Blind Eye to Big Chicken

Frequent Violations but Few Penalties for Maryland's Poultry Industry

ENVIRONMENTAL INTEGRITY PROJECT

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This report was researched and written by Mariah Lamm, Louisa Markow, Courtney Bernhardt, and Tom Pelton of the Environmental Integrity Project.

THE ENVIRONMENTAL INTEGRITY PROJECT

The Environmental Integrity Project (http://www.environmentalintegrity.org) is a nonpartisan, nonprofit organization established in March of 2002 by former EPA enforcement attorneys to advocate for effective enforcement of environmental laws. EIP has three goals: 1) to provide objective analyses of how the failure to enforce or implement environmental laws increases pollution and affects public health; 2) to hold federal and state agencies, as well as individual corporations, accountable for failing to enforce or comply with environmental laws; and 3) to help local communities obtain the protection of environmental laws.

For questions about this report, please contact EIP Director of Communications Tom Pelton at (443) 510-2574 or tpelton@environmentalintegrity.org.

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Executive Summary

Maryland's Eastern Shore is famous for its beauty, unique Chesapeake Bay ecology, and for being the birthplace of the modern poultry industry. Since its invention by Arthur Perdue near Salisbury, Maryland, last century, the industrial-style poultry house has multiplied across the Delmarva Peninsula and transformed the landscape. As of 2019, Maryland had 503 active poultry operations,[1] called Animal Feeding Operations (AFOs) – with a total of 2,178 houses, each longer than a football field -- that raise a total of about 300 million chickens a year. They also produce more than 600 million pounds of manure[2] and tons of airborne ammonia, which create a host of downstream problems—including runoff of nitrogen and phosphorus into the Chesapeake Bay and health threats for neighbors.[3]

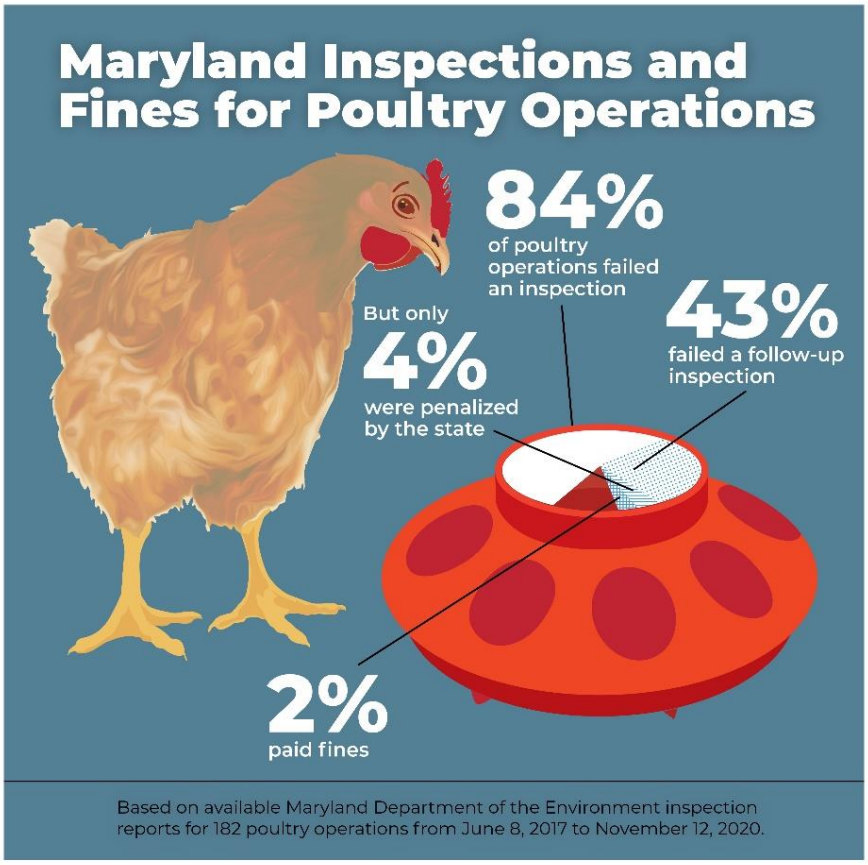
Two state agencies oversee this sprawling industry in Maryland: the Maryland Department of the Environment (MDE) and the Maryland Department of Agriculture (MDA). Each has a different responsibility. MDE issues water pollution control permits for poultry operations and is tasked with enforcing the federal Clean Water Act. MDA is charged with making sure that farms follow manure management plans that are supposed to prevent the over-application of phosphorus and other nutrients to their fields. How rigorously are these agencies performing their duties? And how often are poultry operations penalized when they break the rules?

More than half of poultry farms with available records in 2019 admitted to the state that they overapplied manure to their fields in violation of their nutrient management plans and state law.

To answer these questions, the Environmental Integrity Project (EIP) reviewed more than 5,000 pages of poultry operation inspection reports, annual farm reports, and other state records. We found that despite the industry's large footprint on the Eastern Shore, state oversight is minimal and ineffective at protecting water quality. More than half of poultry farms whose records were available in 2019 admitted in their annual reports to the state that they had over-applied manure to their crops, in violation of their own nutrient management plans and state law.[4] Despite this, neither MDA nor MDE fined any of the poultry operations for these violations – although the state can fine them up to $5,000 per violation. This shows that both agencies are not

doing their jobs by ensuring that farms are actually complying with their nutrient management plans and water pollution control permits. According to MDE documents, about two thirds of poultry operations inspected between 2018 and 2020 violated waste management requirements by, for example, leaving poultry litter outside where rain can wash it into streams or having inadequate storage facilities for manure.[5]

EIP's examination of the public record found that Maryland's system of oversight for the poultry industry is, in reality, an empty paperwork exercise that falls well short of what is needed to control agricultural runoff pollution or protect the Chesapeake Bay. Although MDA is responsible for enforcing the farms' implementation of nutrient management plans, the agency's employees do not even sample for nutrients in crop fields[6] or streams to determine if overapplication of manure is happening, instead trusting field testing to farmers and their contractors. MDA has never fined a poultry operation for a manure-overapplication violation[7] – although farmers admit in their annual reports to the state that these violations are common. Instead, the state agency focuses mainly on paperwork reviews – meaning MDA is failing to provide any reality-based ground-truthing or accountability for the largest single source of pollution in the Bay, the agricultural industry.



MDE's limited staff has been performing a declining number of in-person inspections at poultry operations. MDE rarely tests nearby waterways for pollution,[8] and never samples for ammonia air pollution at the exhaust fans of chicken houses or the homes of people next door. A Maryland court in March 2021 ordered MDE to start controlling these emissions,[9] but MDE is challenging that order in court, and so far only samples for ammonia on a limited, regional basis, with its nearest monitor about a third of a mile from the closest poultry house.[10]

The result of regulators' soft treatment of the poultry industry is unchecked pollution that threatens not only the Chesapeake Bay but also the health of farmers and other residents who live nearby. Phosphorus pollution and algae blooms in the Eastern Shore's waterways have not improved over the last two decades and continue to fail "healthy waters" benchmarks set by the state (see EIP's report, "*Stagnant Waters*").[11] For an example of how neighbors can suffer from the industry, see page 24 of this report for a story about a farmer

who filed multiple complaints with MDE because of ammonia pollution and flooding caused by a poultry operation next door.

The Environmental Integrity Project's review of MDE and MDA records and annual farmer implementation reports found the following. (For a detailed description of this report's methodology, see Appendix A).

- Fifty-one percent (or 29 of 57) of the poultry operations for which public records were available in 2019 reported to the state that they had applied manure to their crop fields in amounts above the limits in their nutrient management plans, which would make it illegal. However, none of them was fined by the state for this violation.

- MDE has inadequate staff to oversee the poultry industry, with only three employees responsible for inspecting and overseeing more than 500 poultry operations, and in recent years (2014 and 2015) only two employees.[12] MDA has only nine employees responsible for overseeing the fertilizer management plans of 5,251 farms of all kinds statewide.

