., DeRose, E., & Lindstrom, A. B. (2016). Comparison of fipronil sources in North Carolina surface water and identification of a novel fipronil transformation product in recycled wastewater. *Sci Total Environ*, 569-570, 880-887.

[14] Heidler, J., & Halden, R. U. (2009). Fate of organohalogens in US wastewater treatment plants and estimated chemical releases to soils nationwide from biosolids recycling. *J Environ Monit*, 11(12), 2207-2215.

[15] Supowit, S. D., Sadaria, A. M., Reyes, E. J., & Halden, R. U. (2016). Mass Balance of Fipronil and Total Toxicity of Fipronil-Related Compounds in Process Streams during Conventional Wastewater and Wetland Treatment. *Environ Sci Technol*, 50(3), 1519-1526.

[16] Teerlink, J., J Hernandez, R Budd. 2017. Fipronil washoff to municipal wastewater from dogs treated with spot-on products. Sci Total Environ 599-600: 960-966.

[17] Supporting Information for Sub-sewershed Monitoring to Elucidate Down-the-Drain Pesticide Sources. Robert Budd, Jennifer Teerlink, Christopher Alaimo, Luann Wong, and Thomas M. Young, *Environmental Science & Technology*. Accepted January 24, 2023. DOI: https://pubs.acs.org/doi/10.1021/acs.est.2c07443.

Figure 3. (from Budd et. al. 2023) Conceptual model for urban pesticides transfer to wastewater

