Before the Maryland Department of Agriculture








Petition to Develop a Comprehensive Pesticide Data Program under the Maryland Agricultural Code

December 17, 2024

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INTRODUCTION

In Maryland, approximately 14,000 pesticides are registered for sale and use.[1] Beyond the number of registered pesticides, however, Marylanders have little accurate information about pesticide use in their state. As discussed below, pesticides can cause serious, persistent, and widespread harm to humans, wildlife, and the environment in Maryland and across the country. The state's lack of accurate, publicly available pesticide use data exacerbates the risk and severity of these harms, as it hinders efforts to predict, identify, and address them. The lack of pesticide use data also violates Maryland law. This petition asks the Maryland Department of Agriculture (MDA) to develop a comprehensive pesticide data program that will better inform and protect Marylanders, while also bringing MDA into compliance with a decades-old Maryland law that expressly requires MDA to establish just such a program.[2]

Even when lawfully applied, pesticides can cause serious harm to humans, wildlife, and the environment. People exposed to pesticides can suffer acute symptoms, such as impaired vision, nausea, vomiting, difficulty breathing, and fatigue, as well as chronic conditions, including cancer, developmental defects, and reproductive disorders.[3] Pesticides pollute surface water, groundwater, and soils, harming aquatic organisms, non-target insects, and other wildlife directly and indirectly by poisoning and disrupting food webs, habitats, and ecosystem processes. The damage pesticides cause can last well beyond the time of application, as many pesticides persist and accumulate in the environment for years, lingering in or near homes, schools, parks, and waterways. Their harms can also spread far beyond the area of application, as pesticides often move off-site due to wind, soil erosion, or rainfall. And even broken-down pesticides can be toxic, persistent, and mobile.[4] Information from United States regulatory documents, federal and state health organizations, and international bodies, together with independent scientific studies, demonstrates that many of the approximately 14,000 pesticides registered for sale and use in Maryland threaten human health or the environment.[5]

Despite the threats that pesticides pose, there has long been insufficient data on pesticide use in Maryland. This insufficient data hinders efforts to identify and address harm from

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[1] *See* MDA, Registered Products – Pesticides (Aug. 17, 2023), https://mda.maryland.gov/plants-pests/Documents/RegisteredPesticides.pdf.

[2] *See* Md. Code Ann., Agric. § 5-102(c) (requiring MDA to "develop a comprehensive pesticide data program that includes: . . . (2) Figures for the number, types, and uses of pesticides in Maryland").

[3] *See* Geoffrey M. Calvert et al., *Acute Pesticide Poisoning Among Agricultural Workers in the United States*, 1998–2005, 51 Am. J. Indus. Med. 883 (2008); *see also* Sara Mostafalou & Mohammad Abdollahi, *Pesticides and Human Chronic Diseases: Evidences, Mechanisms, and Perspectives*, 268 Toxicology & Applied Pharmacology 157 (2013).

[4] *See* Chenyang Ji et al., *The Potential Endocrine Disruption of Pesticide Transformation Products (TPs): The Blind Spot of Pesticide Risk Assessment*, 137 Env't Int'l 105490 (2020).

[5] *See* Beyond Pesticides, *Gateway on Pesticide Hazards and Safe Pest Management*, https://www.beyondpesticides.org/resources/pesticide-gateway?joiner=OR#searchstart (enter each active ingredient into the "chemical name" search bar and review the chemical's health and environmental effects).

pesticides, interfering with action that might otherwise be taken by legislators, scientists, public health researchers, medical professionals, and individuals who are especially sensitive to pesticides, as well as farmers and other pesticide applicators. For example, in a 2012 report on toxic contaminants in the Chesapeake Bay and its watershed, which includes Maryland, the U.S. Environmental Protection Agency (EPA) observed that "[d]ata and research gaps exist for many pesticides . . . and consequently the extent and severity [of their impacts] remains uncertain."[6] In 2014, the Maryland Pesticide Information and Reporting Workgroup—which was convened by the legislature in response to Marylanders' concerns about the lack of pesticide use data in the state[7]—reached a similar conclusion, stating that "[b]oth environmental scientists and public health experts indicate that there is an absence of readily available data," which prevents them from understanding pesticide usage and identifying human and environmental pesticide exposures.[8]

More recently, scientists and advocates have continued to highlight the need for increased pesticide data. During the December 2022 Pesticides and the Chesapeake Bay Watershed Conference, the Research and Data Gaps Working Group stated that "[b]etter documentation of temporal changes in pesticide occurrence and exposure" is necessary to understand how pesticide applications affect pesticide concentrations in the Chesapeake Bay.[9]

Since 1989, Maryland law has required MDA to develop a comprehensive pesticide data program. The legislature has also provided MDA with legal tools and funding to carry out this directive and implement the program. In 2014, in response to a recommendation by the Pesticide Information and Reporting Workgroup, the legislature passed a law providing MDA over $100,000 annually for pesticide data collection, analysis, and reporting.[10] Yet, MDA has failed to develop a comprehensive program, as required. Instead, MDA conducts only sporadic, voluntary surveys of pesticide use, some of which fail to satisfy even the minimum requirements imposed by Maryland law, let alone to collect all the data that legislators, scientists, public health researchers, medical professionals, especially sensitive individuals, and farmers and other applicators need in order to identify and address harms from pesticides. As a result, MDA has not satisfied its duty to develop a comprehensive pesticide data program.

In light of MDA's failure to comply with state law and Marylanders' longstanding need for improved pesticide data, Petitioners—a broad coalition of organizations advocating for the

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[6] *See* EPA, Technical Report: Toxic Contaminants in the Chesapeake Bay and its Watershed: Extent and Severity of Occurrence and Potential Biological Effects 44 (Dec. 2012), https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/ii.c._-_toxic_contaminants_summary_report_2012.pdf.
[7] *See* Md. Gen. Assemb. Dep't of Legis. Servs., Fiscal and Policy Note, S.B. 675, 2013 Sess., at 1 (2013), https://mgaleg.maryland.gov/2013RS/fnotes/bil_0005/sb0675.pdf.
[8] *See* MDA, *Interim Report of the Pesticide Information and Reporting Workgroup* 1–2 (2014), https://mda.maryland.gov/about_mda/Documents/Pesticide_Work_Group_Interimt_Report.pdf.
[9] *See* Pesticides Smart, *Key Findings & Data Gaps from a Decade of Pesticide Research* (Dec.14, 2022), https://www.youtube.com/watch?v=r_F6iEX1JCc.
[10] *See* Md. Gen. Assemb. Dep't of Legis. Servs., Fiscal and Policy Note, H.B. 621, 2014 Sess., at 1 (2014), https://mgaleg.maryland.gov/2013RS/fnotes/bil_0005/sb0675.pdf.

environment, communities, farmworkers, environmental justice, wildlife, and animal welfare, as well as businesses, farmers, scientists, and public health professionals—urge MDA to comply with state law by developing the comprehensive pesticide data program described in this petition. The requested program would require entities that already must keep records of their pesticide applications or sales—that is, producers of agricultural commodities who apply restricted use pesticides, public agencies that apply any pesticides, pest control businesses that apply any pesticides, and sellers or distributors of restricted use pesticides—to submit their records to MDA annually.[11] For all but the sellers and distributors of restricted uses pesticides, these records include both general use pesticides and restricted use pesticides. In other words, existing law requires farmers who apply restricted use pesticides to record their use of restricted use pesticides *and* general use pesticides; the requested program would mandate that farmers submit those records to MDA each year. In addition, the program would require MDA to make portions of the records—including information on the date, zip code, and amount of each pesticide application and sale—available to the public. It would not require homeowners to maintain or report records of their pesticide applications, nor would it make an applicator's name, home address, or other identifying information available to the public.

Because the requested program will incorporate pesticide application records that pesticide applicators, sellers, and distributors *already* are required to keep, it will impose minimal additional burdens. However, it will provide tremendous value by presenting data from those records on a timely basis and in a format that is useful to legislators and the public. As a result, it will help legislators identify and address instances in which pesticide use poses a particular risk, allow scientists to determine whether a pesticide may be the cause of environmental or human health harms, and aid medical professionals in tracing and treating pesticide exposures. The data will also help farmers and other applicators improve the efficacy and safety of their pest management and better understand pesticide-related issues that affect their operations, such as pest and weed resistance, as well as pollinator and beneficial insect declines. And, given the limited number of states with pesticide data reporting requirements, adopting the requested program will position Maryland as a leader in pesticide data transparency, achieving the goal that the legislature established over 30 years ago.

I. FACTUAL BACKGROUND

Pesticides—which include insecticides, herbicides, fungicides, and rodenticides—are chemical substances or mixtures that are meant to kill or repel certain organisms that are considered pests. They contain active ingredients, targeted to controlling pests, and inert ingredients, a catch-all category that includes any ingredients other than the active ingredients, such as emulsifiers, solvents, aerosol propellants, fragrances, and dyes.[12] Active ingredients are often hazardous to target and non-target organisms. For example, studies link atrazine—one of

[11] *See infra* Section I for a discussion of restricted use and general use pesticides.
[12] *See* Caroline Cox & Michael Surgan, *Unidentified Inert Ingredients in Pesticides: Implications for Human and Environmental Health*, 144 Env't Health Persps. 1083 (2006).

the most commonly applied active ingredients in the world—to cancer in humans.[13] Inert ingredients can also be toxic.[14] A recent study found that alcohol ethoxylates, which are used as surfactants and emulsifiers, cause numerous harms to bumble bees, including weight loss and gut damage.[15] Pesticides may also contain per- and polyfluoroalkyl substances (PFAS), which do not naturally break down in the environment[16] and have been linked to serious health problems in humans, including cancer, birth defects, liver disease, kidney disease, autoimmune disorders, high cholesterol, and decreased immunity.[17] Testing has detected levels of PFAS in samples of a pesticide that is widely used by the Maryland government in its mosquito control program.[18] Relatively little research has been conducted on the synergistic effects of different pesticides that come in contact with each other,[19] and Petitioners know of no research on the effects of pesticides when combined with PFAS.[20] Moreover, because toxicity can vary widely among pesticides, pesticide risk might increase even as overall application amounts decline.[21]

Pesticides in Maryland are classified as "restricted use" or "general use,"[22] and both categories of pesticides pose risks of harm. Maryland follows the federal government's classification of restricted use pesticides,[23] and EPA's list of restricted use products—that is, products that contain restricted use pesticides—includes approximately 1,000 products[24] that

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[13] *See, e.g.*, Jagadeesh Puvvula et al., *Association Between Aqueous Atrazine and Pediatric Cancer in Nebraska*, 13 Water 1 (2021).
[14] *See* Cox & Surgan, *supra* note 12, at 1084–05; *see also* Edward A. Straw et al., *'Inert' Ingredients Are Understudied, Potentially Dangerous to Bees and Deserve More Research Attention*, 289 Proceedings of the Royal Society B 1, 7 (2022) (finding that inert ingredients "drive [bee] mortality through multiple exposure routes, synergize with other stressors and cause sublethal effects").
[15] *See* Edward A. Straw & Mark J.F. Brown, *Co-formulant in a Commercial Fungicide Product Causes Lethal and Sub-lethal Effects in Bumble Bees*, 11 Sci. Reps. 1 (2021).
[16] *See* Tom Perkins, *Toxic 'Forever Chemicals' Detected in Commonly Used Insecticides in US, Study Finds*, The Guardian (Oct. 7, 2022), https://www.theguardian.com/environment/2022/oct/07/forever-chemicals-found-insecticides-study.
[17] *See* Md. Pesticide Educ. Network, *PFAs Found in Widely Used Insecticide* (Mar. 26, 2021), https://mdpestnet.org/pfas-found-in-widely-used-insecticide/.
[18] *See id.*
[19] *See* Yongkui Zhang et al., *Assessing the Toxicological Interaction Effects of Imidacloprid, Thiamethoxam, and Chlorpyrifos on* Bombus terrestris *Based on the Combination Index*, 12 Sci. Reports 6301 (2022).
[20] *See* Willa Childress, *PFAS and Pesticides*, Pesticides Action Network N. Am. (PANNA) (Apr. 20, 2022), https://www.panna.org/news/pfas-and-pesticides/.
[21] *See, e.g.*, Secretariat of the Convention on Biological Diversity, *Science Briefs on Targets, Goals and Monitoring in Support of the Post-2020 Global Biodiversity Framework Negotiations*, at 9 (2022), https://www.cbd.int/doc/c/6053/38a4/3710d6e83f5b006ef774607d/wg2020-04-inf-02-rev-01-en.pdf (reporting that, although the amount of insecticides applied in the United States decreased by 40 percent between 1992 and 2016, "insecticide risk for aquatic invertebrates (driven by pyrethroids) or pollinators (driven by neonicotinoids) increased up to a factor of four" during the same time period).
[22] *See* MDA, *Pesticide Regulation: Enforcing the Maryland Pesticide Applicator's Law* 1 (2013), https://mda.maryland.gov/Documents/ag_brief/AgBrief_PesticideReg.pdf.
[23] *See* Md. Code Ann., Agric. § 5-201(r).
[24] *See* EPA, *Restricted Use Product Summary Report* (Oct. 31, 2022), https://www.epa.gov/system/files/documents/2022-11/RUP-Report-10-31-2022.pdf.

"have the potential to cause unreasonable adverse effects to the environment and injury to applicators or bystanders."[25] Many restricted use pesticides are used widely. For example, atrazine—a restricted use pesticide that has been linked to cancer in humans[26]—is the second most commonly used pesticide in the country.[27] But general use pesticides also have the potential to harm humans and the environment. Glyphosate—a widely used herbicide—is a general use pesticide that the World Health Organization's International Agency for Research on Cancer has determined is a probable carcinogen.[28]

Pesticides can persist in the environment long after they are applied, with some pesticides remaining in or near homes, schools, parks, and waterways for years.[29] For example, triazine compounds, which are widely used in herbicides and have been shown to disrupt the growth and development of tadpoles and harm other organisms,[30] can remain in soils and sediments for days, weeks, and even years.[31] Pesticides can also break down into other forms, often called "transformation products," which can be more toxic and persistent than the original material.[32]

Not only can pesticides and their transformation products remain in the environment, but they also can move from the application site. Pesticides sprayed from the air or ground can drift off target,[33] and after application, pesticides and their transformation products can move offsite due to soil erosion and runoff.[34] Indeed, off-target pesticide movement has harmed humans working and living nearby,[35] as well as neighboring crop fields.[36] As discussed in greater detail

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[25] EPA, *Restricted Use Products (RUP) Report* (Nov. 3, 2022), https://www.epa.gov/pesticide-worker-safety/restricted-use-products-rup-report.
[26] *See* Puvvula et al., *supra* note 13.
[27] *See* Ctr. for Food Safety, *Atrazine*, https://www.centerforfoodsafety.org/issues/6459/pesticides/atrazine#:~:text=Atrazine%20is%20the%20second%20most,more%20than%2040%20other%20countries (last visited Sept. 5, 2023).
[28] *See* World Health Org., *IARC Monographs Volume 112: Evaluation of Five Organophosphate Insecticides and Herbicides* (2015), https://www.iarc.who.int/wp-content/uploads/2018/07/MonographVolume112-1.pdf.
[29] *See* Fernando P. Carvalho, *Pesticides, Environment, and Food Safety*, 6 Food & Energy Security 48, 50–52 (2017).
[30] *See* Yuchen Liu et al., *Adsorption Behavior and Residue Degradation of Triazine Herbicides in Soil Amended with Rice Straw Biochar*, 13 Agric. 1 (2023).
[31] *Id.* at 52, Fig. 7.
[32] *See* Ji et al., *supra* note 4.
[33] *See* Edward J. Kasner et al., *Examining the Role of Wind in Human Illness Due to Pesticide Drift in Washington State, 2000-2015*, 20 Env't Health (2021).
[34] *See* Meindert C. Commelin et al., *Pesticides are Substantially Transported in Particulate Phase, Driven by Land Use, Rainfall Event and Pesticide Characteristics—A Runoff and Erosion Study in a Small Agricultural Catchment*, 10 Frontiers in Env't Sci. 1 (2022).
[35] *See* Calvert et al., *supra* note 3, at 891 (finding that, in 1,926 reported cases of acute pesticide poisoning in farmworkers, the most common cause was off-target drift).
[36] *See* Joyce Sterman & Emily Featherston, *Growing Concern: Thousands of Farms Across U.S. Damaged by 'Dicamba Drift' That Devastates Crops*, WBTV (Aug. 1, 2022), https://www.wbtv.com/2022/08/01/growing-concern-thousands-farms-across-us-damaged-by-dicamba-

below, because pesticides are formulated to harm or kill living organisms and are persistent and mobile in the environment, they pose serious threats to humans, wildlife, and the environment. And the impacts of climate change exacerbate the harms that pesticides cause by facilitating off-target pesticide movement, driving agricultural producers to apply greater amounts of pesticides, and making pesticides more toxic.[37]

A. Pesticides are harmful to children, farmworkers, and other humans.

Pesticides are used extensively in the United States, and, as a result, humans are at risk of exposure through many pathways.[38] As discussed below, farmworkers face a particularly high risk of exposure in the workplace. Other individuals can be exposed to pesticides that have entered the air, water, and food chain.[39] For example, studies show that pesticides are prevalent in groundwater, including groundwater used for public water supplies.[40] One study of groundwater samples from 47 wells in the Maryland Coastal Plain found a total of 29 different pesticides across the samples.[41] And pesticides contaminate the food we eat. A recent investigation found harmful levels of the pesticide chlormequat—which has been shown to disrupt animal reproduction—in 12 of the 13 sampled oat-based cereals, granola, and other products.[42]

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drift-that-devastates-crops/ (describing how the chemical dicamba can drift miles from where it is sprayed, devastating crops that have not been bred to resist it). Not only does dicamba harm neighboring crop fields, but it can also harm crops planted on target fields *after* it has been applied, indicating that it can remain in the soil long enough to injure the subsequently planted crops. *See* Steven S. Seefeldt et al., *Clopyralid and Dicamba Residue Impacts on Potatoes and Weeds*, 91 Am. J. Potato Rsch. 625 (2014).

[37] *See infra* Section I.C.

[38] *See* Silvia Gangemi et al., *Occupational and Environmental Exposure to Pesticides and Cytokine Pathways in Chronic Diseases (Review)*, 38 Int'l J. Molecular Med. 1012, 1012–13 (2016).

[39] *See* Muyesaier Tudi et al., *Exposure Routes and Health Risks Associated with Pesticide Application*, 10 Toxics 1, 2 (2022).