The number of poultry farms inspected by Maryland Department of the Environment has declined by 40 percent since 2013, although the number of permitted operations has grown.

- The number of poultry farms inspected by MDE on an annual basis has fallen by 40 percent since 2013, even as the number of permitted operations has grown. MDE inspected an average of 218 operations a year from 2013 through 2017; but only 134 per year from 2018 through 2020, with the decline predating the COVID-19 pandemic.[13]

- MDE inspection reports show high rates of noncompliance with the requirements of the state's water pollution control permit for animal feeding operations. Eighty-four percent of inspected poultry farms (153 of 182) failed their initial, routine inspections from June 2017 to November 2020,[14] most because of a combination of waste management problems and record keeping failures.[15] Almost half (43 percent, or 78 of 182) also failed follow up inspections.

- The most common waste management failures found by inspectors at poultry operations from 2017 to 2020 were inadequate manure storage structures (on 66 farms), unsanitary handling of dead birds (48 farms), and manure left outside in paved work areas (31 farms).

- Despite these frequent violations, penalties from the state are rare. MDE imposed fines on only eight of the 78 poultry farms with repeat violations from 2017 to 2019, and actually collected the fines from only four of these eight. [16]

- MDE often does not collect the penalties it imposes. From 2018 to 2021, the amount of fines paid by animal feeding operations with violations ($8,250) was less than that of the total fines that remained unpaid ($12,250) or were cancelled (revoked) by the state ($5,750).[17] Some fines were cancelled for legitimate reasons (like when farmers turned in missing reports or an operation closed.)

Although the number of poultry farms in Maryland has declined slightly since 2017, the average size and capacity of chicken houses has grown. Also rising are the number of broilers raised and average weight of each bird, which means more manure. The number of factory-style poultry operations with chicken houses but no crop fields doubled between 2013 and 2019.[18] This means that there are fewer small family farms with crops and more *larger* animal operations with nothing but rows of windowless buildings, often run by off-site landlords.

The state should increase water and air monitoring around animal feeding operations, especially by adding a series of ammonia air pollution monitors.

This report recommends that Maryland take the following steps to help improve compliance with federal and state clean water laws and safeguard the health of people living on the Eastern Shore:

1) MDE and MDA should more frequently impose – and then actually collect – penalties against poultry operations that fail to comply with their nutrient management plans or fail to meet the requirements of their water pollution control permits. These fines should also be extended to the big poultry companies (the integrators), who often exert extensive control over their contract growers. Penalties are likely to remain low and inconsequential as long as the state imposes them only on the farmers and not on the integrators.
2) MDE should hire more inspectors for animal feeding operations, so that the agency can scrutinize the facilities more than just once every five years and make sure they are complying with the requirements of their permits.

3) The state should increase water and air monitoring around poultry operations, especially by adding a series of ammonia air monitors at operations that have neighbors immediately downwind. Fenceline air monitoring should be required whenever a chicken house is located within 400 feet of a neighboring residence (which is true of at least a third of poultry operations.)
4) MDE should revise and strengthen its general water pollution control permits for animal feeding operations so that they work to control chicken house ammonia emissions, which deposit into waterways. Permit requirements should include the installation of ammonia pollution control systems, such as "scrubbers," and the planting and maintenance of thick buffers of trees surrounding poultry houses.[19]
5) Maryland should vigorously enforce the state's new manure application rules, called the Phosphorus Management Tool (PMT), which took full effect on July 1. As part of the oversight of these rules, Maryland should allow MDA and MDE inspectors to take soil samples from fields to perform a reality check on self-reported compliance information.
6) MDE and MDA should improve the self-reporting requirements for all farms that spread poultry manure on crops as fertilizer. Since most poultry manure is sent off-site to other farms, MDA should require all users of poultry manure to report field-level manure application information (including phosphorus fertility index values) on annual implementation reports submitted to the state.
7) MDA should provide more guidance, support, and technical expertise to farmers who have fields that are overloaded with phosphorus. Solutions should promote remediation using practices that absorb excess phosphorus and improve soil health.

Stepped up inspections and monitoring of poultry operations, combined with penalties for violations and stronger support for more sustainable farming practices, will help protect not only the Chesapeake Bay and its tributaries, but also the health and quality of life of people on the Eastern Shore.

The Scale and Growth of the Poultry Industry

There were 503 active poultry operations on Maryland's Eastern Shore in 2019, and they reported raising over 300 million chickens.

There were 503 active poultry operations on Maryland's Eastern Shore in 2019, and they reported raising over 300 million chickens. (There were 529 operations total that year, but some were inactive.) Regulated animal feeding operations are required to file annual reports with MDE and MDA each year, detailing how many chickens they raised, how they handled their manure, and how much manure was applied to crops under their control. EIP analyzed these reports to track growth and practices of the industry.

Table 1 (below) shows the changes in the number of operations and the number of chickens raised between 2013 and 2019, by county.

TABLE 1: MARYLAND POULTRY OPERATIONS, 2013 vs. 2019

County	Poultry Farms in 2013	Poultry Farms in 2019	Birds Produced in 2013	Birds Produced in 2019	Net Change in Production 2013 to 2019
Caroline	89	108	38,751,600	49,870,300	+11,118,700
Dorchester	63	45	32,113,440	27,940,938	-4,172,502
Kent	10	11	5,298,000	5,805,500	+507,500
Queen Anne's	40	40	23,113,900	22,501,950	-611,950
Somerset	87	82	49,816,540	50,993,620	+1,177,080
Talbot	10	9	4,685,300	3,629,600	-1,055,700
Wicomico	113	107	57,845,325	63,019,800	+5,174,475
Worcester	86	97	65,365,050	74,073,450	+ 8,708,400
Total	**498**	**503**	**276,989,155**	**300,643,158**	**+ 23,654,003**

Production trends from 2013 to 2019 for broiler poultry operations, by county, on Maryland's Eastern Shore. Source: Farmer self-reporting on Annual Implementation Reports for 2013 and 2019 crop-growing years. According to the 2019 data, four operations were under construction and one farm was sold. Some farmers may have omitted flock size or number of flocks in their Annual Implementation Reports or neglected to submit a report at all in 2013 or 2019.

The number of chickens produced over this time increased by about nine percent, rising from 278 million in 2013 to 300 million in 2019,[20] while the number of farms increased by only five, from 498 to 503. That meant the average size of each poultry operation grew, reflecting an industry trend.[21]

In addition to an increasing *number* of chickens being produced, the average *weight* of each chicken has increased, as the industry has selected for heavier birds and adjusted their diet and living conditions. For example, the average weight of a broiler (meat chicken) grown in Maryland increased from 5.3 pounds in 2013 to 6.5 pounds in 2020 – a 23 percent increase, according to U.S. Department of Agriculture statistics.[22] This growth has an environmental impact, because larger chickens produce more manure – meaning more potential runoff into streams, rivers, and the Chesapeake Bay.