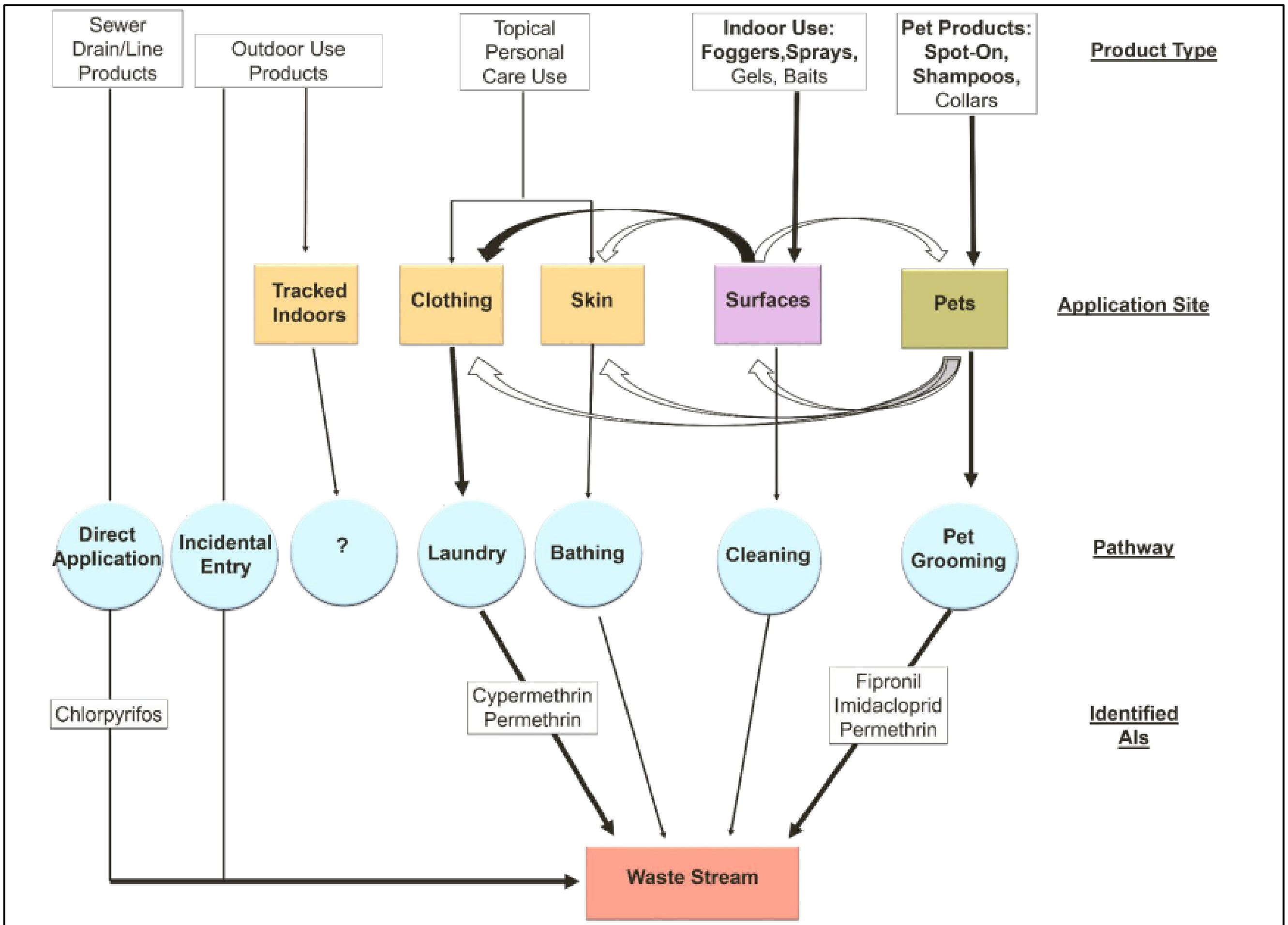

Figure S5. Conceptual model for urban pesticides to enter wastestream. Darker arrows and text represent pathways that are supported by monitoring data and available product information.

<u>Evidence of Transfer of On-Pet Flea Control Products to Hands</u>

Several scientific studies have examined the transport of active ingredients from pet flea control products onto surfaces, such as human hands, that are subsequently washed, completing a transfer pathway to the sewer system.

(1) Spot-on treatment product to glove (hands) pathway: A 2012 study by Bigelow Dyk et al. presents additional evidence of transport of a pet flea control products onto human hands and through homes.[18] In the study, researchers monitored transfer of fipronil (from a commercially available spot-on product) onto pet owners' hands and within their homes

[18] Bigelow Dyk, M., et al. (2012) Fate and distribution of fipronil on companion animals and in their indoor residences following spot-on flea treatments, Journal of Environmental Science and Health, Part B: Pesticides, Food Contaminants, and Agricultural Wastes, **47**(10): 913-924

over a four-week period following spot treatment application. Participants used cotton gloves to pet their dog or cat for 2 minutes at a time at specific intervals after the application (24 hours, 1 week, 2 weeks, 3 weeks, and 4 weeks). Participants also wore cotton socks for 2 hours a night for 7 nights in a row, for four consecutive weeks following application. The gloves, socks, and brushed pet hair were subsequently analyzed for fipronil and its degradates. Bigelow Dyk and colleagues also incorporated a fluorescent dye into the spot treatment to provide photographic evidence of spot-on pesticide transfer. The photographic results shown in the paper illustrate the transfer from the application location to other areas of the pet's fur and onto the pet owners' hands.

Other studies documenting this pathway for fipronil are Jennings et al 2002 [19] and Cochran et al 2015.[20]

(2) Spot-on treatment product to glove (hands) pathway: A 2015 study by Litchfield et al. evaluated the transfer of permethrin and indoxacarb from a topical pet flea control treatment to people's hands.[21] In the study, the topical treatment was applied to dogs that had not received a topical treatment for at least two months. To simulate human exposure to the pesticides, "Glove sampling included the wipe sampling technique, which consisted of petting the dog forward and back along its back and sides, while avoiding the application site, for five minutes while wearing a 100% cotton glove." The cotton glove samples were collected at days 0, 1, 2, 3, 7, 14, 21, 28, and 35. While the results showed that the largest mass of permethrin was transported within the first week, there continued to be measurable transfer to the gloves, even at day 35.