[40] *See* Laura M. Bexfield et al., *Pesticides and Pesticide Degradates in Groundwater Used for Public Supply across the United States: Occurrence and Human-Health Context*, 55 Env't Sci. & Tech. 362 (2021).

[41] *See* Judith M. Denver & Scott W. Ator, *Pesticides in Ground Water of the Maryland Coastal Plain*, USGS Fact Sheet FS 2006-3119 (2006), https://pubs.usgs.gov/fs/2006/3119/#:~:text=Selected%20pesticides%20and%20degradate%20compounds%20are%20detectable%20in%20surficial%2C%20unconfined,drinking%2Dwater%20standards%20were%20exceeded.

[42] *See* Sydney Evans et al., *EWG Investigation: Dangerous Agricultural Chemical Chlormequat Found in Popular Oat-Based Products* (Jan. 31, 2023), https://www.ewg.org/research/ewg-investigation-dangerous-agricultural-chemical-chlormequat-found-popular-oat-based**.** Another review found unsafe pesticide levels in 20 percent of U.S. produce, including bell peppers, blueberries, green beans, potatoes, and strawberries. Catherine Roberts, *We Found Unhealthy Pesticide Levels in 20% of US Produce – Here's What You Need to Know*, The Guardian (April 18, 2024), https://www.theguardian.com/environment/2024/apr/18/what-is-pesticide-safety-organic-fruits-vegetables.

Exposure to pesticides can cause serious short- and long-term harm to humans. Pesticide exposure can lead to acute symptoms such as blurred vision, eye irritation, diarrhea, nausea, vomiting, breathing issues, headaches, muscle pain, and fatigue.[43] Pesticide exposure can also lead to chronic diseases, including cancers, respiratory diseases, cardiovascular diseases, diabetes, neurodegenerative disorders, and endocrine and reproductive disorders.[44] Children are particularly susceptible to harm from pesticide exposure, because they may accumulate more pesticides in their bodies than adults, and their bodies are less effective at clearing pesticides.[45] Childhood exposure to pesticides has been linked to increased odds of developing attention deficit disorder and learning disability,[46] decreases in IQ,[47] and significant decreases in lung function.[48]

Numerous studies have found that pesticide use disproportionately burdens communities of color and low-income communities.[49] For example, a study of environmental hazards in California, including pesticide use, revealed that the vast majority of agricultural pesticide use in California occurs in zip codes with the highest percentages of people of color.[50] Similarly, a study of pesticide use in Ventura County, California found a greater percentage of Hispanic, African American, and Asian residents in areas where a greater volume of pesticides were applied.[51] And a study of glyphosate use in California found that in the year studied, more than half of the glyphosate used in the state was applied in the eight most impoverished counties.[52] Each of these studies was made possible by the availability of detailed data on pesticide use in

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[43] *See* Calvert et al., *supra* note 3.
[44] *See* Sara Mostafalou & Mohammad Abdollahi, *Pesticides and Human Chronic Diseases: Evidences, Mechanisms, and Perspectives*, 268 Toxicology & Applied Pharmacology 157 (2013); *see also* Sara Mostafalou & Mohammad Abdollahi, *Pesticides: An Update of Human Exposure and Toxicity*, 91 Archives of Toxicology 549 (2017).
[45] *See* Beti Thompson et al., *Variability in the Take-Home Pathway: Farmworkers and Non-Farmworkers and Their Children*, 24 J. of Exposure Sci. & Env't Epidemiology 522 (2014).
[46] *See* Vidita Chopra et al., *Association Between Phthalates and Attention Deficit Disorder and Learning Disability in U.S. Children, 6-15 years*, 128 Env't Rsch. 64, 54 (2014).
[47] *See* Robert B. Gunier et al., *Residential Proximity to Agricultural Fumigant Use and IQ, Attention and Hyperactivity in 7-Year-Old Children*, 158 Env't Rsch. 358 (2017).
[48] *See* Rachel Raanan et al., *Decreased Lung Function in 7-Year-Old Children with Early-Life Organophosphate Exposure*, 71 Thorax 148 (2016).
[49] *See, e.g.*, Nathan Donley et al., *Pesticides and Environmental Injustice in the USA: Root Causes, Current Regulatory Reinforcement and a Path Forward*, 22 BMC Pub. Health 1, 5–6 (2022) (describing studies).
[50] *See* Lara Cushing et al., *Racial/Ethnic Disparities in Cumulative Environmental Health Impacts in California: Evidence from a Statewide Environmental Justice Screening Tool (CalEnviroScreen 1.1)*, 105 Am. J. Pub. Health 2341, 2345 Fig. 3 (2015). Over 95 percent of agricultural pesticide use in California occurred in the 60 percent of zip codes with the highest percentages of people of color. *Id.*
[51] *See* Alexis M. Temkin et al., *Racial and Social Disparities in Ventura County, California Related to Agricultural Pesticide Applications and Toxicity*, 853 Sci. of the Total Env't 1 (2022).
[52] *See* Nathan Donley, Ctr. for Biological Diversity, *Lost in the Mist: How Glyphosate Use Disproportionately Threatens California's Most Impoverished Counties* 1 (2015), https://www.biologicaldiversity.org/campaigns/pesticides_reduction/pdfs/LostInTheMist.pdf.

California, which the state collects pursuant to its pesticide data program.[53] Indeed, EPA recently highlighted that the availability of pesticide data advances environmental justice.[54]

The problem of unequal exposure to pesticides is not unique to California. A review of pesticides and pesticide metabolites in the blood and urine of a nationally representative sample of the population found that non-Hispanic Blacks and Mexican Americans had higher average concentrations of pesticides and pesticide metabolites than non-Hispanic whites,[55] meaning that they are generally exposed to higher levels of pesticides.[56]

According to MDA's 2022 pesticide use survey results, pesticide use in Maryland especially burdens communities where people lack health insurance. Several Maryland counties with high levels of reported pesticide use also had high percentages of the population lacking health insurance. For example, Wicomico County had the highest reported pesticide usage,[57] and 6.8 percent of the population in Wicomico County lacks health insurance.[58] Similarly, the second highest total pesticide usage in 2022 was reported for Washington County,[59] where 6.3 percent of the population lacks health insurance.[60] By contrast, in some counties in Maryland, less than three percent of the population lacks health insurance.[61] As discussed below, MDA's pesticide use surveys likely reflect a significant undercount of actual pesticide use,[62] so the burdens on people who lack health insurance are likely even greater. And, given the serious health harms that pesticide exposure can cause, high pesticide use in areas where more people lack health insurance—and, thus, may be less likely to seek treatment for exposure—poses a particular threat to Marylanders' health.

Farmworkers—who identify predominantly as people of color[63] and often lack health insurance[64]—are especially at risk of harm from pesticides, as they routinely experience high

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[53] *See* Cal. Code Regs. tit. 3, §§ 6624, 6627.
[54] *See* EPA, *EPA Posts Pesticide Incident Data Publicly* (July 27, 2023), https://www.epa.gov/newsreleases/epa-posts-pesticide-incident-data-publicly.
[55] *See* Nathan Donley et al., *Pesticides and Environmental Injustice in the USA: Root Causes, Current Regulatory Reinforcement and a Path Forward*, 22 BMC Pub. Health 1, 5 (2022).
[56] *Id.* at 6.
[57] MDA, *Maryland Pesticide Survey Statistics 2022 Report* (2023), https://www.nass.usda.gov/Statistics_by_State/Maryland/Publications/Pesticide/2022-MD-Pesticide.pdf.
[58] *See* U.S. Census Bureau, American Community Survey, https://data.census.gov/table (filter for "Health Insurance" and "All Census Tracts within Maryland"). Data is from 2021.
[59] *See* MDA, *Maryland Pesticide Survey Statistics 2022 Report*, *supra* note 57.
[60] *See* U.S. Census Bureau, *supra* note 58.
[61] *Id.*
[62] *See infra* Section III.A.2.c.
[63] *See* JBS Int'l, Findings from the National Agricultural Workers Survey (NAWS) 2019-2020: A Demographic and Employment Profile of United States Farmworkers at i (2022), https://www.dol.gov/sites/dolgov/files/ETA/naws/pdfs/NAWS%20Research%20Report%2016.pdf.
[64] *Id.* at iv.

levels of exposure,[65] and they often lack adequate protections.[66] Farmworkers may be exposed while mixing and applying pesticides; through contact with pesticide residues on non-target surfaces; and while weeding, harvesting, and transporting pesticide-treated plants. EPA has estimated that doctors diagnose as many as 20,000 incidents of pesticide poisoning in farmworkers each year.[67] Accounting for unreported and misdiagnosed incidents, the number of pesticide poisonings in farmworkers rises to an estimated 300,000 each year.[68] In Maryland, there were at least 50 work-related, pesticide-associated illnesses and injuries reported by poison control centers in 2017, the most recent year for which data is available.[69] This figure is likely a significant undercount of the total number of work-related pesticide poisonings in Maryland, as farmworkers—who likely make up a significant portion of workers poisoned by pesticides[70]—face numerous barriers to reporting incidents and seeking medical care.[71]

Farmworkers' family members are also at high risk of harm from pesticide exposure. Farmworkers commonly live on or near the farms where they work, and pesticides applied on the farms can drift into their yards and homes.[72] According to the National Institute for Occupational Safety and Health, nearly 3,000 pesticide poisoning cases associated with drift occurred in 11 states between 1996 and 2008, and 14 percent of those cases involved children under 15 years of age.[73] Even if they do not live near a farm, farmworkers can expose their family members though pesticide residues on their tools, clothes, shoes, and skin.[74]

Farmworkers face unique challenges to accessing the information they need to receive medical treatment for pesticide exposures. Pesticide labels are an important source of this information, as they include the pesticide's active ingredients, warnings regarding the pesticide's

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[65] *See* Calvert et al., *supra* note 3, at 884.
[66] *See* Union of Concerned Scientists, *Farmworkers at Risk: The Growing Dangers of Pesticides and Heat* 4 (2019), https://www.ucsusa.org/sites/default/files/2019-12/farmworkers-at-risk-report-2019-web.pdf ("Many employers do not post adequate notices that fields have been sprayed with pesticides, fail to enforce 'no entry' periods after spraying, fail to provide required protective gear and training on how to use it, or discourage the use of protective gear.").
[67] *See* EPA, *Regulatory Impact Analysis of Worker Protection Standard for Agricultural Pesticides*, at V-11 (1992).
[68] *See* GAO, *Hired Farmworkers: Health and Well-Being at Risk* 13 (1992), https://www.gao.gov/assets/hrd-92-46.pdf.
[69] *See* Council of State and Territorial Epidemiologists, Occupational Health Indicators, https://www.cste.org/page/OHIndicators (last visited Feb. 7, 2023) (Under "Indicator 11: Acute Work-Related Pesticide Poisonings Reported to Poison Control Centers," select 2017 and click "View Data").
[70] *See* Calvert et al., *supra* note 3, at 884; *see also* Union of Concerned Scientists, *supra* note 66, at 4.
[71] *See* Farmworker Just., *Exposed and Ignored: How Pesticides are Endangering our Nation's Farmworkers* 6, 8 (2013), https://www.farmworkerjustice.org/wp-content/uploads/2012/05/aExposed-and-Ignored-by-Farmworker-Justice-singles-compressed.pdf.
[72] *Id.* at 6.
[73] *See* Nat'l Ins. of Occupational Safety & Health, Ctrs. for Disease Control & Prevention, *Risk of Illness from Pesticide Drift Greatest for Agricultural Workers, Study Finds* (June 6, 2011), https://www.cdc.gov/niosh/updates/upd-06-06-11.html.
[74] *See* Farmworker Just., *supra* note 71, at 6.

effect on the skin and eyes, and procedures to follow if exposure occurs.[75] But farmworkers often face challenges in accessing the information on pesticide labels. According to a report on farmworkers' health and well-being by the General Accounting Office (GAO), farmworkers "may fear that requesting label information from employers could jeopardize their jobs."[76] In addition, many farmworkers do not speak fluent English.[77] So, "[e]ven if they receive label information, they may be unable to read or understand it," according to the GAO report.[78] For these reasons, farmworkers and farmworker advocates have a particularly strong need for publicly available pesticide data.[79]

In contrast to California's detailed data on pesticide use, upon which researchers regularly rely to evaluate threats to public health, MDA's limited data on pesticide use obscures the information necessary to identify and address threats to Marylanders. As discussed in greater detail below, pesticides threaten Marylanders' food security and agricultural economy by causing serious harm to bees, which are necessary for pollinating many important Maryland crops.[80] Pesticides also contaminate the Chesapeake Bay and its rivers and streams,[81] which supply drinking water to millions of Marylanders, support the livelihoods of commercial fishers, and draw tourists to the state.[82]

In addition, pesticides pose a threat to Maryland schoolchildren. A recent report found that 380 Maryland elementary schools are located within a quarter mile of a crop field where pesticides may be applied, with 65 of those schools located within 200 feet of a field.[83] Children in these schools are especially at risk of exposure to pesticide drift.[84] Moreover, Maryland law requires county boards of education to develop and implement integrated pest management ("IPM") policies for schools and school grounds—that is, policies that require nontoxic pest control options to be exhausted or deemed unreasonable before pesticides are used—and to notify the public of the systems.[85] But, as of August 2022, only six of Maryland's 24 county

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[75] *See* GAO, *supra* note 68, at 14.
[76] *Id.*
[77] *See* Farmworker Just., *supra* note 71, at 8.
[78] GAO, *supra* note 68, at 14.
[79] *Id.* (noting that "EPA agrees that . . . farmworkers need unhampered access to label or product-specific information that they can understand").
[80] *See* Md. Dep't of Legis. Servs., *Pollinator Health and the Use of Neonicotinoids in Maryland* 3 (2015), https://dls.maryland.gov/pubs/prod/NatRes/Pollinator-Health-and-the-Use-of-Neonics-in-MD-Rpt-Oct-2015.pdf.
[81] *See Chemical Contamination*, Chesapeake Bay Found., https://www.cbf.org/issues/chemical-contamination/index.html (last visited July 10, 2023).
[82] *See Chesapeake Bay Facts and Figures*, Md. Sea Grant, https://www.mdsg.umd.edu/topics/ecosystems-restoration/chesapeake-bay-facts-and-figures (last visited July 10, 2023).
[83] *See* Scott Faber & Al Rabine, *EWG: Schools Near Pesticide Spray Zones Could Lose Health Protections* (Nov. 2, 2023), https://www.ewg.org/news-insights/news/2023/11/ewg-schools-near-pesticide-spray-zones-could-lose-health-protections.
[84] *Id.*
[85] *See* Md. Code Ann., Agric. §§ 5-208.1(a)(6), 5-208.1(d), 5-208.1(e).

boards of education had adopted and publicly posted the required IPM policy.[86] Without these systems in place and available to the public, children may be more likely to be exposed to pesticides in Maryland schools, and parents lack the information they need to ensure that their children are better protected.

B. Pesticides are harmful to wildlife and the environment.

In addition to harming humans, pesticides damage wildlife and the environment. From aquatic life to soil invertebrates, bees, and birds, pesticides harm and kill individual organisms; drive species declines, including in threatened and endangered species; disrupt interactions among species; and threaten entire ecosystems. Many of the organisms that pesticides harm provide essential ecosystem services, including nutrient cycling, carbon transformation, control of pests and disease, and crop pollination. Pesticides thus pose serious threats to biodiversity and food security.

1. Pesticides pollute waterways and threaten aquatic life.

Pesticide pollution is widespread in waterways across the United States. Indeed, a recent study found pesticides and their transformation products in 90 percent of 442 streams located in the Northeast, Southeast, Midwest, Pacific Northwest, and Coastal California.[87] In line with this finding, numerous studies have found pesticides in the Chesapeake Bay and its rivers and streams.[88] According to scientists at the Chesapeake Bay Foundation, chlorpyrifos—an insecticide that can cause neurological damage in children—is present in 90 percent of water samples taken from the Chesapeake Bay, and 40 percent of samples exceeded safe limits for effects on the ecosystem.[89] Recent water sampling by the U.S. Geological Survey (USGS) also shows pesticide contamination in the Chesapeake Bay watershed, finding a total of 27 different pesticides across samples from just two rivers in the watershed.[90]

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[86] *See* Bonnie Raindrop, *Opinion: Md. Ag Department Falls Short in Protecting People, Pollinators, and the Bay from Pesticides*, Md. Matters (Aug. 31, 2022), https://www.marylandmatters.org/2022/08/31/opinion-md-ag-department-falls-short-in-protecting-people-pollinators-and-the-bay-from-pesticides/.

[87] *See* Barbara J. Mahler et al., *Inclusion of Pesticide Transformation Products Is Key to Estimating Pesticide Exposures and Effects in Small U.S. Streams*, 55 Env't Sci. & Tech. 4740 (2021).

[88] *See* Md. Pesticide Network, *Pesticides and the Maryland Chesapeake Bay Watershed* 13 (2009), https://mdpestnet.org/wp-content/uploads/2022/05/MPN-2009WhitePaper.pdf; *see also* Zhihua Kuang et al., *Atmospheric Deposition of Pesticides to an Agricultural Watershed of the Chesapeake* Bay, 32 J. of Env't Quality 1611, 1618–19 (2003); Makesh Karuppiah & Gian Gupta, *Impact of Point and Nonpoint Source Pollution on Pore Waters of Two Chesapeake Bay Tributaries*, 35 Ecotoxicology & Env't Safety 81, 83–84 (1996)

[89] *See* Tiffany Stecker, *Pesticides Plague Chesapeake Bay, Despite Nutrient Pollution Cuts*, Bloomberg L. (Oct. 30, 2018), https://news.bloomberglaw.com/environment-and-energy/pesticides-plague-chesapeake-bay-despite-nutrient-pollution-cuts-1.

[90] *See* Chesapeake Bay Activities, USGS, *Occurrence of Toxic Contaminant Mixtures in Surface Water and Groundwater in Agricultural Watersheds of the Chesapeake Bay* (2021), https://www.usgs.gov/centers/chesapeake-bay-activities/science/occurrence-toxic-contaminant-mixtures-surface-water-and#overview.