Poultry Operations Close to Neighbors

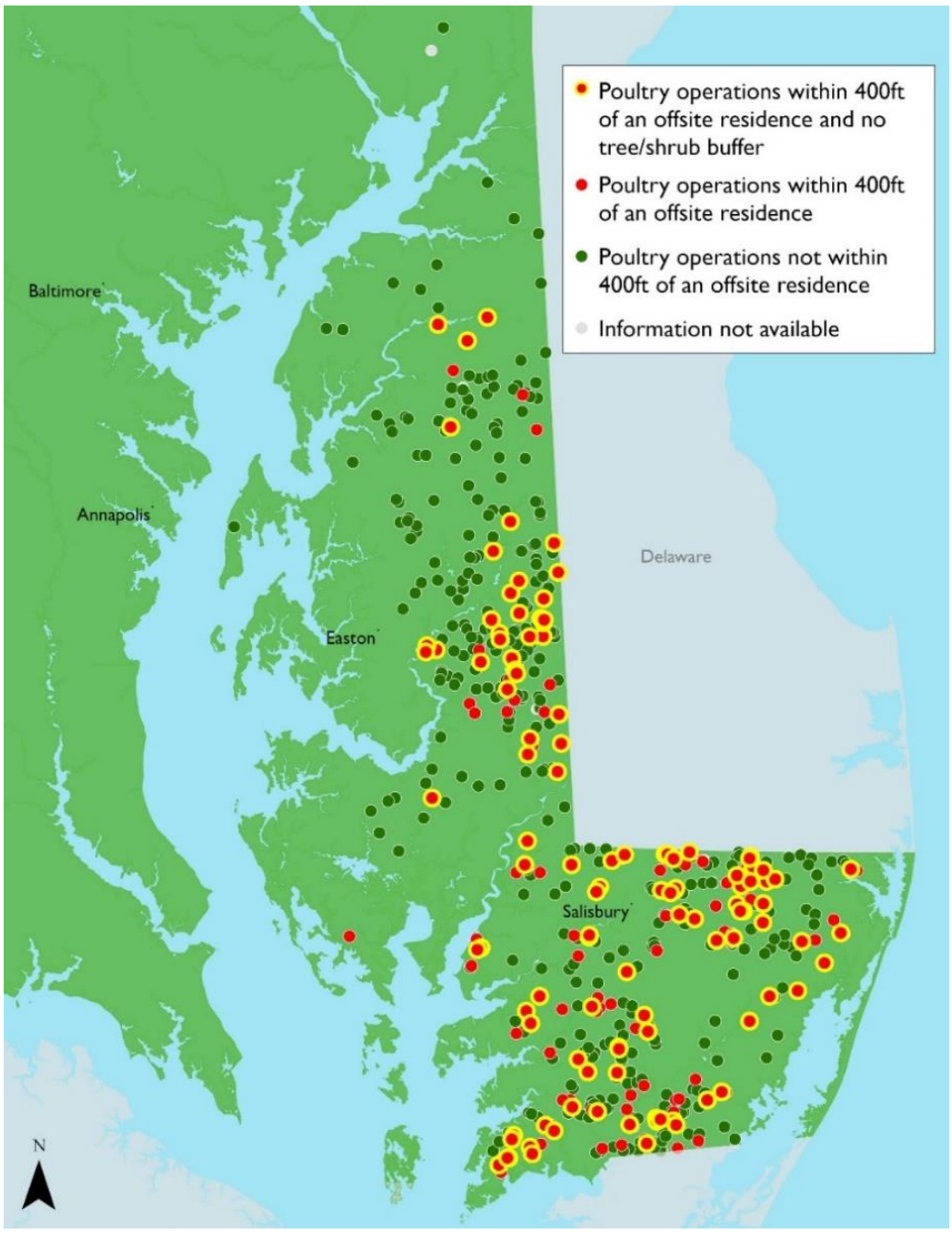
The increasing size of poultry operations raises health and quality of life concerns for neighbors who live downwind and downstream. EIP reviewed 2019 aerial imagery and MDE's list of permitted poultry operations and found that 174 of 529 Eastern Shore poultry operations, or 33 percent, are within 400 feet of a house owned by a neighbor.[23] Living close to poultry operations subjects some neighbors to elevated concentrations of ammonia, dust, noxious odors and manure particles blown out of exhaust fans.[24]

Planting vegetated buffers, consisting of rows of trees and shrubs, between poultry houses and neighbors is one way to disperse emissions and reduce impacts. Trees also help reduce ammonia deposition to waterways, which is a major concern in the Chesapeake Bay and its tributaries.

Despite the benefits of this low-cost pollution control practice, a majority of poultry operations do not use it. Overall, only 204 of 529, or 39 percent, of the operations in Maryland had some kind of vegetative buffer, and only 68 of the 174 with nearby neighbors had buffers, according to EIP's review of aerial imagery. (For an example of living next to a poultry operation without a forested buffer, see example on page 25.)

The map on the following page shows the locations of poultry operations with and without forested buffers, and with and without nearby homes.

MAP1: POULTRY OPERATIONS WITHIN 400' OF NEIGHBORING HOME, 2019



The map above shows the locations of animal feeding operations in Maryland, with the red dots indicating poultry farms located within 400 feet of a neighboring home in 2019. The yellow circles indicate poultry operations without lines of trees and bushes as a buffer between them and nearby residences. Source: MDE data and satellite imagery from Maryland's Geographic Information Office Mapping & GIS Data Portal.

Poultry Companies

Most of the Eastern Shore poultry operations raise chickens on contract for at least one of five large poultry companies: Perdue, Tyson Foods, Mountaire Farms, Amick Farms, and Allen Harim Foods (see Table 2). These companies, also known as "integrators," control the industry from the top down. In addition to slaughtering chickens and supplying them to local and global markets, these companies own the chickens and dictate all aspects of their living conditions on the farm – including the feed they receive and the ventilation and lighting in the chicken houses. Integrators contract with individual farmers to house and raise the chickens according to the companies' detailed specifications. Once chickens are fully grown, poultry companies leave the farmers with the responsibility to manage the manure left behind.