(3) Pet collar to glove (hands) pathway: One such study by Davis et al. quantified glove transfer of tetrachlorvinphos from pet collars.[22] We understand that the U.S. EPA team reviewing tetrachlorvinphos (EPA-HQ-OPP-2008-0316) has examined this paper and is planning to use the glove residue data following feedback from the U.S. EPA's Human Subjects Review Board.[23]

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[19] Jennings, K. A., Canerdy, T. D., Keller, R. J., Atieh, B. H., Doss, R. B., & Gupta, R. C. (2002). Human Exposure to Fipronil from Dogs Treated with Frontline. *Vet Human Toxicol*, 44(5), 301-303.
[20] Cochran, R. C., Yu, L., Krieger, R. I., & Ross, J. H. (2015). Postapplication Fipronil Exposure Following Use on Pets. *J Toxicol Environ Health A*, 78(19), 1217-1226.
[21] Litchfield et al., "Safety Evaluation of Permethrin and Indoxacarb in Dogs Topically Exposed to Activyl® Tick Plus," J Veterinar Sci Technology 2015, 6:2 http://dx.doi.org/10.4172/2157-7579.1000218.
[22] Davis, M., et al. (2008). "Assessing Intermittent Pesticide Exposure From Flea Control Collars Containing the Organophosphorus Insecticide Tetrachlorvinphos," *J. of Exposure Science and Environ. Epidemiology* **18:**564-570.
[23] https://www.regulations.gov/document?D=EPA-HQ-OPP-2008-0316-0040

Appendix 2

Pesticide Discharges to the Sewer Can Lead to Noncompliance with the Clean Water Act

Pesticide discharges to the sewer system can prove costly for POTWs, due to the potential for pesticides to cause or contribute to wastewater treatment process interference, NPDES Permit compliance issues, impacts to receiving waters, recycled water quality and/or biosolids reuse, in addition to exposing POTWs to the potential for third party lawsuits under the Clean Water Act.

Of particular concern is the ability of a specific pesticide to exceed effluent toxicity limits. One universal water quality standard in the U.S., which stems directly from the Federal Clean Water Act, is that surface waters cannot be toxic to aquatic life. NPDES permits require POTWs to demonstrate that they meet this standard by evaluating toxicity using EPA standard methods (set forth in 40 CFR Part 136). To evaluate toxicity, every POTW must (1) conduct toxicity screening tests with a range of species, (2) select the most sensitive species, and (3) perform routine monitoring (typically monthly or quarterly). These monitoring data are used to determine whether the discharger has a *reasonable potential* to cause or contribute to toxicity in the receiving water. If it does, the CWA requires that numeric effluent limits be imposed, otherwise POTWs may be given numeric effluent triggers for further action. In the event that routine monitoring *does exceed* a toxicity limit or trigger, the POTW must perform accelerated monitoring (e.g., monthly); and if there is still evidence of consistent toxicity, the discharger must do a Toxicity Reduction Evaluation (TRE) to get back into compliance. The TRE requires dischargers to evaluate options to optimize their treatment plants and conduct a Toxicity Identification Evaluation (TIE), the cost of which can vary from $10,000 to well over $100,000 depending on complexity and persistence of the toxicant. The goal of the TIE is to identify the substance or combination of substances causing the observed toxicity. If a POTW's effluent is toxic because of a pesticide, it may not have any practical means to comply with Clean Water Act-mandated toxicity permit limits.

Once identified, the cost to treat or remove the toxicity causing compound(s) can vary dramatically. Often, there are few ways for a discharger to mitigate the problem other than extremely costly treatment plant upgrades. Upgrading treatment plants is an extremely expensive and slow process; for example, the Sewer System Improvement Project of the San Francisco Public Utilities Commission is a 20-year and $2+ billion undertaking. Upgrading treatment plants is also often ineffective for organic chemicals like pesticides that appear at sub microgram per liter concentrations, largely because sewage is a complex mixture of natural organic compounds. Regardless of this, the discharger must comply with its Clean Water Act permit limits. If a discharger violates a toxicity limit, it can be subject to significant penalties (in California up to $10/gallon or $10,000 per day).