Pesticides can cause serious harm to fish, amphibians, invertebrates, and other aquatic life. In aquatic environments, pesticide toxicity causes mortality, reproductive failure, eggshell thinning, suppression of the immune system, and other fish health complications, such as excessive slime on fish scales and gills, cancers, tumors, and lesions.[91] For example, atrazine is a potent endocrine disruptor that has a particularly strong effect on amphibians, causing depressed testosterone, decreased breeding gland size, demasculinized development, suppressed mating behavior, and decreased fertility.[92] Atrazine is also linked to intersex fish—that is, fish that have both male and female characteristics—which are widespread across the Chesapeake Bay watershed.[93] Indeed, a USGS study of smallmouth bass (*Micropterus dolomieu*) in waters near national wildlife refuges, including in the Chesapeake Bay region, found that 85 percent of male smallmouth bass were intersex.[94]

Pesticides pose serious risks both to animals that are important to aquatic ecosystems and to threatened and endangered aquatic animals. For instance, pesticides harm freshwater bacteria and zooplankton, upon which entire freshwater ecosystems depend.[95] And, according to the U.S. Fish and Wildlife Service (FWS), pesticides threaten the endangered dwarf wedge mussel (*Alasmidonta heterodon*), which is found in Maryland.[96]

2. Pesticides contaminate soils, harming soil invertebrates and disrupting the essential ecosystem services they provide.

Pesticides are often applied directly to soil, leading to extensive contamination.[97] Soils contain a wide diversity of invertebrates, bacteria, fungi, and other organisms, which provide vital ecosystem services, including nutrient cycling, carbon transformation, and control of pests

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[91] *See* Md. Ariful Islam, *Chronic Effects of Organic Pesticides on the Aquatic Environment and Human Health: A Review*, 18 Env't Nanotechnology, Monitoring & Mgmt. 100740 (2022).
[92] *See* Tyrone B. Hayes et al., *Atrazine Induces Complete Feminization and Chemical Castration in Male African Clawed Frogs* (Xenopus laevis), 107 PNAS 4612 (2010).
[93] *See* Neal Augenstein, *Herbicides Likely Source of Growing Intersex Fish Problem*, WTOP News (May 15, 2013), https://wtop.com/news/2013/05/herbicides-likely-source-of-growing-intersex-fish-problem-video/.
[94] *See* Stephanie Smith, *Study Finds Intersex Bass near Wildlife Refuges in Northeast U.S.*, Chesapeake Bay Program (Dec. 17, 2015), https://www.chesapeakebay.net/news/blog/study-finds-intersex-bass-near-wildlife-refuges-in-northeast-u-s.
[95] *See* M.E. DeLorenzo et al., *Toxicity of pesticides to aquatic microorganisms: A Review*, 20 Env't Toxicology & Chemistry 84 (2001).
[96] *See* Comments of the Attorneys General of New Mexico, California, Maryland, Massachusetts, New Jersey, New York, Oregon, Pennsylvania, Washington, Vermont, and the District of Columbia on the Environmental Protection Agency's "Draft Revised Method for National Level Endangered Species Risk Assessment Process for Biological Evaluations of Pesticides; Notice of Availability and Public Meeting" 3 (Aug. 15, 2019), https://www.law.nyu.edu/sites/default/files/ags-comments-epa-pesticides-esa.pdf.
[97] *See* Tari Gunstone et al., *Pesticides and Soil Invertebrates: A Hazard Assessment*, 9 Frontiers in Env't Sci. 1, 2–3 (2021); *see also* Vera Silva, *Pesticide Residues in European Agricultural Soils—A Hidden Reality Unfolded*, 653 Sci. of the Total Env't 1532 (2019).

and disease.[98] These ecosystem services, in turn, support sustainable agricultural production and help to combat climate change, as they help store carbon and regulate the carbon cycle.[99] A recent review of nearly 400 studies of the effects of pesticides on soil invertebrates concluded that pesticides of all types, including insecticides, fungicides, and herbicides, pose a clear hazard to these organisms,[100] causing death and reducing reproduction, growth, cellular function, and overall species diversity.[101] These harms disrupt the essential ecosystem services that soil invertebrates provide, including maintaining healthy soil that stores carbon and, thus, mitigates climate change.

3. Pesticides are toxic to bees and other insects.

Many pesticides are toxic to bees and other beneficial insects, causing significant population declines and, thereby, eroding food security. A robust body of scientific studies shows that neonicotinoids—one of the most widely used classes of insecticides in the world—are especially harmful to bees.[102] Exposure to neonicotinoids adversely affects navigation, learning, food collection, longevity, resistance to disease, and fecundity in bees,[103] putting entire colonies at risk of population extinction.[104] In addition, herbicides—including the widely used glyphosate—also cause serious harm to bees.[105]

Recent changes in Maryland's bee population illustrate these threats: from 2021 to 2022, almost 50 percent of Maryland's bee colonies were lost.[106] Bees play an essential role in our food system by providing pollination. Over 100 crops in the United States—including non-citrus fruit trees, soybeans, and melons, all of which are important Maryland crops[107]—require

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[98] *Id.* at 2.
[99] *Id.*
[100] *Id.* at 1.
[101] *Id.* at 8, Tbl. 2.
[102] *See, e.g.*, J. P. van der Sluijs et al., *Conclusions of the Worldwide Integrated Assessment of Neonicotinoids and Fipronil to Biodiversity and Ecosystem Functioning*, 22 Env't Sci. & Pollution Rsch. 148, 149, 150 (2015).
[103] *Id.*
[104] *See* Gemma L. Baron et al., *Pesticide Reduces Bumblebee Colony Initiation and Increases Probability of Population Extinction*, 9 Nature Ecology & Evolution 1308 (2017). Although Maryland law restricts some sales and uses of neonicotinoids, it allows farmers and applicators certified by MDA to apply neonicotinoids, so they remain a threat to bees. *See* MDA, *Information Sheet Pollinator Protection Act of 2016*, https://mda.maryland.gov/plants-pests/Documents/PollinatorProtectionActFactSheet.pdf (last visited May 9, 2023).
[105] *See* John Abraham et al., *Commercially Formulated Glyphosate Can Kill Non-Target Pollinator Bees under Laboratory Conditions*, 166 Entomologia Experimentalis et Applicata 695 (2018); *see also* Erick V. S. Motta et al., *Oral or Topical Exposure to Glyphosate in Herbicide Formulation Impacts the Gut Microbiota and Survival Rates of Honey Bees*, 86 Microbial Ecology e01150-20 (2020).
[106] *See* Bee Informed P'ship, *2021/22 Weighted Average Annual All Colony Loss*, https://research.beeinformed.org/loss-map/ (Under "Season", select "Annual") (last visited Feb. 8, 2023).
[107] *See* Md. Dep't of Legis. Servs., *supra* note 80.

pollination to make fruit or seed.[108] As a result, threats to bees jeopardize our food security.[109] They also threaten Maryland's agricultural economy. In 2011, bee pollination services contributed $26,667,080 in value to Maryland's apple, peach, soybean, cantaloupe, cucumber, and watermelon production—that is, over 10 percent of the crops' total value.[110]

Bees are not the only important insects under threat from pesticide use. For example, neonicotinoids reach and kill other non-target, beneficial insects, including pollinating hoverflies and parasitic wasps, which are beneficial predators that perform natural pest control.[111] Indeed, studies link neonicotinoid use to insect species declines around the globe.[112] In addition to neonicotinoids, other pesticides also harm insects. For example, pesticides are thought to be a major factor in the declines of many insects that depend on soil for portions of their life cycle, such as ground beetles and ground-nesting bees.[113] Pesticides also pose a threat to butterflies. In 2019, hundreds of monarch butterflies (*Danaus plexippus plexippus*) died in Queen Anne's County, Maryland in the days following pesticide spraying pursuant to the state's mosquito control program.[114] FWS has determined that listing the monarch butterfly as an endangered or threatened species is warranted due in part to threats from insecticides and other pesticides, but listing it is precluded by FWS's need to first complete other, higher-priority listings.[115] And, according to the Maryland Department of Natural Resources, pesticides threaten Maryland populations of the rare Frosted Elfin (*Callophrys irus*), a non-migratory butterfly.[116]

4. Pesticides harm birds.

Pesticides, including neonicotinoids, carbamates, and organophosphates, are toxic to some birds and are linked to declining bird biodiversity. A review of 122 studies found that pesticide use was the most commonly identified driver of declines in birds that depend on

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[108] *See* U.S. Dep't of Agric., *Pollinator Facts* (2020), https://www.usda.gov/sites/default/files/documents/pollinator-week-factsheet-06.25.2020.pdf.
[109] *See* U.S. Dep't of Agric., Report on the National Stakeholders Conference on Honey Bee Health 5 (2012), https://www.usda.gov/sites/default/files/documents/ReportHoneyBeeHealth.pdf.
[110] *See* Md. Dep't of Legis. Servs., *supra* note 80 at 3 Ex. 2.
[111] *See* Miguel Calvo-Agudo et al., *Neonicotinoids in Excretion Product of Phloem-Feeding Insects Kill Beneficial Insects*, 116 PNAS 16187 (2019).
[112] *See* S. Henrik Barmentlo et al., *Experimental Evidence for Neonicotinoid Driven Decline in Aquatic Emerging Insects*, 118 PNAS 1 (2021).
[113] *See* Gunstone et al., *supra* note 97, at 2. For numerous additional examples of the harms pesticides cause to insects, *see* José Eduardo Serrão et al., *Side-Effects of Pesticides on Non-Target Insecticides in Agriculture: A Mini-Review*, 109 Sci. Nature 17 (2022).
[114] *See* Angela Price, *What's Killing the Butterflies?*, Kent Island Bay Times & Record Observer (Oct. 5, 2019), https://www.myeasternshoremd.com/qa/spotlight/whats-killing-the-butterflies/article_d5b4da4d-61f0-568e-904d-2adf615ed801.html.
[115] *See* Endangered and Threatened Wildlife and Plants; 12-Month Finding for the Monarch Butterfly, 85 Fed. Reg. 81,813, 81,813–14 (Dec. 17, 2020).
[116] *See* Md. Dep't of Natural Res., *Rare, Threatened and Endangered Animal Fact Sheet: Frosted Elfin*, https://dnr.maryland.gov/wildlife/pages/plants_wildlife/rte/rteanimalfacts.aspx?AID=Frosted%20Elfin (last visited June 13, 2023).

farmland habitat in North America.[117] Pesticides can kill birds, as well as render them unable to fly, impair their coordination, weaken their immune responses, and damage their DNA.[118] Pesticides can also stunt birds' ability to gain weight necessary for migration, which delays their travel and, in turn, can reduce their chances of survival and reproduction.[119] Rodenticides can cause spontaneous and internal bleeding and prevent blood clotting in birds,[120] posing a particular threat to birds of prey, which are exposed when they consume poisoned rodents.[121] Neonicotinoids also threaten birds. A recent study found that increases in neonicotinoid use led to statistically significant reductions in bird biodiversity between 2008 and 2014.[122]

C. Climate change exacerbates the harms that pesticides cause.

Climate change exacerbates the harms that pesticides cause in at least three ways. *First*, climate change-induced increases in temperature and precipitation facilitate the movement of pesticides from application sites.[123] Increased temperatures cause more pesticide volatilization—that is, conversion to gasses—thus rendering pesticides more susceptible to movement through the air,[124] while increased precipitation leads to more runoff from application sites.[125] *Second*, the effects of climate change are likely to drive agricultural producers to apply greater amounts of pesticides. For example, as climate change increases pesticide volatilization and runoff, producers may apply more pesticides to account for the losses.[126] In addition, rising temperatures can accelerate pesticide degradation and weaken crops' resilience to pests, thus driving producers to increase applications.[127] *Third*, the effects of climate change can make

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[117] *See* R.L. Stanton et al., *Analysis of Trends and Agricultural Drivers of Farmland Bird Declines in North America: A Review*, 254 Agric., Ecosystems & Env't 244, 250 (2018). Similarly, agricultural intensification, and especially pesticide use, is the most influential pressure driving bird population declines in Europe. *See* Stanislas Rigal et al., *Farmland Practices are Driving Bird Population Decline across Europe*, 120 PNAS 1, 5 (2023).
[118] *See* Thomas James Wood & Dave Goulson, *The Environmental Risks of Neonicotinoid Pesticides: A Review of the Evidence Post 2013*, 24 Env't Sci. & Pollution Rsch. Int'l, 17285, 17314 (2017).
[119] *See* Margaret L. Leng et al., *A Neonicotinoid Insecticide Reduces Fueling and Delays Migration in Songbirds*, 365 Sci. 1177 (2019)
[120] *Id.*
[121] *See* Angela Nelson, *Understanding the Risks of Rodent Poisons to Birds of Prey*, Tufts Now (Sept. 16, 2020), https://now.tufts.edu/2020/09/16/understanding-risks-rodent-poisons-birds-prey.
[122] *See* Yijia Li et al., *Neonicotinoids and Decline in Bird Biodiversity in the United States*, 3 Nature Sustainability 1027 (2020); *see also* Caspar A. Hallman et al., *Declines in Insectivorous Birds Are Associated with High Neonicotinoid Concentrations*, 511 Nature 341 (2014).
[123] *See* Pesticide Action Network, *Pesticides & Climate Change: A Vicious Cycle* (Nov. 10, 2022), https://www.panna.org/news/pesticides-climate-change-a-vicious-cycle/#:~:text=Research%20suggests%20weeds%20will%20have,increase%20their%20pesticide%20application%20rates (last visited Feb. 8, 2023).
[124] *Id.*
[125] *Id.*
[126] *See* Ilse Delcour et al., *Literature Review: Impact of Climate Change on Pesticide Use*, 68 Food Rsch. Int'l 7 (2015).
[127] *See id.*; *see also* Pesticide Action Network, *supra* note 123.

pesticides more toxic.[128] For example, one recent study found that increased water temperature and increased salinity both increased a fungicide's toxicity.[129] These increases in pesticide movement, application amount, and toxicity make collecting detailed, scientifically valid, and up-to-date data information on pesticide use all the more important.

II. LEGAL BACKGROUND

Since 1989, MDA has been under a statutory obligation to develop a comprehensive pesticide data program. As discussed below, Maryland law gives MDA the tools it needs to develop and carry out the required program. MDA already requires certain pesticide applicators, sellers, and distributors to maintain pesticide application and sales records. MDA has legal authority to require these applicators, sellers, and distributors to submit their records to MDA annually, and MDA has funding specifically for pesticide data collection, analysis, and reporting. Yet, as demonstrated in the following section, MDA has failed to utilize these tools to adopt a comprehensive pesticide data program, as required.

A. Maryland law requires MDA to develop a comprehensive pesticide data program.

Since 1989, Maryland law has required MDA to "develop a comprehensive pesticide data program that includes: (1) The number and types of enforcement actions taken; and (2) Figures for the number, types, and uses of pesticides in Maryland."[130] MDA must issue a report on the comprehensive pesticide data program to the General Assembly annually.[131]

At the time of the legislation requiring MDA to develop a comprehensive pesticide data program, MDA recognized the need for a database to store information collected through the program. In a letter to the chairperson of the House Environmental Matters Committee regarding potential amendments to the legislation, then-MDA Secretary Wayne A. Crawley, Jr. asked the chairperson to increase Maryland's annual pesticide registration fee so that MDA could "begin development and operation of an information data base that will provide information on subjects including the number and types of pesticide products registered; the

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[128] *See, e.g.*, Julie Verheyen & Robby Stoks, *Current and Future Daily Temperature Fluctuations Make A Pesticide More Toxic: Contrasting Effects on Life History and Physiology*, 248 Env't Pollution 209 (2019).

[129] *See* Nat'l Ctrs. Coastal Ocean Sci., *The Impact of Temperature and Salinity on Pesticide Toxicity*, https://coastalscience.noaa.gov/project/impact-temperature-salinity-pesticide-toxicity/ (last visited Feb. 8, 2023). Climate change can cause increased salinity due to increases in evaporation and reductions in rainfall, which concentrate salt in the water left behind. *See* David Adam, *Climate Change 'Making Seas More Salty,'* The Guardian (Oct. 27, 2008), https://www.theguardian.com/environment/2008/oct/27/climate-change-water.

[130] Md. Code Ann., Agric. § 5-102(c).

[131] *See id.* § 5-102(d). As discussed below, MDA's annual reports to the General Assembly do not contain any pesticide use data and, thus, do not indicate that MDA has the required comprehensive pesticide data program.

number, type, and category of pesticide applicators; the number and type of regulatory or enforcement actions; and the quantities of pesticide products used or sold in Maryland."[132] In the time since this legislation, the legislature increased the pesticide registration fee specifically to support MDA's pesticide data collection and reporting.[133] The legislature has also recognized the threats that pesticides pose to Marylanders and the environment.[134] But, as discussed below, MDA has never developed a pesticide use database.[135]

MDA also recognized that a comprehensive pesticide data program would provide useful information to the legislature and public. In the same letter, then-Secretary Crawley opposed an amendment that would have enumerated certain data points that MDA must collect, because doing so "may restrict [MDA] from collecting or providing some useful information."[136] MDA is not limited to collecting information responsive to the data points enumerated in the statute, because the statute's use of "includes" signifies that the enumerated data points are only *some* examples of the information that constitutes a comprehensive pesticide data program.[137] Nonetheless, then-Secretary Crawley's letter reflects his position that the pesticide data program should collect and provide a wide range of useful information.

B. Maryland law allows MDA to require pesticide applicators, sellers, and distributors to submit pesticide application and sales records to MDA.