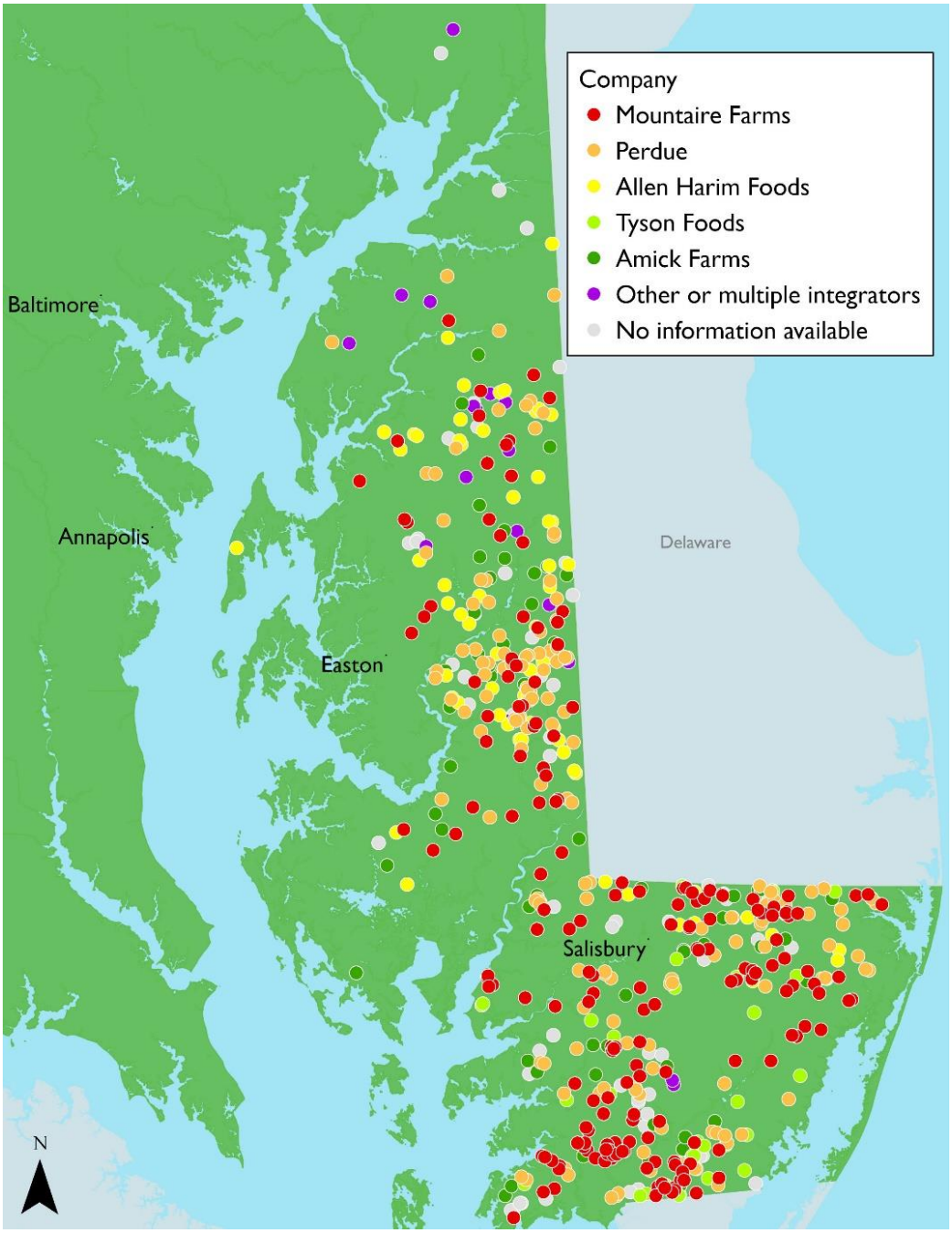
TABLE 2: MD POULTRY PRODUCTION BY INTEGRATORS, 2013 & 2019

Integrator	# Farms in 2013	# Farms in 2019	Chickens Raised in 2013	Chickens Raised in 2019
Mountaire Farms	145	176	77,411,525	107,383,500
Perdue	132	162	74,672,250	85,071,850
Allen Harim Foods	56	59	25,394,300	30,724,538
Amick Farms	42	53	21,728,890	34,044,220
Other or multiple	77	32	51,058,890	29,032,150
Tyson Foods	46	28	26,723,330	23,665,800
Grand Total	**498**	**503**	**276,989,185**	**300,643,158**

Poultry farms are often contracted out to produce chickens for a poultry company or 'integrator.' The above table shows how many farms produced chickens for each major integrator in 2013 and 2019. Source: Annual Implementation Reports for the 2013 and 2019 growing years. Some operations may not have reported their integrator on their Annual Implementation Report.

The table above shows the number of farms that raised chickens for each company and how many chickens they produced in 2013 and 2019 (also see map on the next page). Farmers on Maryland's Eastern Shore reported raising the most chickens for Mountaire and Perdue in 2019, and the least for Tyson.[25] (A large number of chicken farmers raise chickens for Tyson in Accomack County, Virginia, which is closer to Tyson's slaughterhouse). The number of chickens produced under contract with Amick and Mountaire grew the most from 2013 to 2019, with 57 percent and 39 percent increases respectively.

MAP 2: POULTRY FARMS BY COMPANY (INTEGRATOR), 2019



The map above shows the locations of animal feeding operations in Maryland in 2019, colored coded by poultry company (integrator). Source: MDE's Status of Animal Feeding Operations (AFO) database and 2019 farm annual implementation reports.

Manure Production and Disposal

Raising tens of thousands of chickens in enclosed spaces means that farmers need to remove poultry litter—a mix of manure and bedding material — from chicken houses on a regular basis. This litter creates environmental problems when it is stored improperly or applied to fields in amounts that exceed what crops need to grow, allowing its nutrient content (nitrogen and phosphorus) to run off into rivers and streams, or contaminate underground drinking water supplies.

Poultry farms in Maryland reported removing 304,212 tons of litter from poultry houses in 2019, or about 608 million pounds. (This number was lower than the total amount of manure reported in 2013,[26] even though the number of chickens produced was almost 24 million higher in 2019. It's unclear whether this discrepancy is due to reporting failures or changes in farm practices.) After removing manure from poultry houses, operators usually store it on site until it can be used as fertilizer. This storage happens in storage sheds, but Maryland regulations also allow farmers to temporarily stockpile it under certain conditions.[27] Stockpiling can cause groundwater and surface water pollution if piled up close to waterways or if left uncovered and exposed to rain, snow, and wind. Fifty-nine Maryland poultry operations reported temporarily stockpiling manure in 2019.

The vast majority of poultry operations in Maryland do not have any cropland (439 of the 503 active operations). These operations ship their manure off-site, either to grain farmers or for alternative uses. (For a map of poultry farms that applied manure to their own cropland in 2019, see Appendix B). Four hundred and five poultry operations reported "exporting" 290,704 tons of manure in 2019. The practice of exporting manure from poultry farms for use as fertilizer on other farms has grown even more common since 2013. This is because trends in the industry have made smaller, more traditional chicken farms with their own fields of crops less economical than larger operations that do nothing but grow chickens.

The increase in manure exports may also be explained in part by 2015 state regulations called the Phosphorus Management Tool (or PMT) that limit the application of poultry manure to fields that are already overloaded with phosphorus. While phosphorus is a useful nutrient when applied to crops, excessive application results in soil phosphorus buildup and an increased risk of runoff into waterways. This phosphorus runoff fuels algal blooms and depletes water of oxygen needed by fish and other aquatic life. Runoff from agriculture is the largest single source of pollution in the Chesapeake Bay.[28]

Poultry Litter Applied to Cropland as Fertilizer

According to a 2021 report from the Maryland Department of Agriculture, farmers applied 345,527 tons of poultry litter to 168,786 acres of cropland in the state in 2019. Over three quarters of that—268,490 tons, or 77 percent—was applied to 136,814 acres of cropland on the Eastern Shore, with the largest amounts in Caroline and Queen Anne's counties.[29]

Table 3 shows the amount of manure spread on cropland on Maryland's Eastern Shore and elsewhere in the state.

TABLE 3: POULTRY MANURE SPREAD ON MARYLAND CROPLAND, 2019

County	Tons of Poultry Manure Spread on Cropland	Acres of Cropland Receiving Manure
Caroline	54,903	34,179
Queen Anne's	48,266	22,307
Dorchester	43,065	19,084
Kent	41,626	18,001
Worcester	29,820	15,030
Talbot	21,197	12,893
Somerset	11,555	6,219
Wicomico	10,037	5,783
Cecil	8,022	3,318
Eastern Shore Total	**268,490**	**136,814**
Other Counties Total	**77,037**	**31,972**
Grand Total	**345,527**	**168,786**

Source: MDA's January 14, 2021 report to the Governor and State Legislature[30]

Farm fields in Lower Eastern shore counties—Somerset, Wicomico, and Worcester—already have the highest phosphorus levels in the state, according to MDA.[31] State regulations limit -- and some cases, prohibit-- how much more manure farmers can apply to phosphorus-saturated fields. The county-level data compiled and published by MDA do not provide enough detail to determine if farmers applied manure in ways that harm water quality. In fact, MDA does not require all users of poultry manure to report the information that it would need in order to make that determination. MDE, by contrast, does require poultry operations to report that information.

EIP took a detailed look at MDE public records to examine field-level manure application records submitted by poultry operations as part of their 2019 annual reports. Seventy-seven poultry operations reported applying poultry manure to their own cropland in 2019.[32] However, only 57 of these 77 reported enough information to allow us to determine whether they over-applied poultry manure to at least one crop field in 2019.[33]

We found that 55 of those 57 operations applied manure to their fields in amounts over the needs of crops, as determined by guidelines set forth by the Maryland Department of Agriculture (see Table 4). This kind of over-application is sometimes legal, because in some cases a farm's nutrient management plan allows for higher amounts of phosphorus

application, depending on soil conditions and the nitrogen requirements of crops (manure contains both nitrogen and phosphorus). However, 29 of the 57 poultry operations self-reported applying manure to their fields in amounts *above* the limits in their nutrient management plans, which would make it illegal.