Case in point, a POTW in San Rafael, California, serving a community of 30,000 residents with a discharge of about 3 million gallons a day, observed toxicity in 21 of 28 samples several years ago. In one sample, the toxicity was 8 times the threshold to be considered toxic. The facility conducted a TIE and identified that the likely cause of the toxicity was pesticides – specifically pyrethroid insecticides. Follow-up investigations identified that the pesticide permethrin was present at low concentrations in the wastewater. EPA (in its Clean Water Act oversight role) subsequently required that toxicity limits be imposed upon reissuance of the permit. The cost to this small community and the resources required of the local water regulatory agency are precisely what we seek to avoid in the future for all pesticide chemicals.

In addition, when surface water bodies become impaired by pesticides, wastewater facilities may be subject to additional requirements established as part of Total Maximum Daily Loads (TMDLs) set for the water bodies by U.S. EPA and state water quality regulatory agencies. A number of pesticide-related TMDLs have been adopted or are in preparation in California. The cost to wastewater facilities and other dischargers to comply with TMDLs can be up to millions of dollars per water body per pollutant. This process will continue as long as pesticides are approved for uses that result in water quality impacts. As EPA has acknowledged in other settings (e.g., see EPA's Pyrethroids Ecological Risk Mitigation Proposal [Docket ID # EPA-HQ-OPP-2008-0331-0096]), failure to meet this nationwide standard imposes burdensome costs on POTWs. It is therefore imperative that EPA conduct registration reviews of pesticides with a focus on water quality impacts and that EPA act to ensure that any impacts are prevented or fully mitigated.

Appendix 3

Pesticides in Treated Wastewater Pose a Threat to Municipal Climate Adaptation Plans

As the effects of climate change impact available water supplies, municipalities around the country must pursue other sources of drinking water, including indirect and direct potable reuse. Pesticides in wastewater effluent pose a serious challenge to the feasibility of potable reuse. Treated wastewater effluent continuously discharged into surface waters represents an ongoing source of contaminants recalcitrant to removal. Concentrations of at least half a dozen pesticides reported in undiluted POTW effluents exceed the USEPA OPP benchmarks for chronic[24] exposure to aquatic invertebrates (see Sutton et al 2019).[25] Many more would exceed these benchmarks when concentrated by a factor of 5 (or greater) in the wastewater stream generated as a byproduct of reverse osmosis to create water suitable for potable reuse.

Given the growing efforts toward potable use of wastewater effluents,[26] ensuring that the presence of pesticides in this concentrated waste stream does not render such projects technologically or economically infeasible is in the nation's interest (see Moran & LaBella 2020).[27] Pesticides in reverse osmosis concentrate will increase costs for public agencies—or entirely prevent potable reuse of wastewater effluent. The use of pet pesticide treatments could prevent a municipality from recycling water for indirect or direct potable use, impacting a source of water that is essential to municipal climate adaptation plans. Modifying uses of persistent mobile pesticides in ways that avoid sewer discharges may be the best—and perhaps only—means to allow society to access this future water supply.

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[24] The "chronic" benchmark comparison is made because POTWs continuously discharge.
[25] Sutton et al. (2019). Occurrence and Sources of Pesticides to Urban Wastewater and the Environment. In K. Goh (Ed.), Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management (pp. 63-88). Washington, DC: American Chemical Society.
[26] US EPA Office of Water (2017). *Potable Reuse Compendium*.
[27] Moran, K. and M. LaBella (2020). "Will Pesticides Prevent Publicly-Owned Wastewater Treatment Plant Effluent from Becoming a Much- Needed Drinking Water Supply?" North America Society of Environmental Toxicology and Chemistry SciCon2 Conference (online).