MDA regulations require certain pesticide applicators, sellers, and distributors to maintain records of their pesticide applications and sales,[138] and Maryland law allows MDA to require them to submit the records to MDA.[139] In particular, MDA regulations require each

[132] Letter from Wayne A. Crawley, Jr., Secretary, MDA, to The Honorable John S. Arnick, Chairman, Env't Matters Committee (Feb. 3, 1989), attached as Exhibit 2.
[133] *See* Md. Gen. Assemb. Dep't of Legis. Servs., Fiscal and Policy Note, H.B. 621, 2014 Sess., at 1 (2014), https://mgaleg.maryland.gov/2014RS/fnotes/bil_0001/hb0621.pdf.
[134] *See* Md. Gen. Assemb. Dep't of Legis. Servs., Fiscal and Policy Note, S.B. 198, 2016 Sess., at 3 (2016), https://mgaleg.maryland.gov/2016RS/fnotes/bil_0008/sb0198.pdf ("Concern has been raised, however, about [neonicotinoids'] impact on nontarget organisms, including bees and other pollinators, and the environment.").
[135] *See infra* Section III.A.
[136] Letter from Wayne A. Crawley, Jr., *supra* note 132.
[137] *See Liverpool v. Balt. Diamond Exchange, Inc.*, 799 A.2d 1264, 1274 (2002) (explaining that "includes" ordinarily means "comprising by illustration [of a general term] and not by way of limitation").
[138] *See* Md. Code Regs. 15.05.01.07(F); Md. Code Regs. 15.05.01.12; Md. Code Regs. 15.05.01.13(E).
[139] *See* Md. Code Ann., Agric. § 5-204(5) (allowing MDA to "[e]stablish guidelines and requirements for the application of pesticides and providing for submission of records to the Secretary").

certified private applicator,[140] licensee,[141] and permit holder[142] to keep records of: the name of the applicator; the date of the application; the plant, animal, or site to which the pesticide was applied; the size of the area treated or number of plants or animals treated; the address of the property treated; the common name and EPA registration number of the pesticide used; the application rate; and the total amount of the pesticide applied.[143] Each certified private applicator, licensee, and permit holder must maintain records of both their general use and restricted use pesticide applications.[144] MDA regulations also require persons who sell or distribute restricted use pesticides to keep records of: the name of the pesticide sold or distributed, the formulation of the pesticide, the quantity sold or distributed, and the date of sale or distribution.[145] Sellers and distributors of restricted use pesticides must maintain records only of their restricted use pesticide sales.[146] Certified private applicators, licensees, permit holders, and restricted use pesticide sellers and distributors must make the records available to MDA upon request.[147]

C. Maryland law provides funding specifically for pesticide data collection, analysis, and reporting.

Maryland law provides MDA over $100,000 annually for pesticide data collection, analysis, and reporting. In 2014, the legislature passed a bill requiring MDA to use at least $10 of each pesticide registration fee "only for activities . . . relating to the collection, analysis, and reporting of data on pesticide use in the State."[148] To fund this directive, the legislature increased the annual pesticide registration fee from $100 to $110.[149] The legislature estimated that the increased registration fee would increase both revenues and expenditures by approximately $130,000 annually, "due to additional fee collections and corresponding spending."[150] These funds are "supplemental to and [are] not intended to take the place of

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[140] A "private applicator" is a person who uses a restricted use pesticide for the purpose of producing an agricultural commodity on property owned or rented by the applicator or applicator's employer. *See* Md. Code Regs. 15.05.01.01(23).
[141] A "licensee" is a place of business engaged in the business of pest control or pest control consulting. *See* Md. Code Ann., Agric. § 5-207(e).
[142] A "permit holder" is a person who sells or distributes a restricted use pesticide, *see id.* § 5-207(h)(1), or a public agency that applies a pesticide, *see id.* § 5-207(i).
[143] *See* Md. Code Regs. 15.05.01.07(F); Md. Code Regs. 15.05.01.12. Licensees and permit holders must maintain records of more information than certified private applicators. Their records must also include the pest to be controlled, the name of the owner or tenant of the property treated, the concentration of the pesticide used, the type of equipment used, the time of day of the application, and the direction and estimated velocity of the wind at the site of the application, unless the application consisted of baits in bait stations or was made in, or within three feet of, a structure. *See* Md. Code Regs. 15.05.01.12
[144] *See* Md. Code Regs. 15.05.01.07(F); *see also* Md. Code Regs. 15.05.01.12.
[145] *See* Md. Code Regs. 15.05.01.13(E).
[146] *Id.*
[147] *See* Md. Code Regs. 15.05.01.07(F); Md. Code Regs. 15.05.01.12; Md. Code Regs. 15.05.01.13(E).
[148] Md. Code Ann., Agric. § 6-501(d)(2).
[149] *See* Md. Gen. Assemb. Dep't of Legis. Servs., Fiscal and Policy Note, H.B. 621, 2014 Sess., at 1 (2014), https://mgaleg.maryland.gov/2013RS/fnotes/bil_0005/sb0675.pdf.
[150] *Id.*

funding that otherwise would be appropriated for [pesticide data collection, analysis, and reporting]."[151] MDA may use additional funds from pesticide registration fees, late fees, and penalties to develop and operate its comprehensive pesticide data program.[152]

The 2014 legislation stemmed in part from the need to address gaps in information about pesticide use in Maryland. In 2013, the legislature passed a bill creating the Pesticide Information and Reporting Workgroup, which was tasked with assessing various issues related to pesticide use data, including identifying data gaps.[153] The Workgroup concluded that "[b]oth environmental scientists and public health experts indicate that there is an absence of readily available data with which to determine the nature and extent of pesticide usage and human and environmental exposures and to better target limited funding resources."[154] Accordingly, "more complete information about where and when pesticides are used and the extent of pesticides usage is needed."[155] To facilitate the collection of this data, the Workgroup recommended increasing the annual pesticide registration fee and using the proceeds exclusively for pesticide use surveys and data collection.[156] That dedicated fee increase was effectuated through the 2014 legislation.

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[151] Md. Code Ann., Agric. § 6-501(f).
[152] *See id.* § 6-501(d)(1).
[153] *See* Md. Gen. Assemb. Dep't of Legis. Servs., Fiscal and Policy Note, S.B. 675, 2013 Sess., at 1 (2013), https://mgaleg.maryland.gov/2013RS/fnotes/bil_0005/sb0675.pdf. The original language of this bill would have required MDA to develop a pesticide data reporting program similar to the one requested in this petition. *See* S.B. 675 (Md. Feb. 1, 2013), https://mgaleg.maryland.gov/2013RS/bills/sb/sb0675f.pdf. However, to assess the need for a pesticide data reporting program, lawmakers ultimately elected to amend the bill's language to create the Pesticide Information and Reporting Workgroup. *See* Md. Gen. Assemb. Dep't of Legis. Servs., Fiscal and Policy Note, S.B. 675, 2013 Sess., at 1 (2013), https://mgaleg.maryland.gov/2013RS/fnotes/bil_0005/sb0675.pdf. As explained below, the Workgroup determined that a reporting program is necessary. *See infra* note 153 and accompanying text. Under Maryland caselaw, the legislature's decision to not pass the bill as originally written offers little indication of the legislature's position on the pesticide data reporting program the bill would have created. *See City of Balt. Dev. Corp. v. Carmel Realty Assocs.*, 395 Md. 299, 329, 910 A.2d 406, 424 (Md. 2006) (explaining that even a bill's failure is not a definitive indicator of legislative intent "because the General Assembly may well have concluded that the rejected [language] 'warrant[ed] further investigation' before acting on it . . . or decided not to enact the [language] for a myriad of other reasons" (quoting *Auto. Trade Ass'n of Md. v. Ins. Comm'r of Md.* 292 Md. 15, 24, 437 A.2d 199, 203 (Md. 1981) (internal citation omitted)); *see also Harden v. Mass Transit Admin.*, 277 Md. 399, 406 354 A.2d 817, 820–21 (Md. 1976) (explaining that relying on a failed bill to discern legislative intent is "a weak reed upon which to lean").
[154] See MDA, *Interim Report of the Pesticide Information and Reporting Workgroup*, *supra* note 8, at 1–2.
[155] *Id.* at 2.
[156] *See id.* at 6.

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Maryland law requires MDA to develop a comprehensive pesticide data program, and it gives MDA the legal authority and funding to do so. However, MDA has failed to use these tools to comply with the law.

III. JUSTIFICATION

Despite its longstanding duty to develop a comprehensive pesticide data program, MDA has failed to develop the required program. As discussed below, a "comprehensive" pesticide data program must be complete and include everything that is necessary to provide useful information to the legislature and public. However, MDA's pesticide data collection efforts, which consist of sporadic, voluntary pesticide use surveys and bare-bones reports to the General Assembly, fail to meet this standard. To satisfy its statutory duty, MDA should develop a pesticide data program that requires certain pesticide applicators, sellers, and distributors to submit records—which they already are required to keep—to MDA annually and provides for the compilation of detailed information on the date, location, and amount of each pesticide application and sale in a public database. The requested program will provide useful information that legislators, scientists, public health researchers, medical professionals, especially sensitive individuals, and farmers and other applicators can use to identify and address human health and environmental harms caused by pesticides.

A. MDA has failed to satisfy its statutory duty to develop a comprehensive pesticide data program.

1. A "comprehensive" pesticide data program must be complete and include everything that is necessary to provide useful information to the legislature and public.

Principles of statutory interpretation dictate that MDA's comprehensive pesticide data program must be complete and include everything that is necessary to provide useful information to the legislature and public. To interpret a statute, Maryland courts "begin[] 'with the plain language of the statute, and ordinary, popular understanding of the English language dictates interpretation of its terminology.'" *Johnson v. Maryland*, 225 A.3d 44, 50 (2020) (quoting *Blackstone v. Sharma*, 191 A.3d 1188, 1203 (2018)). "[I]t is proper to consult a dictionary or dictionaries for a term's ordinary and popular meaning." *Montgomery Cnty. v. Deibler*, 31 S.3d 191, 198 (2011) (quoting *Chow v. Maryland*, 903 A.2d 388, 396 (2006)). "In addition to the plain language, the modern tendency of [the Supreme Court of Maryland] is to continue the analysis of the statute beyond the plain meaning to examine 'extrinsic sources of legislative intent' in order to 'check [] [its] reading of a statute's plain language' through examining 'the context of a statute, the overall statutory scheme, and archival legislative history of relevant enactments.'" *Johnson*, 225 A.3d at 51–52 (quoting *In re S.K.*, 215 A.3d 300, 311 (Md. 2019)).

Applying the ordinary, proper meaning of "comprehensive," MDA's comprehensive pesticide data program must be "complete and includ[e] everything that is necessary" to provide useful information to the legislature and public.[157] Indeed, the U.S. Supreme Court has adopted a similar understanding of "comprehensive," concluding that "[t]he term 'comprehensive' has a clear meaning—something that is all-encompassing or sweeping."[158] The Maryland legislative history aligns with this interpretation. In then-Secretary Crawley's letter regarding potential amendments to the bill, he opposed enumerating certain information that MDA must collect, because doing so "may restrict [MDA] from collecting or providing some useful information."[159] In other words, MDA did not want the statute to limit its ability to develop a complete program.

2. MDA's pesticide data collection efforts are incomplete and fail to include everything that is necessary to provide useful information to the legislature and public.

Since 1982, MDA has conducted sporadic, voluntary surveys of pesticide use in Maryland with the assistance of the National Agricultural Statistics Service. Over the past 42 years, MDA has conducted only 12 surveys, with gaps of up to seven years between some surveys. For the reasons below, MDA's surveys are incomplete and fail to include everything that is necessary to provide useful information to the legislature and public. *First*, at least some of MDA's surveys do not collect information explicitly required by Maryland law. *Second*, MDA's surveys do not collect detailed information about individual pesticide applications and sales, including the date, location, and amount of each pesticide application and sale. *Third*, they do not reflect information that is representative of pesticide applications and sales in Maryland. And *fourth*, they do not provide up-to-date information. Each of the four flaws in MDA's surveys causes them to fall short of providing useful information that legislators, scientists, public health researchers, medical professionals, especially sensitive individuals, and farmers and other applicators can use to identify and address human health and environmental harms caused by pesticides.

In addition to conducting sporadic pesticide use surveys, MDA also issues annual reports on its pesticide data program to the Maryland General Assembly. *See, e.g.*, MDA, *Pesticide Data Report for 2018*, attached as Exhibit 1. These reports merely state that MDA conducts pesticide use surveys; they do not contain any pesticide use data and, thus, do not indicate that

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[157] "Comprehensive," *Cambridge Dictionary*, https://dictionary.cambridge.org/us/dictionary/english/comprehensive (last visited Jan. 23, 2023); *see also Richmarr Holly Hills, Inc. v. Am. PCS, L.P.*,701 A.2d 879, 897 (1997) (explaining that a "comprehensive zoning plan" must be "well thought out, the product of careful consideration and extensive study, and based upon considerations concerning the common needs of the particular area").

[158] *Gundy v. United States*, 139 S. Ct. 2116, 2126–27 (2019). The Supreme Court was interpreting the Sex Offender Registration and Notification Act, which Congress had declared was "a comprehensive national system for the registration of sex offenders and offenders against children." *Id.* at 2126 (internal quotation marks omitted).

[159] Letter from Wayne A. Crawley, Jr., *supra* note 132.

MDA has the required comprehensive pesticide data program. *See id.* at 12. Moreover, to Petitioners' knowledge, the annual reports are not accessible online.

a. Some of MDA's surveys fail to collect statutorily required information.

Although none of MDA's surveys qualify as comprehensive, several surveys fail to collect all of the information explicitly required by the statute and, therefore, are patently incomplete. Maryland law requires MDA to collect information on the number, types, and uses of pesticides in the state.[160] Yet, the 2004 and 2011 surveys failed to collect *any* information on pesticides uses, instead including only very general information on the types of pesticides applied in the state and the total amounts applied.[161] Despite the fact that pesticide applicators, sellers, and distributors are required to maintain records of the plant, animal, or site to which a pesticide was applied and the size of the area treated or number of plants or animals treated,[162] the surveys did not collect any of this information on pesticide uses. Because at least the 2004 and 2011 pesticide use surveys fail to collect even the minimum information explicitly required by the statute, MDA has not developed a comprehensive pesticide data program.

b. MDA's surveys fail to collect detailed information about individual pesticide applications and sales.

Not only are some of MDA's surveys patently incomplete, but the remaining surveys also fail to qualify as comprehensive because they fail to collect detailed information about individual pesticide applications and sales, which pesticide applicators, sellers, and distributors already are required to maintain. Instead, the surveys at best gather only general information about some applicators' total pesticide usage during the survey year, including the total amount of each pesticide used during the year, the total area on which the pesticides were applied during the year, the county and season in which the pesticides were applied, and the target crop or site.[163] According to numerous public health researchers, the "voluntary sample surveys conducted by MDA have not provided data that meet several [necessary] criteria and hence have fostered no new research" on the links between pesticide exposure and human health harms.[164]

Detailed information about pesticide applications and sales is necessary for the work of legislators, scientists, public health researchers, medical professionals, especially sensitive individuals, and farmers and other applicators. Thus, this information is required for a comprehensive pesticide data program. For example, legislators need this information to identify instances in which pesticide use may pose a particular risk to humans, wildlife, and the

[160] *See* Md. Code Ann., Agric. § 5-102(c).
[161] To Petitioners' knowledge, only the 2004, 2011, 2014, 2020, and 2022 surveys are accessible online.
[162] *See* Md. Code Regs. 15.05.01.07(F); Md. Code Regs. 15.05.01.12.
[163] *See, e.g.*, MDA, *Maryland Pesticide Survey Statistics 2022 Report*, *supra* note 57.
[164] Letter from Lynn Goldman, MS, MPH, MD, Dean, Milken Inst. School of Pub. Health, George Wash. Univ. et al., to Md. Officials, attached as Exhibit 3.

environment.[165] In New York, a study using pesticide application data collected pursuant to the state's Pesticide Reporting Law found that seeds treated with neonicotinoids pose a significant threat to pollinators in the state but do not provide a consistent increase in net income for New York farmers.[166] These findings contributed to state legislation that would restrict use of neonicotinoid-treated seeds.[167]

Scientists and public health researchers likewise need detailed pesticide application data in order to "establish a scientifically valid, reliable and representative information system to guide [their] efforts in tracking pesticide impacts."[168] To determine whether a pesticide is the cause of a cluster of cancer cases or a decline in fish numbers, for example, scientists and public health researchers need to know which pesticides have been applied, where they have been applied, and how much has been applied.[169] According to USGS biologist Dr. Vicki Blazer, scientists could use pesticide use data to "focus research on chemical 'hot spots,' the exact moment high concentrations of pesticides hit waters where vulnerable young fish are

[165] *See* Secretariat of the Convention on Biological Diversity, *supra* note 21; *see also* Per Kudsk, *Pesticide Load—A New Danish Pesticide Risk Indicator with Multiple Applications*, 70 Land Use Pol'y 384 (2018); Ralf Schulz et al., *Applied Pesticide Toxicity Shifts Toward Plants and Invertebrates, Even in GM Crops*, 372 Sci. 6537, 81–84 (2021); Niklas Möhring et al., *An R package to Calculate Potential Environmental and Human Health Risks from Pesticide Applications Using the 'Pesticide Load' Indicator Applied in Denmark*, 191 Computers & Electronics Agric. 106498 (2021).

[166] *See* Travis A. Grout et al., Cornell Univ., *Neonicotinoid Insecticides in New York State* 30 (2020), https://cornell.app.box.com/v/2020-neonicotinoid-report; *see also* Natural Res. Defense Council, *Birds and Bees Protection Act Public Hearing Sparks Debate* (Sept. 20, 2021), https://www.nrdc.org/press-releases/birds-and-bees-protection-act-public-hearing-sparks-debate.

[167] *See* Senate Bill S01856 (N.Y. 2023); *see also* Assembly Speaker Carl E. Heastie, *Assembly Passes the Birds and Bees Protection Act* (Apr. 25, 2023), https://nyassembly.gov/Press/?sec=story&story=105739 (citing the New York study as support for the bill).

[168] *See* Letter from Dan Fisher, PhD, Senior Rsch. Sci., Wye Rsch. Ctr. et al., to Md. officials, attached as Exhibit 4; *see also* Farmworker Just., *supra* note 71, at 4 ("Lack of information hinders public health officials, occupational safety experts, medical personnel, employers, and consumers from making decisions that would best protect farmworkers from pesticide exposure."); Edward J. Kasner et al., *Examining the Role of Wind in Human Illness Due to Pesticide Drift in Washington State, 2000–2015*, 20 Env't Health 1, 13 (2021) (explaining that "more accurate and complete information about location, time, wind speed, and wind direction" is critical for analyzing pesticide drift events and that "[p]ublic health investigators will benefit greatly from improved meteorological data and accurate application records").

[169] *See, e.g.*, Paul K. Mills, *Correlation Analysis of Pesticide Use Data and Cancer Incidence Rates in California Counties*, 53 Archives of Env't Health 410 (2010) (using data collected pursuant to California's Pesticide Use Reporting System to identify correlations between pesticide use and cancer incidence rates).

growing."[170] Medical professionals also need this information to trace potential pesticide exposures and prescribe appropriate treatments.[171]

Marylanders who are especially sensitive to pesticides need detailed pesticide application data to obtain prompt and appropriate treatment when they suffer from exposure to pesticides. MDA regulations allow Marylanders who are sensitive to pesticides to register with the agency, and the regulations require certain pesticide applicators to notify any registered individuals before applying pesticides to property contiguous to the individuals' property.[172] If pesticide-sensitive individuals are exposed due to inadequate notice or an application to property that is not contiguous to their own, access to detailed pesticide application data may aid them in identifying the pesticide to which they were exposed and, as a result, obtaining appropriate medical treatment for the exposure. According to Marylanders who are sensitive to pesticides, MDA does not share application records with registered individuals even after they have been harmed by an application, making access to application data all the more necessary.