TABLE 4: MANURE PHOSPHORUS APPLIED TO CROPS AT POULTRY FARMS, 2019

	Farms	Acres	% of Total Acres	Phosphorus Applied (lbs)	% of Total Phosphorus Applied
Poultry farms that reported applying phosphorus from manure to crops[34]	57	10,463	100%	441,372	100%
Farms that applied phosphorus over crop needs	55	9,599	92%	387,561	88%
Farms that applied manure to fields above legal limits in their nutrient management plans	29	4,015	38%	180,035	41%
Farms that applied manure to fields with extreme levels of phosphorus (FIV > 500)	2	50	<1%	1,221	<1%

Source: EIP analysis of 2019 Annual implementation Reports and nutrient management plans obtained from the MDE. The amount of soil phosphorus available to crops is expressed as a fertility index value (or FIV). Excessive values are higher than 100, and they indicate that soil already contains more than enough phosphorus to support crop growth. Values over 500 FIV mean more manure application is banned. [35]

The worst of these illegal over-application cases recorded in the state records reviewed by EIP were two poultry operations (one in Caroline County, the other in Wicomico County), which reported applying manure to fields that already had extreme concentrations of phosphorus (meaning a "fertility index value" of more than 500 as determined by Maryland's Phosphorus Management Tool.)[36]

Government Oversight of Maryland's Poultry Industry

Two state agencies in Maryland—the Department of the Environment (MDE) and the Department of Agriculture (MDA)— regulate the water quality impacts from industrial poultry farms. These agencies have different missions and approaches to carrying out their oversight roles. The MDE began regulating animal feeding operations under the Clean Water Act in 2009. Its mission is to "protect and restore the environment for the health and well-being of all Marylanders,"[37]and it oversees and implements a state program that regulates industrial chicken farms through permits. Those permits require poultry farms to prevent any discharges of manure or poultry waste into waters of the state. The permits are not site-specific, and the same general permit is issued to every poultry operation in the state, with a common set of conditions. MDE is responsible for enforcing the terms of those permits and ensuring that poultry operations are not discharging pollution to waterways.

MDE and MDA split responsibilities for overseeing the industrial poultry operations on Maryland's Eastern Shore.

The MDA's mission is different in that it features the *promotion* of the agricultural industry. The agency's website describes its mission this way: "to provide leadership and support to agriculture and the citizens of Maryland by conducting regulatory, service, and educational activities that assure consumer confidence, protect the environment, and promote agriculture."[38] The MDA oversees and implements the state's nutrient management program. This program aims to protect water quality by ensuring that farmers manage fertilizer and manure in ways that enable bountiful crop production while protecting the environment. The program requires almost all farms in Maryland to have and follow plans for applying fertilizer and managing manure and other animal wastes.

MDA also oversees and enforces state regulations, imposed in 2015 and taking full effect in July 2021, that limit the application of phosphorus in manure to fields (the PMT, or Phosphorus Management Tool). In 2020, MDA had nine employees (called agricultural

nutrient management specialists) responsible for reviewing and overseeing the nutrient management plans and PMT compliance for 5,251 farms covering 1.2 million acres (including some poultry operations with fields of crops).[39]

MDE does not test emissions from the exhaust fans of poultry houses like this one to determine their impact on next-door neighbors.

Poultry operations are required by state regulation to self-report information each year about how they implemented their nutrient management plans. These farm Annual Implementation Reports include the number of chickens housed, how many flocks they raised, and the poultry companies for which they raised chickens. The reports also include information about manure—how much was removed from poultry houses, whether the farms had manure storage structures on site, and whether that manure was sent off-site or applied to cropland that the poultry operation controls. If a poultry farmer does apply manure to their own cropland, they also must report the crops they grew and harvested, where they applied manure, the recommended nutrient application rates, their actual nutrient application rates, yield goals, and the phosphorus content of the soil. MDA reviews this self-reported information to determine if farmers comply with their nutrient management plans.

Most of the manure application records that farmers keep and that MDA reviews during inspections of farms are not a matter of public record, so there is a lack of transparency to the system. While poultry operators generate about 600 million pounds of chicken manure a year, more than 90 percent of that waste is shipped offsite to other farms on the Eastern Shore that are not poultry operations with permits from MDE. For these farms with no MDE permits, there are no public records available to indicate whether or where that manure is spread in amounts above crop needs or legal limits.

Inspections & Enforcement

Maryland Department of the Environment

In terms of inspecting poultry operations, MDE officials say they are committed to inspecting each animal feeding operation at least once every five years, which is the term of a general permit.[40] During an inspection, an inspector from MDE reviews farm records and notes whether the operators submitted an annual report, has a current nutrient management plan, and maintains a variety of records like manure lab analyses and self-inspection records documenting the conditions of waste storage and stormwater control structures. The inspector also performs a walkthrough to check the operation's manure storage structures and other structures to ensure that manure, dead birds, and feed are being stored properly and are not in contact with water.

If an MDE inspector observes a violation, they may help the farmer achieve compliance, such as by filling out an incomplete annual report. Or the inspector may set up a follow-up inspection date, at which point the operator should have resolved any problems. MDE does not regularly sample the air or nearby waterways for pollution. However, MDE officials say that if one of their inspectors observes obvious signs of water pollution – such as a foul-smelling liquid leaking from a manure storage structure into a stream – the inspector may collect water samples and analyze them.[41] MDE does not sample the exhaust fans of poultry houses for ammonia emissions, require any air pollution controls, or check the air quality at homes next door, although the agency did begin a limited program of regional, ambient air sampling for ammonia on the Eastern Shore in 2019.[42]

To perform an independent assessment of poultry house ammonia emissions, EIP and Assateague Coastal Trust in 2020-2021 started sampling for ammonia at four homes next door to poultry operations on the Lower Eastern Shore. This testing found levels of ammonia significantly higher than what MDE found, sometimes spiking higher than the risk screening level that MDE uses to determine if the state should require an industry to control ammonia emissions. This testing by EIP and Assateague Coastal Trust continues.

MDE currently has only three inspectors to oversee more than 500 permitted poultry operations, including one supervisor who has duties beyond inspections.[43] In recent years (2014 and 2015), the agency only had two inspectors. According to annual MDE enforcement and compliance reports, MDE decreased the number of animal feeding operations inspected on an annual basis from 2013 to 2020, although the number of permitted operations grew.[44] The number of operations inspected by MDE fell from an average of 218 a year from 2013 through 2017; to 134 per year from 2018 through 2020, according to MDE data.

TABLE 5: MDE ENFORCEMENT AND COMPLIANCE FOR AFOS, 2013-2020

	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Permits issued	116	171	93	158	193	165	74	34
Effective permits[45] (Registered AFOs)	346	493	516	549	565	552	572	552
Sites inspected	327	237	171	174	181	146	146	111
# of inspected sites with significant violations	12	5	4	9	5	0	0	0
# of significant violations involving environmental or health impact	3	1	0	1	5	0	0	0
Administrative or civil penalties obtained	$9,100	$9,800	$3,625	$1,000	$14,938	$16,813	$17,250	$8,000

Summary of enforcement and compliance data from Maryland Department of Environment for animal feeding operations from fiscal years 2013 to 2020. This data is for all of Maryland and is not limited to the Eastern Shore. The number of penalties per year varies, as collection sometimes takes place in a following fiscal year. There is a lag time for penalties obtained, meaning that the year the penalty is reported is not necessarily the year that it was imposed.

The number of sites considered by MDE to have "significant violations" – meaning violations that are chronic or threaten significant impact to the environment -- has declined. Maryland had an average of seven significant violations at animal feeding operations a year from fiscal years 2013 through 2017, but MDE says it has found none since July 1, 2017. However, the meaning of this supposed decline in "significant violations" is questionable, because MDE records also show that 17 poultry operations were continuously noncompliant with their water pollution control permits during three or more state inspections from June 2017 through November 2020 – which would seem to qualify them as chronic and therefore significant problems. Most of these repeat offenders (14 of 17) had both waste-management problems and record-keeping failures. Moreover, as noted earlier, 51 percent of the poultry operations for which public records were available in 2019 reported to the state that they had applied manure to their crop fields in amounts above the limits in their nutrient management plans. This would make them in violation of the water pollution control permits that MDE is supposed to be enforcing. The frequent nature of these overapplication violations should make them "significant," even if MDE does not classify them this way.

In response to a question from EIP about why MDE has not found a single "significant violation" at a poultry operation since fiscal year 2017, MDE Spokesman Jay Apperson said in a written statement that there had been a spike in significant violations in the years shortly after 2009, which later levelled off.[46] "As a result of new requirements and learning adjustments farm operators were faced with, relatively more significant permit violations occurred in the years following 2009," Apperson said. "With the annual outreach opportunities and routine site inspections conducted by MDE inspectors, significant violations began to decrease as these types of violations were not being observed as frequently." (For the complete text of MDE's responses to EIP's questions, see Appendix C). In response to EIP's question about why MDE's inspections of poultry operations have declined since 2017, Apperson said: "The number of inspections and number of sites

inspected varies over time for a variety of reasons, including the number of follow-up inspections that must be conducted to determine whether corrective actions have been taken, the number of new operations (which are a top priority for inspection), and the emphasis in certain years on inspecting larger CAFOs where more time is needed to complete the inspection process. In some years, external or unanticipated factors have also impacted the number of inspections. For example, in 2018 there were unanticipated events that affected employee availability to perform inspections. And in FY 2020, in-person CAFO inspections were paused for a period of approximately 5 months as a result of the COVID-19 pandemic."[47]

Violations and Penalties

Although it is common for poultry operations to fail state inspections, fines are rare. EIP reviewed MDE reports for 288 inspections at 182 poultry operations on the lower Eastern Shore from January 1, 2018, to October 21, 2020, and from June 8, 2017 to November 12, 2020 for the upper Eastern Shore. Eighty-four percent (153 of 182) of the poultry operations failed their initial inspection, most (97 of the 153) because of a combination of waste management problems and record-keeping failures.[48] Forty-three percent of the poultry operations (78 of 182) also failed a follow up inspection from MDE. The vast majority of the poultry operations that failed inspections (95 percent) had some kind of record-keeping problem, such as failing to file annual reports with the state or failing to maintain records. However, about two-thirds of the operations that failed inspections (104 of the 153) also had a waste management problem.

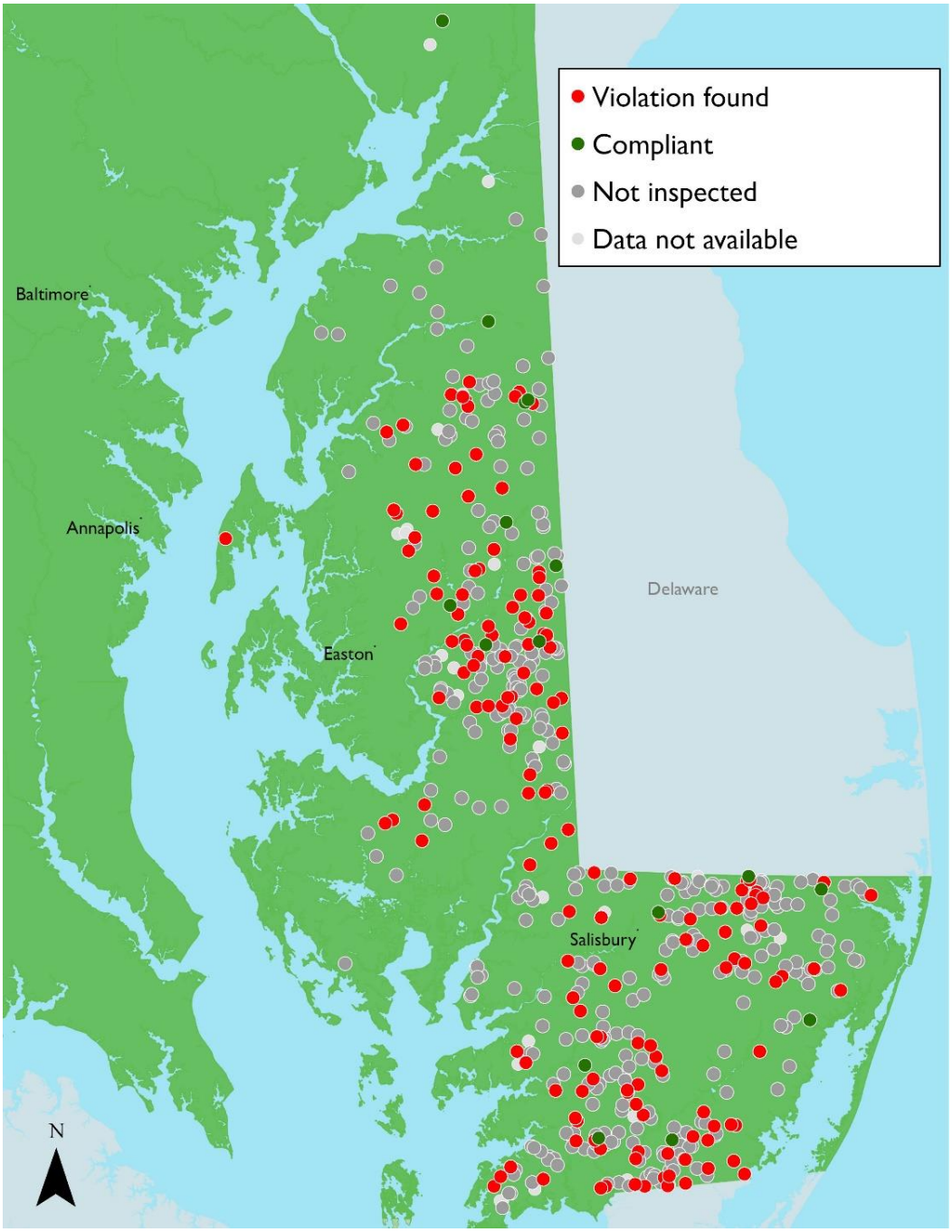
TABLE 6: MOST COMMON WASTE MANAGEMENT PROBLEMS AT AFOS THAT FAILED INSPECTIONS, 2017-2020

Waste Management Problems	# of Operations	% of Noncompliant Operations
Inadequate waste storage structures	66	63%
Improper use or maintenance of dead bird composter	48	46%
Manure left outside in paved areas	31	30%
Poor stormwater management	11	11%
Inadequate buffers between operation and waterway	5	5%
Improper application of manure to crops (too close to waterways)	4	4%

The above numbers are out of 104 animal feeding operations on Maryland's Eastern Shore that failed inspections from 2017 to 2020 and were cited for waste management problems. A single operation often had violations for multiple waste management problem categories.

The following map shows the locations of poultry operations that failed MDE inspections from June 2017 to November 2020.

MAP 3: POULTRY FARMS THAT FAILED PERMIT REQUIREMENTS DURING INSPECTIONS, 2017-2020



The map above shows poultry operations (in red) that failed at least one MDE inspection between June 2017 to November 2020. Eighty-five percent of poultry farms that were inspected (153 of 182) failed their initial inspections, usually because of a combination of waste management and record keeping failures.

Despite the frequent compliance problems, MDE enforcement logs from fiscal years 2019 through 2021 show that MDE rarely issues penalties and often fails to collect them (see Table 7, below.) All but one of the penalties imposed by the department during those years were for problems with the farms' submission of annual implementation reports, which show how farmers follow their nutrient management plans. Some operations submitted incomplete reports, or no reports at all.[49]

TABLE 7: MDE PENALTIES TO ANIMAL FEEDING OPERATIONS, FY 2018-2021

Fiscal Year	# of Operations Penalized	Paid Fines in $	Fines Revoked (cancelled by state)	Unpaid Fines in $
2018	0	0	0	0
2019	6	$6,000	$1,750	$2,000
2020	20	$2,250	$4,000	$6,250
2021	2	0	0	$4,000

EIP received enforcement logs from the Maryland Department of Environment for fiscal years 2019, 2020, and 2021. There were no fines imposed in FY 2018.

In the years EIP reviewed, the total fines actually paid by poultry operations with violations ($8,250) was less half the fines that remained unpaid ($12,250) or were cancelled (revoked) by the state ($5,750 for 12 violations). It should be noted that the state revoked several of these fines for what seem to be legitimate reasons – for example, when farmers finally turned in missing annual reports, or when MDE learned that poultry operations that they had penalized were now closed or had been sold.

Oversight by the Maryland Department of Agriculture

MDA is responsible for ensuring that farms have and follow nutrient management plans and that they do not over-apply manure to fields, especially when they have limits as determined by state regulations and Maryland's "phosphorus management tool" or PMT. Despite this responsibility, however, an MDA spokesman said the agency is "not authorized" to collect soil samples from farm fields to measure phosphorus levels – the main question in determining compliance.[50] Instead, MDA leaves the task of taking soil samples to measure compliance with the PMT to contractors paid by the farmers, or to the farmers themselves.