In addition, farmers, other pesticide applicators, and researchers studying pesticide applications and outcomes may benefit from detailed pesticide application data. Access to application data could allow a farmer to compare his or her own pesticide use to that of others across the state and make changes to improve effectiveness, reduce costs, and decrease risks to human health and the environment. Indeed, a recent study shows that farmers' intentions to reduce pesticide use are driven strongly by whether other farmers also act.[173] A farmer in Sunderland, Maryland confirms that "reporting would benefit farmers by helping to identify harmful pesticides."[174] Application data could also aid researchers in making recommendations for more effective pesticide use. For example, application information has revealed instances in which reduced pesticide use can increase crop yields.[175] And application data could help both farmers and researchers better understand pesticide-related issues that affect farmers, such as pest and weed resistance, as well as pollinator and beneficial insect declines.

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[170] *See* Darryl Fears, *Bay's Intersex Fish Mystery Remains Unsolved*, Wash. Post (Mar. 17, 2013), https://www.washingtonpost.com/national/health-science/bays-intersex-fish-mystery-remains-unsolved/2013/03/17/7f368734-8746-11e2-9d71-f0feafdd1394_story.html.

[171] *See* GAO, *Farmworkers: Additional Information Needed to Better Protect Workers from Pesticide Exposure* 2–3 (2021), https://www.gao.gov/assets/gao-21-63.pdf (explaining that "in the case of farmworker exposure to a pesticide, information on a pesticide's hazards can be critical to expedite the diagnosis of an illness").

[172] *See* Md. Code Regs. § 15.05.01.17.

[173] *See* L. Bakker et al., *Kicking the Habit: What Makes and Breaks Farmers' Intentions to Reduce Pesticide Use?*, 180 Ecological Econ. 1, 8 (2021).

[174] Fears, *supra* note 170.

[175] *See* Jacob R. Pecenka et al., *IPM Reduces Insecticide Applications by 95% While Maintaining or Enhancing Crop Yields Through Wild Pollinator Conservation*, 118 PNAS 1 (2021).

c. MDA's surveys fail to collect information that is representative of pesticide applications and sales in Maryland.

MDA's pesticide use surveys fail to collect representative information. Because the surveys are voluntary, they suffer from a low response rate. For example, the 2022 survey received responses from just 32.3 percent of all the applicators surveyed.[176] Specifically, the survey received responses from 656 farmers (43.7 percent of the 1,500 farmers surveyed),[177] 277 certified private applicators (20.2 percent of the 2,798 certified private applicators surveyed),[178] 883 commercially licensed business (31.6 percent of the 1,368 businesses surveyed), and 101 public agencies (38.3 percent of the 264 agencies surveyed).[179] Moreover, because the surveys were sent to only a subset of all applicators, the responses are even *less* representative than the low response rate might suggest. The 2022 survey was sent to just 18 percent of Maryland's approximately 12,400 farms,[180] meaning that the responses accounted for only eight percent of all Maryland farmers and certified private applicators. According to scientists and public health researchers familiar with the surveys, sample sizes this small "will not assure scientific validity for research in all areas of the state."[181] The Pesticide Information and Reporting Workgroup agrees, recommending that MDA aim to achieve an 80 percent response rate.[182]

Because the surveys are not representative of pesticide applicators, they also likely are not representative of pesticide applications. Comparing MDA's survey results to USGS's estimates of pesticide use in Maryland makes this clear. Figure One shows MDA's 2022 survey results—which reflect the reported amounts used of the top ten most-used pesticides in each Maryland county in 2022—and USGS's low-end estimate of all pesticides used in each Maryland county in 2018. In nearly every county, the pesticide use amount from MDA's survey is substantially lower than the low-end estimate from USGS. For Frederick County and Queen Anne's County, the survey results are at least four times lower than USGS's estimate. The likely explanation for the significant gap between the survey results and USGS's estimates is that MDA's surveys fail to accurately reflect pesticide use in Maryland.

In addition, county-level pesticide use according to MDA's survey does not correlate with county-level cropland acres harvested, which also indicates that MDA's surveys are not representative of pesticide applications. As shown in Figure Two, which draws from USGS's low-end estimates, pesticide use is typically strongly correlated with the number of acres harvested. In MDA's 2022 survey results, however, there is no correlation between reported

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[176] *See* MDA, *Maryland Pesticide Survey Statistics 20220 Report*, *supra* note 57.
[177] "Farmers" likely includes agricultural producers who do not apply restricted use pesticides.
[178] "Certified private applicators" are agricultural producers who are certified to apply restricted use pesticides. *See* Md. Code Regs. 15.05.01.01(23).
[179] *See* MDA, *Maryland Pesticide Survey Statistics 20220 Report*, *supra* note 57.
[180] *See* U.S. Dep't Agric., *2022-2023 Agricultural Statistics Annual Bulletin: Maryland* 4 (2023), https://www.nass.usda.gov/Statistics_by_State/Maryland/Publications/Annual_Statistical_Bulletin/2022/2022-2023_MD%20Bulletin.pdf.
[181] Letter from Dan Fisher, PhD, *supra* note 168; *see also* Letter from Lynn Goldman, *supra* note 164.
[182] *See* MDA, *Interim Report of the Pesticide Information and Reporting Workgroup*, *supra* note 8, at 6.

pesticide use and acres harvested, as shown in Figure Three. In fact, the survey results show some counties with *high* harvested acreage but with very *low* pesticide use. For example, Frederick County had the highest number of acres harvested but reported far less pesticide use than other counties. According to the 2022 U.S. Census of Agriculture, there were 127,000 acres harvested in Frederick County.[183] Based on the strong relationship between pesticide use and harvested acres shown in Figure Two, it is likely that over 180,000 kilograms of pesticides were used in Frederick County. In contrast, MDA's 2022 pesticide use survey reports just over 50,000 kilograms of pesticide used in Frederick County. In light of the general correlation between pesticide use and acres harvested, the disconnect in the 2022 survey results indicates that the results do not accurately represent pesticide use in Maryland.

[183] *See* U.S. Dep't Agric., *2022 Census of Agriculture Maryland State and County Data* 288, Tbl. 9 (2024), https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_1_State_Level/Maryland/mdv1.pdf.

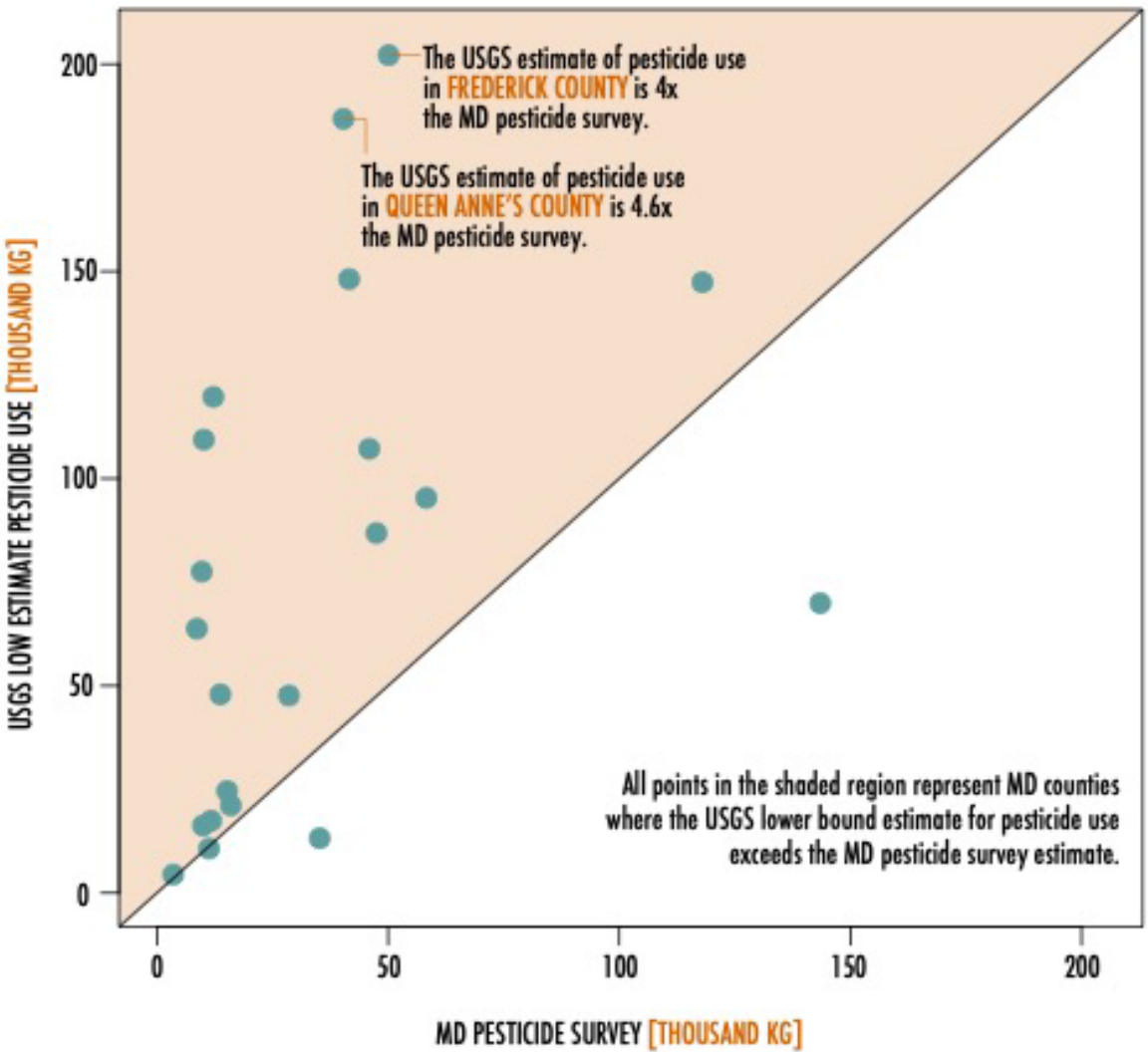

Figure One. County-level pesticide use reported in MDA's 2022 pesticide use survey[184] compared to county-level pesticide use estimated by USGS.[185] Points along the diagonal line show counties with similar values in both datasets. Points above the line show counties with lower values in MDA's survey than in USGS's estimates.

[184] *See* MDA, *Maryland Pesticide Survey Statistics 2022 Report*, *supra* note 57.
[185] *See* C.M. Wieben, USGS, *Preliminary Estimated Annual Agricultural Pesticide Use for Counties of the Coterminous United States, 2018* (2021), https://www.sciencebase.gov/catalog/item/6081a706d34e8564d686618e.

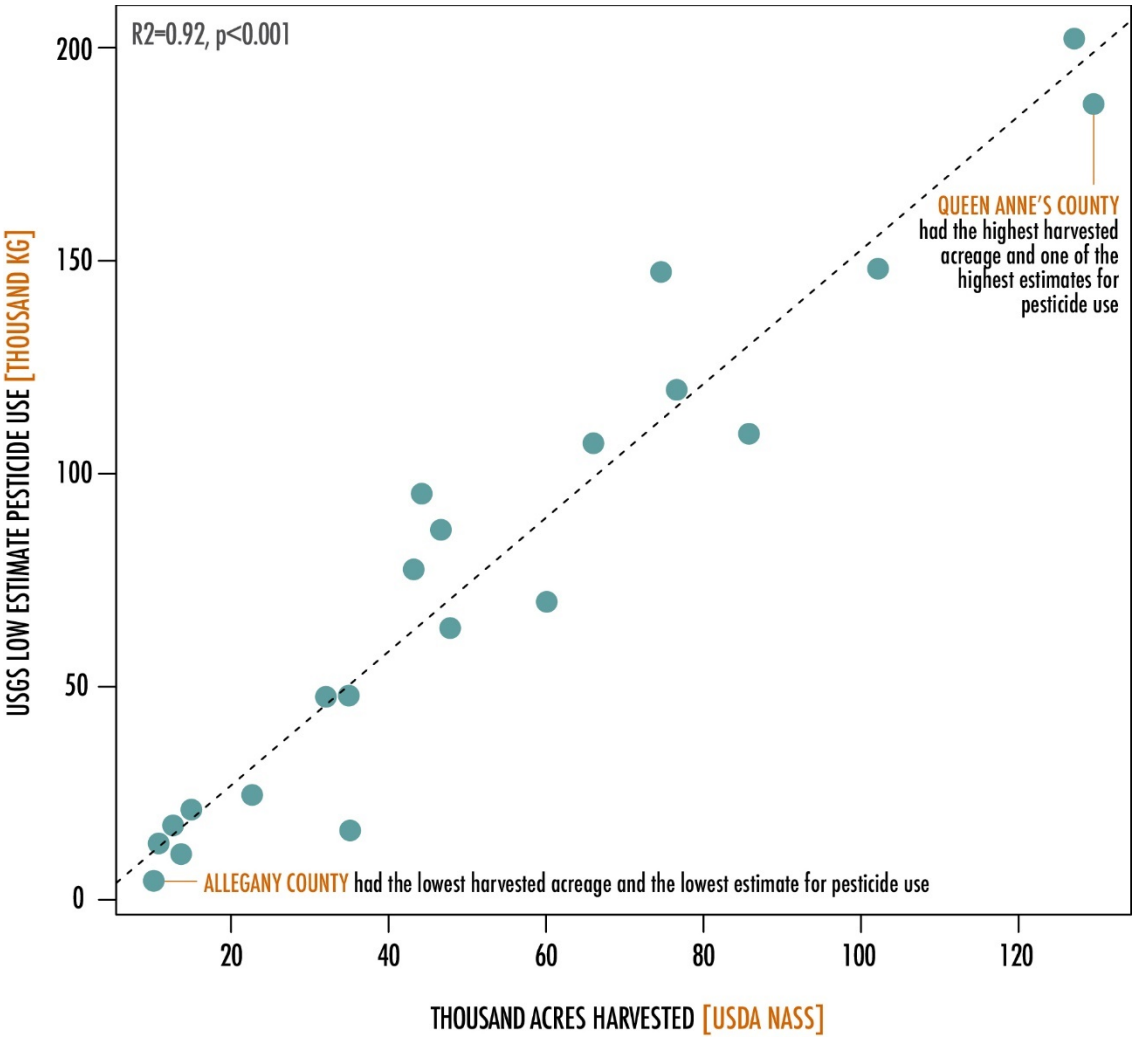

Figure Two. County-level pesticide use estimated by USGS[186] compared to county-level acres harvested as reported in the U.S. Census of Agriculture.[187] Total pesticide use is positively correlated with harvested acreage.

[186] *Id.*

[187] *See* U.S. Dep't Agric., *2017 Census of Agriculture Maryland State and County Data* 272 tbl.9 (2019), https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Maryland/mdv1.pdf.

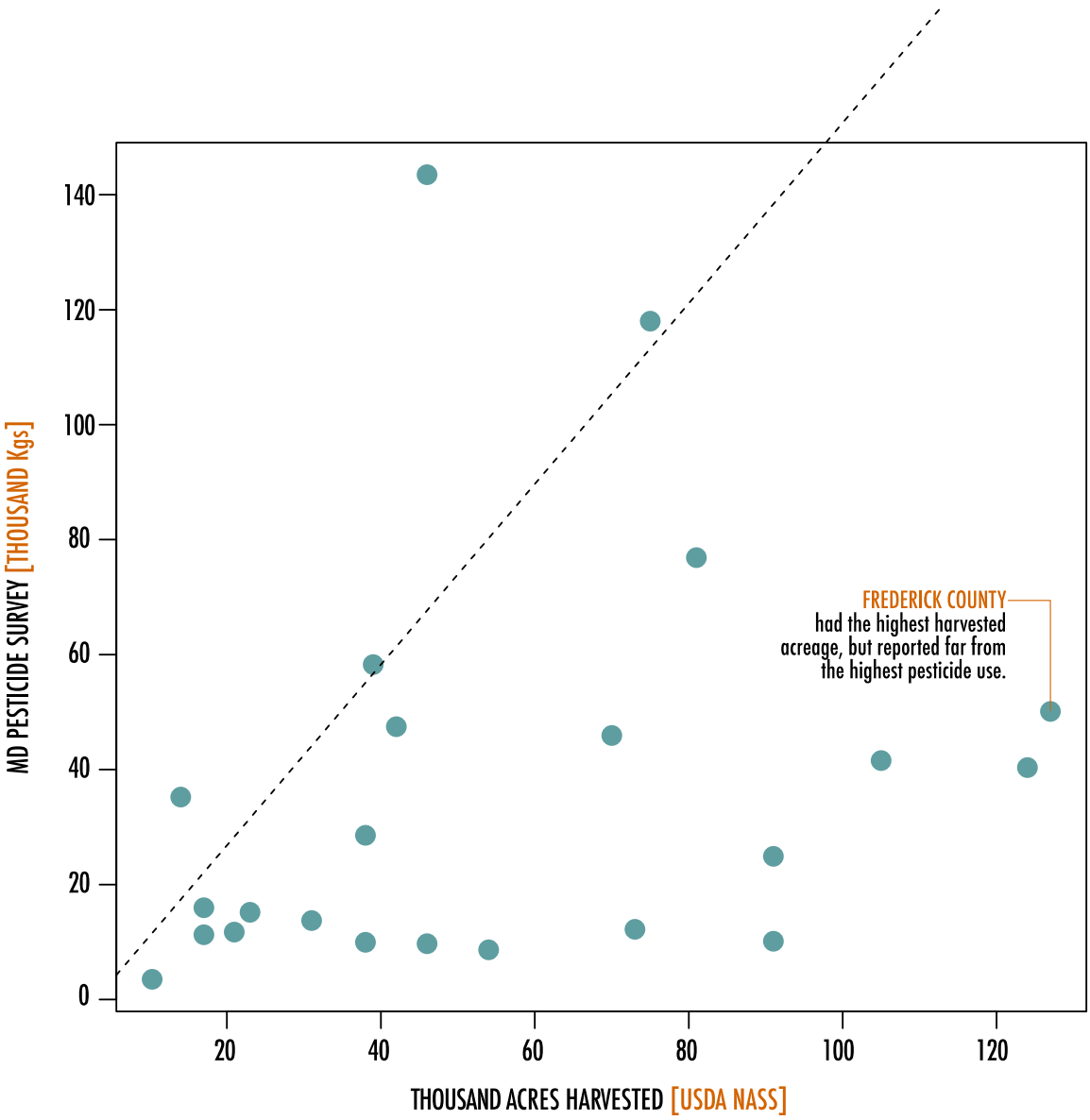

Figure Three. County-level pesticide use reported in MDA's 2022 pesticide use survey[188] compared to county-level acres harvested as reported in the U.S. Census of Agriculture.[189] There is no correlation between reported pesticide use and harvested acreage. The diagonal line shows the expected relationship between these variables based on the USGS and USDA data shown in Figure 2. For most counties, pesticide use reported in MDA's 2022 pesticide use survey is far below that predicted by the strong relationship between harvested acres and pesticide use.