Farmers must submit annual implementation reports to MDA that detail how they are complying with their nutrient management plans. When farmers do not turn in these reports, or submit incomplete reports, MDA imposes fines. Over the last five years, the agency has penalized a total of 72 poultry operations $250 each for reporting failures,[51] including 14 fines in 2016, 30 in 2017, 18 in 2018, six in 2019 and four in 2020, according to MDA figures. It should be noted that these fines to poultry operations have declined in recent years, falling from an average of 20 penalties a year from 2016 through 2018, to just a handful in 2019 and 2020[52] (with the decline preceding the COVID-19 pandemic). Beyond these reporting and paperwork issues, MDA also has the power to impose larger fines -- of

up to $5,000 -- to farms that refuse to actually *follow* their nutrient management plans. However, the state agency has never imposed any of these larger fines.

In fact, to date, MDA has never fined a farm for failing to follow the manure application limits in a nutrient management plan.[53] In essence, MDA is only enforcing requirements for reports and paperwork, and is not enforcing limits on manure application itself, although it should be because reducing fertilizer applications is what protects water quality.

Checking for documentation and reporting on farms is important but not sufficient, because documents can be incomplete or misleading. An illustration of this problem can be found in a 2015 study by a University of Maryland researcher, Michele R. Perez.[54] She interviewed farmers on the Eastern Shore anonymously and found that a majority of them (61 percent) admitted that they do not follow the fertilizer application limits in their written plans. Perez wrote: "Several interviewed farmers, private planners, and fertilizer dealers stated they were actively evading the spirit and letter of the law because they kept double books (one plan to show an inspector and one plan to use to farm) or applied higher manure rates than they knew they should be using." Only 17 percent of farmers interviewed as part of Perez's research explicitly said they follow their nutrient management plans.[55] Although this study is six years old, it suggests that there is still room for more vigorous oversight of Maryland's nutrient management program by MDA and tougher fines for farmers who fail to follow the rules.

In response to questions from EIP, The Maryland Department of Agriculture argued that it has been performing its role in oversight by making sure that farms – including poultry operations – have nutrient management plans and file annual reports.[56] "In the last five years a $250 fine has been given to 72 CAFO operations," that have failed to file reports, said Jason Schellhardt, Director of Communications for the Maryland Department of Agriculture.[57] (For the full text of MDA's answers to EIP's questions, see Appendix D).

However, it should be repeated that – beyond these fines for paperwork issues – MDA also has legal authority to issue violations and impose fines on farms that pollute the environment by not complying with manure application limits in their nutrient management plans. MDA even has the authority to issue larger fines to farms that *knowingly* apply manure to fields where state laws prohibit phosphorus application under the state's PMT regulations. That means fields that have a high potential for runoff of phosphorus into streams and which have very high phosphorus levels, as measured by a "fertility index values" of more than 500. But MDA has – so far – not used this authority.

The state's "hands off" treatment of poultry operations causes many problems, including to water quality and the quality of life of people who live next door. The following example provides an illustration.

FEATURE STORY:

Farmer Complains to MDE About Poultry Operation Next Door

Centreville, Md. -- Bruce Ivins stood at the edge of the 60-acre farm where he grew up on Maryland's Eastern Shore and pointed to a sign at the edge of his neighbor's property that warns: "STOP! Keep Out. Biosecurity Area."

Farmer Bruce Ivins pointed to a "Keep Out. Biosecurity" sign on a tree bordering his neighbor's poultry houses. "I can't even open the windows of my house anymore," because of the ammonia and dust, he complained.

Above him, in the sky, drifted what looked like a cloud of smoke. It rolled toward Ivins' cherry red farmhouse with its white trim and green roof.

It's not smoke, he explained, but particles of manure and feathers mixed with ammonia. The air pollution was blown from six industrial-scale exhaust fans at the back a poultry house the size of an aircraft hangar built four years ago by the adjacent landowner. The fans are aimed directly at Ivins' home.

"Can you get a ***smell*** of that? The smell is just astronomical," said Ivins, 62, a welder and lifelong farmer. "I can't even open the windows in my house anymore. If I want to hang some clothes out on the line to dry, I can't do that anymore."

Ivins said he's repeatedly complained to MDE about the Little Chicks Farm in Centreville, where three metal buildings each house about 36,000 chickens.

About four years ago, the neighboring landowner clear cut 25 acres of woods to build the poultry houses. Before that, Ivins said he used to hunt in those forests. He played in the trees with his brother when they were kids. Now the property looks like an industrial site, dominated by a line of giant buildings, feed towers, gravel roads and a constant roar of exhaust fans.

"As soon as it was sold, they were cutting down trees – clearcutting everything," Ivins complained about the construction process. "I said, 'Could you please at least put the exhaust fans on the *far end* of the chicken houses, so they won't blow directly onto my house?'"

He said also asked the owner to not install a large manure storage shed close to Ivins' home. Neither of those requests was granted.

"They told me they were going to put a dirt berm up here that would be high enough that I could not see these chicken houses," Ivins said. "Then they said they were going to plant trees up on top of that berm to make a buffer and a filter. But they haven't done anything they said they were going to do. So to me, they're out of compliance."

"I'm angry about it, because it's really changed my lifestyle on the farm. I don't think I should have to live like this," Ivins said of the air pollution, odors, feathers, dust and flooding from the poultry farm next door.

Ivins hopped into a golf cart and motored across a stream bed near the poultry operation. Here, he explained, his neighbor built a makeshift dam from telephone poles and chunks of cement to block the stream and prevent the water from approaching the poultry houses.

The unpermitted dam caused a flood across several acres of Ivins' pastures and farm fields, making them useless for growing, he complained. Ivins said he got so angry about the flood damage, he demanded that the neighbor remove the dam within a week. The deadline passed, but the dam remained. So Ivins said he drove in a backhoe and ripped out the dam himself, allowing the stream to flow again.

Ivins said he hired an attorney, who filed complaints about his neighbor's poultry operation with Queen Anne's County and MDE. But none of the complaints ever went anywhere or resulted in any penalties or corrective actions by his neighbor.

"Where were the people from MDE?" Ivins demanded. "Where was the (county) planning and zoning department? Why weren't they here? Where was the person on the job site when they were building this, saying, 'hey, wait a minute!'"

MDE records show that, in response to Ivins' complaint, inspectors from the MDE and county on September 12, 2017, visited the farm. The MDE inspector looked it all over and concluded: "Corrective actions required," according to a state report.

"It was observed that chicken feathers were exiting the large exhaust fans at the ends of the poultry houses and being deposited on the ground," near Ivins' home, the MDE inspector wrote. "An odor was also detected at the site near the exhaust fans."

MDE conducted a follow-up inspection on May 1, 2018, and the inspector once again wrote at the top of the form: "Site condition: corrective actions required." But the inspector also later concluded, in contradiction to what he said at the top, that the farm "was operating in compliance with the General Discharge Permit," and so therefore no corrective actions were needed.

The owner of Little Chicks Farm, Tina Johnson, declined to comment. "I am not really comfortable talking about my chicken operation," she said in a phone call.

In response to another complaint by Ivins, MDE conducted a third inspection on April 26, 2018. This visit produced a report that concluded: "Site condition: additional investigation required."

But nothing was ever done to solve the problems that Ivins had complained about -- the air pollution, dust, feathers, and noise -- or to penalize the poultry farm for the construction of the dam that caused the flooding.

"Someone dropped the ball. They weren't monitoring this site," Ivins concluded. "I'm angry about it, because it's really changed my lifestyle on the farm. I don't think I should have to live like this," he said of the intense ammonia odors and clouds of particles.

"Where were the people from MDE?" farmer Bruce Ivins complained about the poultry operation next door. "Where was the (county) planning and zoning department?.... Someone dropped the ball. They weren't monitoring this site."