[188] *See* MDA, *Maryland Pesticide Survey Statistics 2022 Report*, *supra* note 57.
[189] *See* U.S. Dep't Agric., *2022 Census of Agriculture Maryland State and County Data.*, *supra* note 183.

d. MDA's surveys fail to provide up-to-date information.

MDA's pesticide use surveys fail to provide up-to-date information. For example, the 2014 survey reflects information on pesticides used in 2014, but the results were not published until October 2016.[190] The same delay exists for the 2011 and 2004 surveys.[191] And, because the surveys usually take at least two years to conduct and publish, and MDA does not work on multiple surveys simultaneously, data is available for only one out of every three years, at most. Scientists and public health researchers agree that this out-of-date and infrequently collected data is inadequate. They explain that in order to establish trends in pesticide use, they need a minimum of three data points.[192] If data is collected only once every three years, it will take nine years to begin to see a trend, and by then, the pesticide usage may have changed, invalidating the trend.[193] Moreover, out-of-date information is less useful for determining whether a pesticide may be the cause of health problems or environmental harms.

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For all these reasons, MDA's pesticide use surveys are incomplete and fail to include everything that is necessary to provide useful information that legislators, scientists, public health researchers, medical professionals, especially sensitive individuals, and farmers and other applicators can use to identify and address human health and environmental harms caused by pesticides. As a result, MDA has failed to satisfy its statutory duty to develop a comprehensive pesticide data program.

B. To satisfy its statutory duty, MDA should develop a pesticide data program that requires pesticide applicators, sellers, and distributors to submit records annually and requires MDA to compile detailed information on the date, location, and amount of each pesticide application and sale in a public database.

To satisfy its statutory duty to develop a comprehensive pesticide data program, MDA should require all licensees, permit holders, certified private applicators, and restricted use pesticide sellers and distributors to submit their records to MDA annually, and MDA should compile detailed information on the date, location, and amount of each pesticide application and sale in a public database.[194] As discussed below, this program will generate data that is complete and necessary to provide useful information, and it will ensure that the data is in a format that is

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[190] *See* MDA, *Maryland Pesticide Statistics for 2014* (2016), https://mda.maryland.gov/plants-pests/Documents/MarylandPesticideSurveyPub.pdf.
[191] *See* MDA, *Maryland Pesticide Statistics for 2011* (2013), https://mda.maryland.gov/Documents/MD_Pesticide_Stats_2011.pdf; *see also* MDA, *Maryland Pesticide Statistics for 2004* (2006), https://mda.maryland.gov/Documents/MD_Pesticide_Stats_2004.pdf.
[192] *See* Letter from Dan Fisher, PhD, *supra* note 168; *see also* Letter from Lynn Goldman, *supra* note 164.
[193] *Id.*
[194] To protect the identity of the applicator, the public database should not include the applicator's name or address.

most useful to legislators and the public. To develop this program, MDA can look to California's pesticide data program, New York's pesticide data program, and the Maryland Department of the Environment's (MDE) Emergency Planning and Community Right-to-Know Act reporting system, called the Maryland Online Tier II Reporting System (MOTTRS), as models, and it can draw from the annual funding that it must set aside for pesticide data collection.

Collecting pesticide use information from pesticide application and sales records will generate data that is complete and necessary to provide useful information to the legislature and public. Existing MDA regulations require all licensees, permit holders, certified private applicators, and restricted use pesticide sellers and distributors to keep detailed records for every pesticide application and sale.[195] For licensees, permit holders, and certified private applicators, these records must include the date of the application; the plant, animal, or site to which the pesticide was applied; the size of the area treated or number of plants or animals treated; the address of the property treated; the common name and EPA registration number of the pesticide used; the application rate; and the total amount of the pesticide applied.[196] And for restricted use pesticide sellers and distributors, these records must include the name of the pesticide sold or distributed, the formulation of the pesticide, the quantity sold or distributed, and the date of sale or distribution.[197] This information will satisfy the statute's minimum requirement to collect data on the number, types, and uses of pesticides in Maryland. It will also meet the needs of legislators, scientists, public health researchers, medical professionals, especially sensitive individuals, and farmers and other applicators, who need detailed, scientifically valid, and up-to-date data in order to identify and address human health and environmental harms caused by pesticides.

Compiling the information from pesticide application and sales records in a public database will ensure that the data is in a format that is most useful to legislators and the public. Indeed, since the relevant statutory provision was enacted in 1989, MDA has recognized the importance of a pesticide database.[198] Scientists and public health researchers agree that a public database is necessary for tracking pesticide impacts.[199] A database will allow users to manipulate the data—that is, reorganize it to make it easier to interpret and incorporate into research—and, according to numerous Maryland scientists, "[i]nvestigators must be able to manipulate data as they are formulating hypotheses and research proposals."[200] In addition, a

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[195] *See* Md. Code Regs. 15.05.01.12; Md. Code Regs. 15.05.01.07(F).
[196] *See* Md. Code Regs. 15.05.01.07(F); Md. Code Regs. 15.05.01.12. Licensees and permit holders must maintain records of more information than certified private applicators. Their records must also include the pest to be controlled, the name of the owner or tenant of the property treated, the concentration of the pesticide used, the type of equipment used, the time of day of the application, and the direction and estimated velocity of the wind at the site of the application, unless the application consisted of baits in bait stations or was made in, or within three feet of, a structure. *See* Md. Code Regs. 15.05.01.12.
[197] *See* Md. Code Regs. 15.05.01.13(E).
[198] *See* Letter from Wayne A. Crawley, Jr., *supra* note 131.
[199] *See* Letter from Dan Fisher, PhD, *supra* note 167; *see also* Letter from Lynn Goldman, *supra* note 163.
[200] Letter from Dan Fisher, PhD, *supra* note 168.

database will facilitate mapping the data. As Maryland scientists explain, "[m]apping environmental problems, such as a decline in primary productivity or a reduction in fish numbers or honeybees or birds, can be compared with pesticide use to identify positive or negative correlations so that pesticides can be ruled in or out as causative agents."[201] A database will also allow for quick and easy review of multiple years of data, which will help medical professionals narrow down the pesticides to which a patient may have been exposed.

MDA can look to California's pesticide data program as a model for Maryland's program. In California, any person who uses a pesticide for an agricultural use, any person who uses a restricted pesticide, any person engaged in the business of pest control, any person who uses a pesticide for industrial post-harvest commodity treatment, and any person who uses a pesticide containing certain chemicals with the potential to pollute groundwater must submit a summary of their monthly pesticide use to their county commissioner at the end of each month.[202] The county commissioners then report the data to the California Department of Pesticide Regulation (CA DPR).[203] CA DPR, in turn, compiles the reports in a publicly available database that is updated each year.[204] According to CA DPR, "[t]he data is used by a wide range of stakeholders including academic and government scientists, growers, registrants, non-profits, policy makers, legal firms, journalists, and the general public," and "[i]t serves to assist [CA DPR] in achieving its mission statement to protect human health and the environment by regulating pesticide sales and use, and by fostering reduced-risk pest management."[205] Indeed, the data collected pursuant to California's pesticide data program has allowed for numerous studies of the effects of pesticide use on Californians and the environment.[206]

MDA can also look to New York's pesticide data program as a model. In New York, all commercial pesticide applicators must maintain records of their applications and submit a report on the applications to the state at least annually.[207] In addition, all persons who sell restricted use pesticides to private applicators must submit a report on their sales to the state at least annually.[208] The New York State Department of Environmental Conservation (NY DEC) must

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[201] *Id.*
[202] *See* Cal. Code Regs. tit. 3 §§ 6624, 6627.
[203] *See* CA DPR, 1. Introduction, https://www.cdpr.ca.gov/docs/pur/purovrvw/purovr1.htm (last visited Jan. 29, 2023).
[204] *See* CA DPR, 8. Maintaining the Databases, https://www.cdpr.ca.gov/docs/pur/purovrvw/purovr8.htm (last visited Jan. 29, 2023).
[205] CA DPR, Pesticide Use Reporting (PUR), https://www.cdpr.ca.gov/docs/pur/purmain.htm (last visited Jan. 29, 2023).
[206] *See, e.g.*, John R. Nuckols et al., *Linkage of the California Pesticide Use Reporting Database with Spatial Land Use Data for Exposure Assessment*, 115 Env't Health Persps. 684 (2007); Robert B. Gunier et al., *Agricultural Pesticide Use in California: Pesticide Prioritization, Use Densities, and Population Distributions for a Childhood Cancer Study*, 109 Env't Health Persps. 1071 (2001); Peggy Reynolds et al., *Agricultural Pesticide Use and Childhood Cancer in California*, 16 Epidemiology 93 (2005); Carlos Davidson, *Declining Downwind: Amphibian Population Declines in California and Historical Pesticide Use*, 14 Ecological Applications 1892 (2004).
[207] *See* N.Y. Env't Conserv. Law § 33-1205(1).
[208] *Id.* § 33-1205(2).

then maintain a database of information from the application reports.[209] Upon the request of an interested person or the New York State Department of Health, NY DEC must provide information from the pesticide application reports by county or zip code.[210] NY DEC also partners with Cornell University to prepare and publish an annual summary of information from the pesticide application reports.[211]

As a model for its database, MDA can look to the Maryland Online Tier II Reporting System.[212] MOTTRS is administered by MDE and is an online reporting system and database where certain Maryland facilities that use or store hazardous materials must report their inventories annually.[213] The facilities are responsible for inputting their inventories into the system using an online portal, making it relatively easy for MDE to administer.[214] MOTTRS includes a geographic information system module, which allows MDE to map the facilities and conduct spatial analyses of potential community hazards.[215] MDE's administration of MOTTRS makes clear that it is feasible for MDA to develop a similar reporting system and database for pesticide application records. Alternatively, MDE and MDA could expand MOTTRS to include the data collected under MDA's comprehensive pesticide data program. Doing so would allow MDA to develop and maintain its pesticide use database efficiently and cost effectively.[216]

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[209] *Id.* § 33-1201.
[210] *Id.* § 33-1203.
[211] *See* NY DEC, *Pesticide Annual Report Data*, https://www.dec.ny.gov/chemical/96898.html (last visited Jan. 29, 2023).
[212] MDA also can look to the Maine Board of Pesticides Control's online portal, which can accept electronic reports from commercial pesticide applicators and pesticide dealers. *See* Maine Board of Pesticides Control, *Online Portal*, Maine Department of Agriculture, Conservation & Forestry, https://www.maine.gov/dacf/php/pesticides/pega.shtml (last visited Apr. 22, 2024). In June 2023, Maine's Governor signed a bill requiring the Board of Pesticides Control to adopt rules necessary to transition from paper to electronic reporting for all commercial pesticide applicators and pesticide dealers. *See* Maine H.P. 1134 – L.D. 1770 (2023). The Board has since adopted rule amendments requiring commercial pesticide applicators and pesticide dealers to maintain and submit electronic reports. *See* Maine Board of Pesticides Control, *Rulemaking*, Maine Department of Agriculture, Conservation & Forestry, https://www.maine.gov/dacf/php/pesticides/rulemaking.html (last visited Dec. 2, 2024).
[213] *See* Md. Dep't of the Env't, Maryland Online Tier II Reporting System (MOTTRS), https://mde.maryland.gov/programs/businessinfocenter/CommunityRightToKnow/Pages/tier2reporting.aspx (last visited Jan. 18, 2023).
[214] *Id.*
[215] *Id.*
[216] Using MOTTRS, or a system like it, would also be feasible for pesticide applicators, including farmers. As of the U.S. Department of Agriculture's latest Census of Agriculture in 2022, 78 percent of Maryland's farmers reported having internet access on their farm. *See* U.S. Dep't Agric., *2022 Census of Agriculture Maryland State and County Data supra* note 183, at 44 tbl. 53, https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_1_State_Level/Maryland/mdv1.pdf. And, in light of the state's ongoing efforts to expand high-speed internet access, farmers' internet access likely has increased since the 2022 Census of Agriculture and will continue to do so. *See* Office of Governor Wes Moore, *Governor Moore Announces Nearly $92 Million Awarded to Expand Broadband Access* (Apr. 5, 2023), https://governor.maryland.gov/news/press/pages/Governor-Moore-Announces-Nearly-$92-Million-Awarded-to-Expand-Broadband-Access.aspx.

MDA can use the annual funding that it must set aside for pesticide data collection to cover a significant portion of the cost of developing and operating the requested program. As described above, the Maryland legislature has already increased the state's pesticide registration fee specifically to provide funding for pesticide data collection, analysis, and reporting.[217] This funding amounts to approximately $130,000 each year.[218] In addition, MDA can draw from the funds it collects from pesticide registration fees, late fees, and penalties to cover the cost of the database.[219] In fiscal year 2020, MDA received $604,503 from pesticide registration and license fees,[220] and in fiscal year 2019, MDA received $1,032,003 from pesticide registration and license fees.[221] According to a professor at the University of Maryland who has developed data storage systems, it will cost MDA approximately $250,000 to $350,000 to develop its pesticide database and the same amount or less each year to operate it.[222] This cost may be lower if MDE and MDA expanded MOTTRS to include MDA's pesticide use data.[223] Thus, MDA has ample funds available to develop and operate the requested comprehensive pesticide data program. And even if the funds were insufficient, MDA cannot rely on inadequate funding to avoid complying with its statutory duty to develop a comprehensive pesticide data program.[224]

PROPOSED REGULATORY LANGUAGE

All certified private applicators, licensees, and permit holders who are required to maintain pesticide identification, recommendation, and application records pursuant to Md. Code Regs. 15.05.01.07(F) and Md. Code Regs. 15.05.01.12 must submit copies of their records to MDA at least annually.

All persons who sell or distribute restricted use pesticides and are required to maintain pesticide records on the sale or distribution of each pesticide pursuant to Md. Code Regs. 15.05.01.13 must submit copies of their records to MDA at least annually.

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[217] *See infra* Section II.C.
[218] *See* Md. Gen. Assemb. Dep't of Legis. Servs., Fiscal and Policy Note, H.B. 621, 2014 Sess., at 1 (2014), https://mgaleg.maryland.gov/2013RS/fnotes/bil_0005/sb0675.pdf.
[219] *See* Md. Code Agric. § 6-501(d).
[220] *See* Md. Dep't of Budget & Mgmt., FY 2019 Statement of Dedicated Special Funds at 4, https://dbm.maryland.gov/budget/StatementofDedicatedSpecialFunds/FY19-StatementofDedicatedSpecialFunds.pdf.
[221] *Id.*
[222] *See* Letter from Min Qi Wang, Professor, College of Health & Human Performance & George Harman, Env't Consultant (Nov. 11, 2013), attached as Exhibit 5.
[223] *Id.*
[224] *See Loudner v. U.S.*, 108 F.3d 896, 903 n.7 (8th Cir. 2001) (noting that "the government may not avoid its . . . duties on the grounds that [its] budget and staff . . . are inadequate"); *see also Forest Guardians v. Babbitt*, 174 F.3d 1178, 1192 (10th Cir. 2001) (rejecting the argument that inadequate funding relieved the government of its statutory duty, as it would amount to an argument that the legislature's inadequate appropriations repealed the duty by implication, which is disfavored); *Ctr. for Biological Diversity v. Norton*, 304 F. Supp. 2d 1174, 1179 (D. Arizona 2003) (explaining that "[b]udgetary constraints, far from being exceptional, are an everyday reality" and do not excuse an agency from complying with the law).

The Secretary shall compile the following information from all pesticide identification, recommendation, and application records into a searchable public database at least annually:[225]

a. the date of the application;
b. the plant, animal, or site to which the pesticide was applied;
c. the size of the area treated or number of plants or animals treated;
d. the zip code of the address of the property treated;
e. the common name and EPA registration number of the pesticide used;
f. the application rate; and
g. the total amount of the pesticide applied.

The Secretary shall compile the following information from all restricted use pesticide sales and distribution records into a searchable public database at least annually:

a. the name of the pesticide sold or distributed
b. the formulation of the pesticide
c. the amount sold or distributed
d. the date of the sale or distribution
e. the name of the seller or distributor
f. the address of the seller or distributor

CONCLUSION

MDA's failure to develop a comprehensive pesticide data program violates Maryland law and deprives Marylanders of the information they need to identify and address the numerous harms that pesticides cause. To remedy these issues, Petitioners ask MDA to develop a comprehensive pesticide data program that requires pesticide applicators, sellers, and distributors to submit records annually and compiles detailed information on the date, location, and amount of each pesticide application and sale in a public database.

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2001 Veirs Mill Rd.
Rockville, MD 20848
(240) 772-1639

(continued)

[225] If including any portion of the listed data would disclose information about the operations of an individual applicator, MDA could omit the data, using the U.S. Department of Agriculture's procedure for maintaining respondent confidentiality in the U.S. Census of Agriculture as a model. *See* U.S. Dep't of Agric., *2022 Census of Agriculture*, *supra* note 183 at ix. ("Any tabulated item that identifies data reported by a respondent or allows a respondent's data to be accurately estimated or derived, was suppressed and coded with a 'D.'").

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Assateague Coastal Trust
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Audubon Mid-Atlantic
2901 East Baltimore St.
Baltimore, MD 21224
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Bee Friendly Apiary


Beyond Pesticides
701 E Street SE, Suite 200
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Caitlin Ceryes, PhD, MPH, RN *
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Chesapeake Physicians for Social Responsibility
P.O. Box 10445
Baltimore, MD 21209
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Clean Water Action
145 W. Ostend St., Suite 600
Baltimore, MD 21230
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Cottingham Farm LLC
[redacted]

Earthjustice
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Washington, DC 20001
(202) 667-4500

Environmental Working Group
1250 I St. NW, Suite 1000
Washington, DC 20005
(202) 939-9158

The Farm at Our House
[redacted]

Farmworker Justice
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Forested
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Friends of the Earth
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Washington, DC 20005
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Friends of the Nanticoke River
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GreenLatinos
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Magothy River Association
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Maryland Conservation Council
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Maryland Ornithological Society
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Ellicott City, MD 21042
(410) 313-8154

Maryland Pesticide Education Network
544 Epping Forest Rd.
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(410) 849-3909

Maryland Votes for Animals, Inc.
P.O. Box 10411
Baltimore, MD 21209

Mason Farms Produce LLC


Migrant Clinicians Network
225 N. Division St., Suite 302-303
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(512) 579-5435

Montgomery Countryside Alliance
P.O. Box 24
Poolesville, MD 20837
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Moon Valley Farm


Next Step Produce
10615 Benton Rd.
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Potomac Riverkeeper Network
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Provident Farm


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Benjamin Zaitchik, PhD *
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[redacted]

* Denotes petitioners who sign the petition in their individual capacity.

Exhibit 1

MARYLAND

PESTICIDE DATA REPORT

FOR 2018

MARYLAND
DEPARTMENT OF AGRICULTURE

Lawrence J. Hogan, Jr.
Governor

Boyd K. Rutherford
Lieutenant Governor

Joseph Bartenfelder
Secretary of Agriculture

Julie Olberg
Deputy Secretary

MARYLAND PESTICIDE DATA REPORT FOR 2018

1. INTRODUCTION

The Maryland Pesticide Regulation and labeling Law (Title 5, Subtitle 1, Agricultural Article, Ann. Code Md) Section 5-102 (D), requires the Secretary of Agriculture to develop Secretary of Agriculture to develop a comprehensive pesticide data program and to provide to the General Assembly, in accordance with Section 2-1246 of the State Government Article, a report on pesticide data. The annual data program is to include the number and types of enforcement actions taken and figures for the number, types and uses of pesticides in Maryland.

A pesticide is defined generally by state and federal law, is any substance, or mixture of substances intended to prevent, destroy, repel, or mitigate any pest. There are a least 21 different classes (types) of pesticides based on their target pests, including algaecide – target pest is algae; avicide - birds; bactericide – bacteria; fungicide – fungi; growth regulator – insect or plant growth; herbicide – weeds; insecticides – insects; rodenticide – rodents; and slime – slime molds.

2. The Maryland Department of Agriculture (MDA) is the State agency responsible for regulating the distribution, sale, storage, use and disposal of pesticides in Maryland The Department cooperates with other State agencies and institutions and federal agencies to conduct pesticide education, regulatory and enforcement programs. Departmental activities and responsibilities are described briefly, as follows:

Pesticide Regulation Section (PRS)

1. Enforcement Program

   The Pesticide Regulation Section of the Maryland Department of Agriculture enforces federal (Federal Insecticide, Fungicide, and Rodenticide Act

or, (FIFRA) and State (Pesticide Applicator's Law) pesticide use laws use laws and regulation. Under the enforcement program, MDA conducts routine inspections of licensed pesticide businesses, public agencies and Restricted use pesticide dealers. Inspections include a review of pesticide application records , restricted use pesticide sales records, safety equipment, pesticide storage areas, application equipment, vehicles and anti-siphon devices. Use observations are conducted to observe actual pesticide applications to field crops, structures, lawns and ornamentals to ensure compliance with label direction and state and federal regulations.

Pesticide misuse incidents and, consumer complaints are investigated. In the event of a violation, the Department has the authority to suspend, revoke or deny a license or certificate and to assess a civil penalty. As part of a Cooperative Agreement with the U.S. Environmental Protection Agency (EPA), the Pesticide Regulation Section conducts inspections at Pesticide Producer Establishments, Market Places, Worker Protection, Container-Containment and Pesticide Imports. EPA also refers complaint investigations and special initiative inspections to the Department for investigation.

2. Application Certification and Training Program

The Pesticide Regulation Section certifies private and commercial pesticide applicators to verify the competence of the applicator. Private applicators (farmers) are given closed book written exams to become certified for a three year period. Certification authorizes them to purchase and apply Restricted Use Pesticides on their own property for the purpose of producing agricultural commodities. Certificates are renewed by MDA after submission of proof of update

training. MDA certifies commercial pesticide applicators (employees of pest control businesses and public agencies) who meet the minimum standards of experience or education requirements and who have passed written exams in specific pest control categories. Commercial applicator certificates are renewed annually, after required training has been obtained in order to maintain their level of competency. MDA approves and monitors applicator recertification training courses and sets minimum standards for approval of courses for recertification purposes. Private and commercial applicator training sessions are coordinated with county extension agents who are provided training materials such as slide sets, videos and educational brochures by MDA. In addition, MDA registers employees who work under the supervision of certified commercial applicator. Prior to registration with the Department and, within 30 days of employment, the employee must be trained according to standards developed by MDA.

MDA issues licenses and permits to pesticide businesses or public agencies that apply general or Restricted Use Pesticides. Dealers who sell Restricted Use Pesticides must obtain a permit issued by MDA to do so. MDA issues licenses to pest control consultants who either identify pests or recommend pesticides or other techniques for the purpose of controlling pests.

3. Technical Information Collection and Dissemination Program

The Pesticide Regulation Section provides information to pesticide applicators, dealers, federal, state and local agencies and the general public on issues concerning pesticide use and pesticide regulations.

Training materials, information brochures and fact sheets are developed for pesticide applicators in order to provide compliance assistance when new guidelines or regulations are implemented. A series of "Pesticide Information Sheets" were developed to provide information on pesticide issues and regulations to consumers and pesticide applicators. The Pesticide Regulation Section developed a Consumer Information Bulletin for use by licensed lawn and landscape firms for distribution to their customers. In addition, the section has compiled pesticide product label information that must be given to all pest control customers to inform them of any safety precautions or environment hazards associated with each pesticide used. A listing of pesticide sensitive individuals is available so that these listed individuals can receive advance notification prior to lawn and ornamental pesticide applications being made to adjacent properties by licensed pest control businesses or public agencies. Maryland is one of only twelve (12) states that have a mandated pesticide sensitive individual notification program.

The Department provides information to applicants on where and how to obtain study materials for certification and conducts certification examination session every other month in three regional locations. Private applicators (farmers applying Restricted Use Pesticides) receive exam study materials provided by the Department and ae offered certification examinations in county extension offices on and as-needed basis.

Homeowners are given information on licensing requirements for pest control firms, as well as, information on termite inspections and control, proper pesticide handling and alternatives to chemical pest control. Table top displays, brochures, and "Pesticide Information

sheets" have been developed for use at various trade shows, grower meetings and, State and County Fairs.

During 2018, MDA continued to expand the Pesticide Regulation Section's Homepage so that information on pesticide business licensing requirements, Certification exam dates, Pesticide Information Sheets and, Integrated Pest Management is Schools is available on the internet. Consumers can electronically file complaints, report pesticide incidents, download application forms to apply for Certification, request employee I.D. cards and request additional information about pesticide regulations and management programs. An added feature to the Section's website is a searchable pesticide products, licensed pest control businesses and pesticide database of registered applications.

4. Water Quality Protection, Endangered Species Protection and Worker Protection Programs.

MDA is involves in four Federal (EPA) regulatory programs that are being implemented through the states. The Department had developed a State Water Quality management plan for managing the use of pesticides to protect water resources as part of its Water Quality Protection Program. The Department monitors EPA's "Pesticides of Interest" list annually to maintain a list of" Pesticides of Concern" in Maryland. Under the Endangered Species Protection Program, the Department is responsible to protect federally listed endangered species that may be harmed by the use of certain

pesticides. The Department has implemented and conducts the federal Worker Protection Standard Program to protect certain pesticide users, handlers and farm workers from exposure to pesticides. EPA is currently revising some sections of the Worker Protection Standards. The Department also inspects agricultural facilities to ensue bulk pesticide storage tank, containment structures and mixing/loading pads meet state and federal requirements.

5. Special Programs

The Pesticide Regulation Section conducts special programs relating to Pesticide Management, when funding is available. These special programs address specific Pesticide issue, environmental concerns or regional situations that require additional focus and attention beyond routine programs. Special programs may include development of informational materials and pesticide education programs, as well as, participation in pesticide monitoring programs and coordination of pesticide container and unusable pesticide disposal programs.

6. Chesapeake Bay Programs

MDA is an active participant in efforts to restore the Chesapeake Bay. Pesticide Management commitments have been incorporated Into the Toxic Strategy and include Commitments for adoption of Integrated Pest Management, development of programs for pesticide container recycling and unusable pesticide disposal, and implementation of agricultural best management practices. These pesticide management programs have placed Maryland in a leadership role and have given MDA recognition as one of the key Bay agencies in toxic reduction.

7. Integrated Pest Management in Schools and on School Grounds

The Pesticide Regulation Section has been conducting and Integrated Pest Management (IPM) in Public Schools Program Since 1995, in cooperation with the Maryland State Department of Education, Maryland Association of Boards of Education County School Systems, the University of Maryland, Maryland State Pest Control Association and EPA. The purpose of the Program is to review each school systems pest management Practices and to provide technical assistance to Maryland Public School system to facilitate the implementation of IPM programs In order to reduce the risk of exposing students and staff members to pesticides. Mandatory IPM programs have been required in Maryland Public Schools and on school grounds since 2000.

Maryland Department of Agriculture Contacts:

Kevin Conroy	Dennis Howard	Tom Phillips
Assistant Secretary	Program Manager	State Chemist
Office of Plant Industries	Pesticide Regulation	State Chemist Section

B. State Chemist Section (SCS)

1. Registration

The State Chemist Section (SCS) is responsible for registering all pesticide Products distributed, sold, or transported in Maryland. The purpose for product registration is to ensure the sale and distribution of commodities that are effective and safe for humans and the environment. In 2018 the State Chemist Section registered 13,??? pesticide products.

2. Inspection

Product quality and safety are determined by chemical analysis of products sampled by the Section's staff which inspects, on a regular schedule, warehouses and retail outlets during 2018. Two hundred products were Sampled for formulation analysis, State Chemist Inspectors also collected 353 Samples of fruit juice, produce, fruit and processed food to be analyzed by USDA/FDA to aid in establishing pesticide tolerances in foods consumed by children and infants.

3. Chemical Analyses

In 2018 the State Chemist Section analyzed ?? samples that Where collected by the Pesticide Regulation Section during complaint investigations, as well as, at producer establishments and market place inspections to determine if the pesticide products contained the active ingredients specified on the pesticide product labels.

III. PESTICIDE REGISTRATION DATA AND ENFORCEMENT

The Pesticide Registration and Labeling Law requires a distributor of pesticide Products to annually register the product with MDA's State Chemist Section (SCS) before distribution in the State. The State Chemist Section utilizes a Computerized registration process, which has expedited and improved accuracy of the registration process and has enabled the Section to compile more information about registered pesticide products.

During 2018 pesticide product registration data included

1. Number of registrants = 1,150

2. Number of pesticide products registered = 11,152

As a result of the State Chemist Section's enforcement and registration program (product sample collection, chemical analysis and label review), the following regulatory actions were taken against pesticide products violating the State Pesticide Registration and Labeling Law:

- Market place samples collected and analyzed = 231
- Total Chemical analyzed = 277
- Non-registered products (products offered for sale but not registered with the Department) Stop Sale = 14

In support of the Pesticide Regulation Section's enforcement activities, the SCS laboratory analyzed samples (soil, water, plant tissues, swabs, products, etc.) for pesticide residues. The following summary of the analyses:

Investigation Samples (pesticide misuse, accidents):

Samples analyzed = 140

Total Number of analyses = 15,026

IV. PESTICIDE USE ENFORCEMENT INSPECTION AND ACTIONS

During 2018, inspection of licenses, pest control businesses and public Agencies were conducted as follows:

1. Routine business inspection = 887
2. Routine public agency inspection = 39
3. Pesticide Dealer Inspections = 83
4. Pesticide Use Observations = 32
5. Pesticide Samples collected for analysis = 57
6. Applicator records reviewed = 783

Violations detected during pest control business inspections are Summarized in Table 1 and include:

1. Unregistered employee violations = 14
2. Records incomplete or inaccurate = 73
3. Vehicles not properly identified = 8
4. No Anti-Siphon Device = 4
5. No First Aid/Safety Equipment = 12
6. No customer information provided = 6

During 2018, regulatory or enforcement actions taken against indviduals or firms for violating the Maryland Pesticide Applicators Law. The actions taken or penalties assessed from specific violations of the law or regulations are summarized as follows:

1. Consumer Complaint Investigations = 39 (Investigation initiated as a result of a written complaints from a consumer regarding a pest inspection).
2. An investigational conference held with a licensee gather information about an ongoing investigation and to alert the licensee to correct the situation.
3. Records incomplete or inaccurate = 14
4. Vehicles not properly identified = 18
5. No Anti-Siphon device = 3

4.Penalties Assessed

a. Notice of Warnings = 92 (Certified Letter notifying licensee, permitee, or individual that they have committed a violation or, that a situation needs to be corrected)

b. Field Notice = 8 (Violation noted by field Inspector during routine inspections. Licensee, Permittee or individual is informed of an infraction.

c. Criminal Action = 0 (Action taken against an individual or company that operating without a pesticide business license or who had repeatedly violated pesticide laws. Individual is prosecuted through county court system).

d. Civil Penalties = 8 civil penalties were assessed in lieu of or in addition to a suspension or revocation of a license, permit, certificate, or an employee registration card. Licensees were assessed a total of $8,000 dollars.

V. PESTICIDE APPLICATOR CERTIFICATION AND TRAINING PROGRAM

During 2018, the following licensing and certification activities were conducted and are summarized below.

1. Pesticide businesses licensed	=1,560
2. Public agencies permitted	= 336
3. Pesticide dealer permits	=975
4. Pest control applicators certified	=4,679
5. Private applicators certified	=3,182
6. Commercial applicators examined	=821
7. Total examinations administered	=2,163

In order to maintain applicator certification, private applicators must participate in Departmental approved training once every three years. Commercial applicators of pesticides must attend an annual recertification training session. The following data indicates training held in 2018.

1. Commercial applicator training sessions held	= 531
2. Private applicator training sessions held	=138
3. Commercial applicators recertified	=3,782
4. Private applicators recertified	=1,362

VI. PESTICIDE USE DATA

The Pesticide Regulation Section regulates the use of pesticides in Maryand (See Section II). An essential factor in conducting effective regulatory education programs on pesticides is data relating to the quantity and distribution of pesticide product usage in the State. It is costly and complicated process to collect pesticide usage data. Therefore, the Department conducted pesticide usage surveys on a 3 year cycle, beginning in 1982 and followed with surveys for 1985, 1988, 1991, 1994, 1997, and for 2000. Due to limited resources (funds and personnel), the Department was limited to conduction additional pesticide usage Surveys in 2004 and 2011. The date was compiled by the National Agricultural Statistics Services (NASS), and agency of the U.S. Department of Agriculture, in cooperation with the Maryland Department of Agriculture. The Department contract with NASS to conduct the surveys and to provide final Data but, MDA has no access to the raw data in order to protect the confidentiality of the Data and privacy of the respondents.

Maryland is unique in having such extensive pesticide use data, as no neighboring state has similar data. These data meet the commitment made by Maryland as part of the Chesapeake Bay Agreement. In addition, the data has been used in a variety of ways, including as a basis for conducting surface water surveys or ground water surveys, an as a potential to be a problem in water sources. MDA is planning on contracting with NASS to conduct future pesticide usage surveys.

VII. WATHER QUALTIY PROTECTION, ENDANGERED SPECIES PROTECTION AND WORKER PROTECTION PROGRAM

MDA, as state lead agency for pesticide management, is responsible for developing a Pesticide Management Plan (PMP) to protect water quality. The Pesticide Regulation Section has participated in EPA sponsored ground water protection training courses on pesticides

pesticide monitoring and wellhead protection in order to obtain information and guidance on developing Maryland's PMP. The PMP is on facet of an overall Comprehensive State Ground Water Protection Program (CSGWPP) which includes all state programs affecting ground water resources of the State.

MDA coordinated efforts with the Maryland Department of the Environment (MDE) and the Maryland Department of Natural Resources (DNR) to initate development of Maryland's CSGWPP and PMP. Data collected from the pesticide monitoring plans have been used to develop the generic Pesticide Management Plan. Ground water protection educational materials were developed for farmers, commercial applicators and pesticide dealers and incorporated into application recertification programs. MD has also contracted with the Unites States Geological Survey (USGSO) in a number of monitoring projects located in the Chesapeake Bay.

MDA continues to support the United States Environmental Protection Agency (EPA) in its efforts to protect endangered species program since it was initiated in 1992. The first endangered species listed in Maryland was the Maryland Darter. MDA developed informational brochures and distributed them to growers, commercial and private applicators located in Harford County Maryland.

The federal worker protection standards (WPS) became effective in August of 1992. MDA continues to disseminate information on the federal program in pesticide applicator training programs. EPA has recently provided the States with additional information on the changes to the Worker Protection Standards. Once the they are completed and put in place MDA will provide information to farmers and farm workers regarding the new regulations.

VIII. SPECIAL PROGRAMS

MDA continues to conduct empty pesticide container recycling in Maryland. In 2018 the Pesticide Container Recycling Program collected 28 tons of plastic pesticide contains for recycling.

IX. INTEGRATED PEST MANAGEMENT IN SHOOLS

MDA continues to promote and implement the Integrated Pest Management (IPM) Program in Maryland's Public Schools. Legislation was passed in 1999 that expanded the 1998 law to include pesticide use on school grounds. Schools are required to provide notification to parents, students, and staff of pesticide applications to school buildings and on school grounds. MDA Pesticide Regulation Section staff reviewed and approved revised plans that incorporated programs for managing pest problems on school grounds and provided technical assistance in the development of the plans. All of Maryland's Public schools have fully implemented their IPM programs. MDA staff ensure continued compliance with these IPM regulations. As total of 59 public schools were inspected in 2018.

X. A SUMMARY AND COMPARISON OF PROGRAN ACTIVITIES CONDUCTED BY THE PESTICIDE REGULATION SECTION

Note: Inspection numbers were done in FY 2018 due to the loss of one of the Pesticide Regulation Section's Inspectors. The Pesticide Regulation Section is currently in the process of interviewing Individuals to select a new pesticide agricultural Inspector.

APPENDIX A
PESTICIDE REGULATION SECTION ACTIVITIES

	2016	2017	2018
Pesticide Business Licensed	1,693	1,521	1,708
Not-For Hire Business License	156	140	145
Commercial Pest Control Applicator Certified in One or more More Pest Control Categories	3,495	3,501	3,671
Registered Personnel Employed by Licensed Business And Public Agencies	7,502	7,521	7,599
Public Agency Permits Issues	312	330	342
Public Agency Applicators Certified in One or More Pest Control Category	1,010	1,016	1,024
Private Applicators Certified to Date	3,286	3,342	3,402
Dealer Permits Issued	150	140	142
Applicator Certification Examinations Sessions Held	18	18	18
Individuals Taking Certification Exams	763	769	710
Examinations Administered in All Categories	2,097	2,174	2,180
Number of Businesses Inspected	470	603	953
Number of Businesses Inspection with Violations	122	234	273
Unregistered Employee Violations	6	13	12
Records Incomplete or Inaccurate Violations	68	63	48
Vehicles Not Properly Identified Violations	15	12	13
No Antisiphon Device Violations	8	7	6
No First Aid/Safety Equipment Violations	3	7	2
Incomplete or no Customer Information Violation	12	4	1
Pesticide Dealer Inspections	84	72	68
Pesticide Application Records Reviewed	568	935	899
Hearings and Investigational Conferences	2	0	1
Consumer Complaint Investigations	40	34	43
Pesticide Use Observations	77	60	68
Pesticide Market Place Inspections	26	43	34

Exhibit 2

Serving People and Maryland's Number One Industry - Agriculture

William Donald Schaefer
Governor

Melvin A. Steinberg
Lt. Governor

Wayne A. Cawley, Jr.
Secretary

Robert L. Walker
Deputy Secretary

STATE OF MARYLAND
DEPARTMENT OF AGRICULTURE

February 3, 1989

The Honorable John S. Arnick, Chairman
Environmental Matters Committee
426 Lowe House Office Building
Annapolis, Maryland 21401

Dear Delegate Arnick:

Earlier I wrote to you expressing concerns about possible amendments being proposed to House Bill 74, a Departmental bill relating to Pesticide Registration and Labeling Law. My staff and I have talked with the Chesapeake Bay Foundation, the University of Maryland, and other agencies regarding several issues pertaining to the amendments.

As a result of these discussions, I am requesting that you and the Environmental Matters Committee further amend HB74 on page 3, line 27 by changing the annual registration fee from the initial request of $30 to $35 per product. The revenue from the ~~$5 per product increased~~ fee will be used ~~to begin~~ development and operation of ~~an~~ information data base that will provide information on subjects including the number and types of pesticide products registered; the number, type, and category of pesticide applicators; the number and type of regulatory or enforcement actions; and the quantities of pesticide products used or sold in Maryland.

I feel it is not necessary nor desirable to include in the law detailed langunge requiring the Secretary to develop a specific data base or to report specific information. In fact, I would oppose the inclusion of such langunge in the law as it may restrict us from collecting or providing some useful information.

Mr. Chairman, I request that an amendment to increase the registration fee to $35 be included in the Department's list of amendments to HB74 and that HB74, as amended by the Department, be given a favorable report by your Committee.

Thank you for your consideration of this request. Prompt action on HB74 will be appreciated.

Sincerely,

Wayne A. Cawley, Jr.
Secretary

WAC:sd
c.c. Mr. William Baker
Dr. Craig Oliver
Dr. Charles Puffinberger
Mr. Steven Connelly

50 HARRY S TRUMAN PARKWAY, ANNAPOLIS, MARYLAND 21401

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Baltimore/Annapolis Area

Maryland Relay

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Washington Metro Area

AMENDMENT NO. 2

On page 5, after line 40, insert:

"5-102.

(C) (1) THE SECRETARY SHALL DEVELOP A COMPREHENSIVE PESTICIDE DATA BASE TO ENSURE THAT ADEQUATE INFORMATION IS AVAILABLE TO CARRY OUT THE PROVISIONS OF THIS SUBTITLE AND TO PROVIDE FOR PUBLIC REVIEW OF PESTICIDE USE INFORMATION.

(2) THE PESTICIDE DATA BASE MAY BE USED TO REPORT PESTICIDE INFORMATION ON AN ANNUAL BASIS, INCLUDING:

REJECTED
BY THE HOUSE
3/31/89
DATE

(Over)

(I) THE NUMBER AND TYPES OF PRODUCTS REGISTERED;
(II) THE AMOUNTS AND DISTRIBUTIONS OF PRODUCTS USED;
(III) THE NUMBER AND TYPES OF APPLICATIONS; AND
(IV) THE NUMBER AND TYPES OF ENFORCEMENT ACTIONS TAKEN.

(3) BY JANUARY 1, 1990, THE SECRETARY SHALL ADOPT REGULATIONS TO CARRY OUT THE PROVISIONS OF THIS SUBSECTION.".

Exhibit 3

ESSENTIAL CRITERIA FOR ESTABLISHING A SCIENTIFICALLY VALID PESTICIDE USE INFORMATION SYSTEM IN MARYLAND

TO GUIDE RESEARCH REGARDING
PESTICIDE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT

To: Maryland Officials

Pesticides have been linked to asthma and other respiratory diseases, ADHD, birth defects, cancer, Parkinson's disease, reproductive, neurological and developmental issues and more. More research is needed to assess the impacts of pesticides on the health of Maryland's citizens.

We, the undersigned, are researchers and scientists with interest and expertise in the impact of toxic chemicals on human health. We applaud the 2014 passage of Maryland HB 621 and SB 700 requiring establishment of a dedicated fund for 'collecting, assessing and reporting pesticide use in the state'. We are writing to outline criteria for a good quality database that can be meaningfully used by researchers, scientists, policy makers, and public officials.

Proposed Criteria:

The following criteria will ensure that funding is used to establish a scientifically valid and representative information system to guide our efforts in tracking pesticide impacts.

1. Basic data: The chemical name, the product name and the EPA registration number are recorded, along with the product formulation (liquid/granular), the quantity used on the date of application, and the reason for application.
   Justification: Numerous pesticide products are being applied in Maryland. For cost-effectiveness and efficiency and to achieve a useful result, researchers must be able to focus their inquiries on products known to be in use, as well as the mixtures of active ingredients in different formulations.
2. Geospatial data: The location is defined by watershed or smaller sectors within a watershed.
   Justification: Data at a watershed level, or smaller sectors within a watershed, will make the resulting analyses more powerful and useful. Public health research at a small geospatial scale can address illness clusters.
3. Temporal data: The date of application is recorded.
   Justification: The date of specific applications is needed to adequately ascertain potential linkage between applications and impacts. Impacts may also be due to multiple products applied on the same day in a particular region. Laboratory testing is often done on a single chemical to produce what is called LD50 – the dosage that proves lethal to 50% of a population over a short time. In the field, multiple chemicals are applied together. Knowing the date pesticides have been applied is key to analysis.
4. Frequency of data collection: State-wide data collection is done at least annually.
   Justification: The mixture of pesticides applied to the landscape is in constant flux. To establish trends, a minimum of three data points are needed. If data collection took place every other year, it would take six years to begin to see trends. Over time, the mix of products changes, invalidating the comparisons.

5. Statewide Reporting: Reporting is done by all professional applicators (including farmers, private and commercial certified applicators) in all parts of the state.
   Justification: A voluntary survey or database developed from a sample will not assure scientific validity for research in all areas of the state. Small sample sizes or non-random data collection can render statistical analysis invalid.
6. Scientific Peer Review: Peer review is required to assure that the data collection process is of sound design and produces valid data.
   Justification: The system design and validity of data collection must meet the highest scientific standards. A peer review process will assure that Maryland's implementation is done objectively. The peer review process should be unbiased, and participants in the process should have no conflicts of interest.
7. Searchable: The database is searchable, easily accessed, and downloadable, in online form.
   Justification: Investigators must be able to manipulate data as they are formulating hypotheses and research proposals. Further, mapping illness clusters against pesticide use from a searchable database can identify positive or negative correlations so that pesticides can be ruled in or out as causative agents.
8. Demographic data: Professional applicators will provide basic demographic information such as business name, business address, contact information, and other pertinent information.
   Justification: Information that would identify the applicators will be kept confidential and not used in any reports of these data. Instead, a unique user ID will be created to blind investigators to the identity of the applicators.

If Maryland's pesticide information system does not meet essential criteria, a valuable and cost effective investment may be rendered unusable for its intended purposes. Significant rates of cancer and ADHD are bringing new costs to individuals, the health care system, employers, and society at large. Previous voluntary sample surveys conducted by MDA have not provided data that meet several of these criteria and hence have fostered no new research. Any initial sampling or design work underway this year should be amended to meet these criteria.

Our U.S. regulatory system has yet to account for combined, cumulative or low dose impacts (see addendum following signatories for further details). Interacting chemicals can have synergistic effects at very low levels, according to research. Little research has been done on the impact of the effects of the multiple pesticides to which we are exposed. Maryland's new reporting system can foster biomedical research of value to improve the health of our state and of the nation.

We the undersigned endorse these 7 criteria as essential to provide researchers with data for meaningful pesticide impact research, and as critical elements that will assure Maryland obtains a high return on its investment in a pesticide reporting system.

Signed:

Affiliations are for identification purposes only unless other wise indicated.

Lynn Goldman, MS, MPH, MD,
Dean
Milken Institute School of Public Health
George Washington University

Melissa J. Perry, ScD, MHS
Professor and Chair of Environmental and Occupational Health, and
Professor of Epidemiology
Milken Institute School of Public Health
Professor of Biochemistry and Molecular Biology
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ON BEHALF OF THE JOHNS HOPKINS CENTER FOR A LIVABLE FUTURE (CLF):

- - Robert S. Lawrence, MD
Director, Johns Hopkins CLF
Professor:
Departments of Environmental Health Sciences and
Health Policy and Management, and International Health
Johns Hopkins Bloomberg School of Public Health
and

- - David C. Love, PhD, MSPH
Assistant Scientist
Department of Environmental Health Sciences
Johns Hopkins Bloomberg School of Public Health
Johns Hopkins CLF

Exhibit 4

ESSENTIAL CRITERIA FOR ESTABLISHING A SCIENTIFICALLY VALID PESTICIDE USE INFORMATION SYSTEM IN MARYLAND

TO GUIDE RESEARCH REGARDING PESTICIDE IMPACTS ON THE CHESAEPAKE BAY ECOSYSTEM

To: Maryland Officials

Pesticides have been linked to adverse impacts on the Chesapeake Bay's waterways, aquatic life and wildlife, including honeybees, which are essential for agricultural production. We the undersigned are scientists involved in research regarding Chesapeake Bay restoration, aquatic life and wildlife. We applaud the 2014 passage of Maryland HB 621 and SB 700 requiring establishment of a dedicated fund for 'collecting, assessing and reporting pesticide use in the state'.
(http://mgaleg.maryland.gov/2014RS/bills/hb/hb0621t.pdf)

We are writing to outline criteria for a good quality database that can be meaningfully used by researchers, scientists, policy makers, and public officials.

Proposed Criteria:

When faced with an obvious decline or altered health in (or multiple) species, the question is why and how did this occur? Sometimes the responsible causative agent is quickly found, for example, an accidental discharge of a known toxic chemical. However, often a 'CSI' type forensic approach is required and resource managers need to work backward from the biology to identify the causative agent(s). Ruling out a potential causative agent is just as important so that efforts can be narrowed.

The following criteria will ensure that funding is used to establish a scientifically valid, reliable and representative information system to guide our efforts in tracking pesticide impacts.

1. Basic data: The chemical name of the active ingredient(s) and the product name are both recorded and the EPA registration number, along with the product formulation (liquid/granular) and quantity used on the date of application, and the reason for application.

    Justification: Numerous pesticide products are being applied in Maryland. Researchers need to know what pesticides to test for and assess in order to economically and efficiently narrow their focus to achieve a useful result. This provides information regarding other chemicals in a product, as mixtures of pesticide active ingredients are marketed in different product formulations.

2. Geospatial data: The location is defined by subwatershed or smaller sectors within a watershed.

    Justification: To properly monitor impacts on the Bay ecosystem, data are needed at least at a sub-watershed level; smaller geographic areas within a watershed will make the resulting analyses more powerful and useful. For example, UMD researchers have seen increasing evidence that fungicides may have a sub lethal effect on honeybee colonies. It would have been helpful to look at the trends in fungicidal usage and colony numbers/mortality in specific areas in the state to see if there is any correlative data supporting this finding. Wildlife research would

benefit from a smaller geospatial scale as honeybees travel up to a distance of 3 miles.

3. Temporal data: The date of specific applications is needed to adequately ascertain potential linkage between applications and impacts.

Justification: Impacts may be due to multiple products applied in a particular region. Laboratory testing is often done on a single chemical to produce what is called LD50 – the dosage that proves lethal to 50% of a population tested over a short time. In the field, multiple chemicals are applied together. Therefore knowing the date pesticides have been applied is key to analysis. In some cases with honeybee research, it has been found that this additivity decreases the LD-50 up to 7000 times. In other words, the application mix can be 7000 times as effective at killing bees as any of the single chemicals. Therefore, knowing when pesticides have been applied is key to assessing individual product impacts and multiple product impacts.

4. Frequency of data collection: State-wide data collection needs to be done at least annually.

Justification: The mixture of pesticides applied to the landscape is in constant flux. Also, to establish trends, a minimum of three data points are needed. For example, if data collection is every other year, it will take six years to begin to see trends. If every 3 years, it will take 9 years, and then the mix of products will have changed, invalidating the comparisons.

5. Statewide Reporting: Reporting by all professional applicators (including farmers, private and commercial certified applicators) annually will ensure researchers can monitor and address issues in all parts of the state.

Justification: A voluntary survey or database developed from a sample will not assure scientific validity for research in all areas of the state. Small sample sizes or non-random data collection can render statistical analysis invalid.

6. Scientific Peer Review Committee: Peer review is required to assure that the data collection process is of sound design and produces valid data. Committee members must have no vested interests or conflicts.

Justification: The system design and validity of data collection must meet the highest scientific standards. A peer review process will assure that Maryland's implementation is done objectively. The peer review process should be unbiased, and participants in the process should have no conflicts of interest.

7. Searchable: The database needs to be searchable, easily accessed and downloadable, in online form.

Justification: Investigators must be able to manipulate data as they are formulating hypotheses and research proposals. Further, mapping aquatic and wildlife disease or lethal clusters against pesticide use from a searchable database can identify positive or negative correlations so that pesticides can be ruled in or out as causative agents.

Why a comprehensive scientifically valid and reliable database is needed

The recent 2012 federal report on toxic contaminants in the Bay details which pesticides are widespread in the Bay watershed and others for which there is insufficient data. The report states: "Data and research gaps exist for many pesticides including some current-

use and some legacy pesticides, and consequently the extent and severity remains uncertain… the potential sublethal effects of low concentrations of many pesticides (and degradates) and their mixtures (including adjuvants, etc.) in the environment is poorly understood."

The report also goes on to recommend State toxics monitoring systems: "…existing state and federal monitoring programs, self-reported data sets, and new monitoring systems would help in targeting monitoring activities and keeping [the expense of contaminant monitoring] from limiting the scope of reduction goals and strategies." This is exactly what the pesticide use reporting data could provide researchers within the State of Maryland.

The report echoes a finding of a 2006 U.S. Geological Survey report - Pesticides in the Nation's Streams and Groundwater 1992-2001, which stated that "One of the most important gaps to be filled is improved tracking of pesticide use in agricultural and non-agricultural areas, including amounts, locations, and timing."

Mapping environmental problems, such as a decline in primary productivity or a reduction in fish numbers or honeybees or birds, can be compared with pesticide use to identify positive or negative correlations so that pesticides can be ruled in or out as causative agents. The absence of evidence is not evidence of absence. These retrospective analyses over spatial and temporal scales can only be achieved if actual levels of contaminants are measured or if modeled estimates of load, i.e. from use data, is available.

Having access to comprehensive pesticide use data that is currently required of certified applicators to maintain on site, along with data from all Maryland's farmers as to what specific pesticide(s) were used, when, where and how much is truly essential if we are to be able to cost-effectively and efficiently monitor and assess the impacts of pesticides on our waterways, wildlife and public health, and identify and implement solutions.

Respectfully,

Affiliations are for identification purposes only unless otherwise indicated.

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Wye Research Center

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Exhibit 5

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George Harman
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November 11, 2013

To Whom It May Concern:

RE: Costs for implementing an online reporting system for pesticide use

There has been a substantial amount of speculation regarding the potential costs for implementing an online reporting system for the envisioned pesticide use reporting that has been proposed in legislation over the past several years. The Maryland program was envisioned as being similar in scope to the Community Right-to-Know (CRTK) program that was authorized to establish supportive fees through legislation in 2002. That program, administered within the Department of the Environment, captures annual inventory information on chemicals stored beyond certain thresholds for use by emergency planners and fire departments in the counties for response planning. The envisioned pesticide use reporting system would be used in a similar manner by public health and environmental officials to plan for risk minimization and public health actions and advisories.

Information technology vendors, such as the private vendor that developed the CRTK reporting system and the University of Maryland College of Health and Human Performance that serves DHMH, MDE, and DNR in development of human health and water quality data storage systems, have given verbal estimates for developing the envisioned online reporting system that are in the range of $250,000 to $350,000. Detailed proposals from vendors are not possible until all of the system specifications can be developed, but their estimates for building a system similar to the CRTK program, and the environmental health and water quality systems, put the costs as stated. Cost estimates presented in last year's fiscal note are considered to be an order of magnitude higher than what is needed for the envisioned system. Annual operating costs for the system would be similar to or less than the developmental costs. Again, the degree to which services are provided will need to be negotiated. Note here that all data management services could be contracted to the vendors, with the possible exception of an agency contract manager.

There are two cost saving concepts that have not yet been discussed or explored. The first relates to the recently enacted legislation in Washington, DC that requires pesticide applicators to report their use of pesticides. If Maryland and DC could work on a joint online reporting system, costs could be shared and

theoretically result in savings to each jurisdiction. Secondly, it has been noted that New York collects its product registration fees on a biennial basis. If a biennial registration process was applied in Maryland, the administrative costs to both the registrants and the State could also be cut substantially.

Online reporting systems, once established, can prove to be highly beneficial to the reporting entity. Testimony that a substantial number of pesticide applicators use paper files points to a significant potential benefit of using the online reporting system as an improved and backup data management system. The envisioned system would email the reporting entity a copy of the submitted report in pdf or Excel format as a receipt of the submission. Additionally, once reported, prior year reports could be retrieved online and be simply edited for resubmission as the current year report, thus streamlining reports in all subsequent years and minimizing time and costs for reporting entities.

It should also be noted that building an online reporting system for a limited number of pesticides would not result in any savings in structuring the system over building a system for the full range of products currently being used. New chemicals could be added after the initial system was established, but it would be more efficient to insert the full list of pesticides initially into the look-up tables so that applicators could utilize the system to track all of the products that they use. Annual operating and maintenance costs would be involved in adding initially omitted products and new pesticides that might become available. We again note that the stated costs are in line with those associated with the nationally award winning CRTK program operated by MDE, which was built for $200,000 and annually operated for a similar amount.

Sincerely,

Min Qi Wang, University of Maryland

George Harman, Environmental Consultant