Conclusion and Recommendations:

The poultry industry on Maryland's Eastern Shore has an enormous footprint, with 503 active poultry operations producing more than 300 million chickens each year and over 600 million pounds of manure in 2019. As illustrated by the annual reports filed with the state, many farmers continue to over-apply this manure to fields already saturated with fertilizers, causing runoff of phosphorus and nitrogen pollution into the Chesapeake Bay. Nitrogen also drifts down into the Bay from the ammonia air pollution emitted by poultry houses, and these emissions are totally unregulated.

For an industry of this scale, robust state oversight is needed. But the Maryland Department of the Environment has only two or three inspectors who try to visit each operation once every five years. State inspections of poultry farms have been declining over the last decade, even as the number of permitted facilities has risen. And when MDE does visit a poultry farm, about 84 percent of the time, the state finds the farm is out of compliance on their first inspection. Almost half (43 percent) also fail follow up inspections. Yet very few poultry operations are ever fined even for repeat violations, and fewer still of the penalties are ever collected.

For its part, the Maryland Department of Agriculture is supposed to ensure that all farms not only have but follow manure management plans. But MDA itself doesn't even sample the soil, air or water around farms, instead performing mostly paperwork checks and trusting soil sampling to the farmers themselves or their paid consultants. MDA has never fined a farm for failing to follow its nutrient management plan, although more than half of poultry farms whose records were available in 2019 admitted in their annual reports to the state that they had over-applied manure to their crops, in violation of their own nutrient management plans and state law. On top of this, a 2015 study by a University of Maryland researcher[58] concluded that noncompliance with nutrient management plans by Maryland farmers was frequent and blatant.

Much is at stake in the oversight of the poultry industry and the waste it produces, including the health of the Chesapeake Bay and the quality of life for neighbors who must inhale the industry's ammonia and drink from groundwater.

This report recommends that Maryland take the following steps to protect public health and strengthen the Chesapeake Bay cleanup efforts:

1) MDE and MDA should more frequently impose – and then actually collect – penalties against poultry operations that fail to comply with their nutrient management plans or fail to meet the requirements of their water pollution control permits. These fines should also be extended to the big poultry companies, who often exert extensive control over their contract growers. Penalties are likely to remain low and inconsequential as long as the state imposes them only on the farmers and not on the integrators.

2) MDE should hire more inspectors for animal feeding operations, so that the agency can scrutinize the facilities more than just once every five years and make sure they are complying with the requirements of their permits.
3) The state should increase water and air monitoring around poultry operations, especially by adding a series of ammonia air monitors at operations that have neighbors immediately downwind. Fenceline air monitoring should be required whenever a chicken house is located within 400 feet of a neighboring residence (which is true of at least a third of poultry operations.)
4) MDE should revise and strengthen its general water pollution control permits for animal feeding operations so that they work to control chicken house ammonia emissions, which deposit into waterways. Permit requirements should include the installation of ammonia pollution control systems, such as "scrubbers," and the planting and maintenance of thick buffers of trees surrounding poultry houses.[59]
5) Maryland should vigorously enforce the state's new manure application rules, called the Phosphorus Management Tool (PMT), which took full effect on July 1. As part of the oversight of these rules, Maryland should allow MDA and MDE inspectors to take soil samples from fields and water samples from nearby streams and ditches to perform a reality check on self-reported compliance information.
6) MDE and MDA should improve the self-reporting requirements for all farms that spread poultry manure on crops as fertilizer. Since most poultry manure is sent off-site to other farms, MDA should require all users of poultry manure to report field-level manure application information (including phosphorus fertility index values) on annual implementation reports submitted to the state.
7) MDA should provide more guidance, support, and technical expertise to farmers who have fields that are overloaded with phosphorus. Solutions should promote remediation using practices that absorb excess phosphorus and improve soil health.

Implementing these common-sense steps will help Maryland improve accountability for the Eastern Shore's largest industry, reduce pollution in the Chesapeake Bay, and protect the health and quality of life for everyone in the region.

Appendix A:

Methodology

This report is based on public records and data obtained from the Maryland Department of Agriculture and Maryland Department of the Environment, EIP's geospatial analyses, and interviews with regulators and farmers. Annual Implementation Reports and Nutrient Management Plans contain information that poultry operations submitted to the Maryland Department of the Environment. This self-reported data, while one of the only sources of information about the environmental performance of poultry operations in Maryland, is not error-free. We strove to identify and, where reasonable, correct obvious errors (i.e. a farmer reported the total number of chickens they produced, rather than the size of each flock). We excluded incomplete data from our analysis. However, this means that many of our figures may be underestimates.

Data Sources

Data Source	Geographic Scope	Time Period	# of Operations
Annual Implementation Reports	Eastern Shore Counties	2019 growing year	503 active
MDE's Database of Registered AFOs	Eastern Shore Counties	As of July 2021	529
Inspection Reports for Poultry Operations	Somerset, Wicomico, Worcester	January 2018 through October 2020	93
	Caroline, Dorchester, Queen Anne's, Cecil, Kent, Talbot	November 2017 through November 2020	80
CNMPs and NOIs	Eastern Shore	2018	487
Enforcement Logs	Eastern Shore	2018-2020	Not Applicable
2019 NAIP Imagery-Maryland Mapping and GIS Data Portal	Maryland	Winter 2019	Not Applicable
Tax Parcel Boundaries - Maryland Department of Planning	Maryland	As of August 2021	Not Applicable

Poultry Litter Land-Applied On-Site:

Using Annual Implementation Reports (AIRs) from the 2019 crop-growing year, we identified the number of poultry operations with cropland. In each AIR, poultry operators with cropland reported manure application on a field-level basis. These reports provided information regarding crop type, the number of acres of crops grown, and the amount of

phosphate in the soil of each field per the operation's soil test results. A review of Comprehensive Nutrient Management Plans (CNMPs) and Nutrient Management Plans (NMPs) provided the name of the lab that performed the soil test results and their methodology.

We converted soil test to the appropriate measurement unit (either ppm or lb/acre) using Maryland Department of Agriculture's conversion methods, which vary for each soil test lab. Using this information, we calculated the Fertility Index Value (FIV) unless the FIV was reported in the facility's soil test results. Excessive values are higher than 100, and they indicate that soil already contains more than enough phosphorus to support crop growth. Values over 500 FIV mean more manure application is banned. Recommendations for manure application to crops are dependent on the FIV of the soil and crop type.

We calculated over-application of manure (meaning the amount of phosphorus from manure that was applied over the nutrient recommendations in the Nutrient Management Manual). We converted the total amount of phosphate applied to phosphorus using the molecular weight factor of 0.4364. We excluded fields or operations if, for example, they did not report their soil test results, did not report the nutrient application rate, or we did not have a Nutrient Management Plan on file for the operation.

AFO Locations, Residences Within 400 Feet, and Vegetative Buffers

EIP downloaded poultry operation locations from Maryland Department of Environment's AFO Public Participation Process viewer on 07/13/21. At the time, the MDE dataset included multiple listings for some operations because the database is designed to track permit application status, and many operations are currently seeking coverage under the state's new general discharge permit. We narrowed the list to 529 distinct operations that were included with their primary animal type being listed as chickens (not laying hens). We georeferenced their facility addresses in Google Earth Pro and corrected point locations in ArcGIS, using 2019 or 2018 Annual Implementation Reports (AIRs) and Comprehensive Nutrient Management Plans (CNMPs), Nutrient Management Plans (NMPs), and Notices of Intent (NOI) for permit coverage to ensure consistency with public documents.
We digitized poultry house building footprints in ArcGIS Pro 2.9.0 based on 2019 imagery from Maryland's Mapping & GIS Data Portal.

Using ArcGIS Pro 2.9.0, we implemented a 400-foot buffer around poultry house building footprints. Using 2019 imagery from Maryland's Mapping & GIS Data Portal and land parcel data from Maryland Department of Planning, we identified where off-site residences (residences on land parcels with different primary owners from the poultry house land parcels) intersected by the 400-foot buffer.

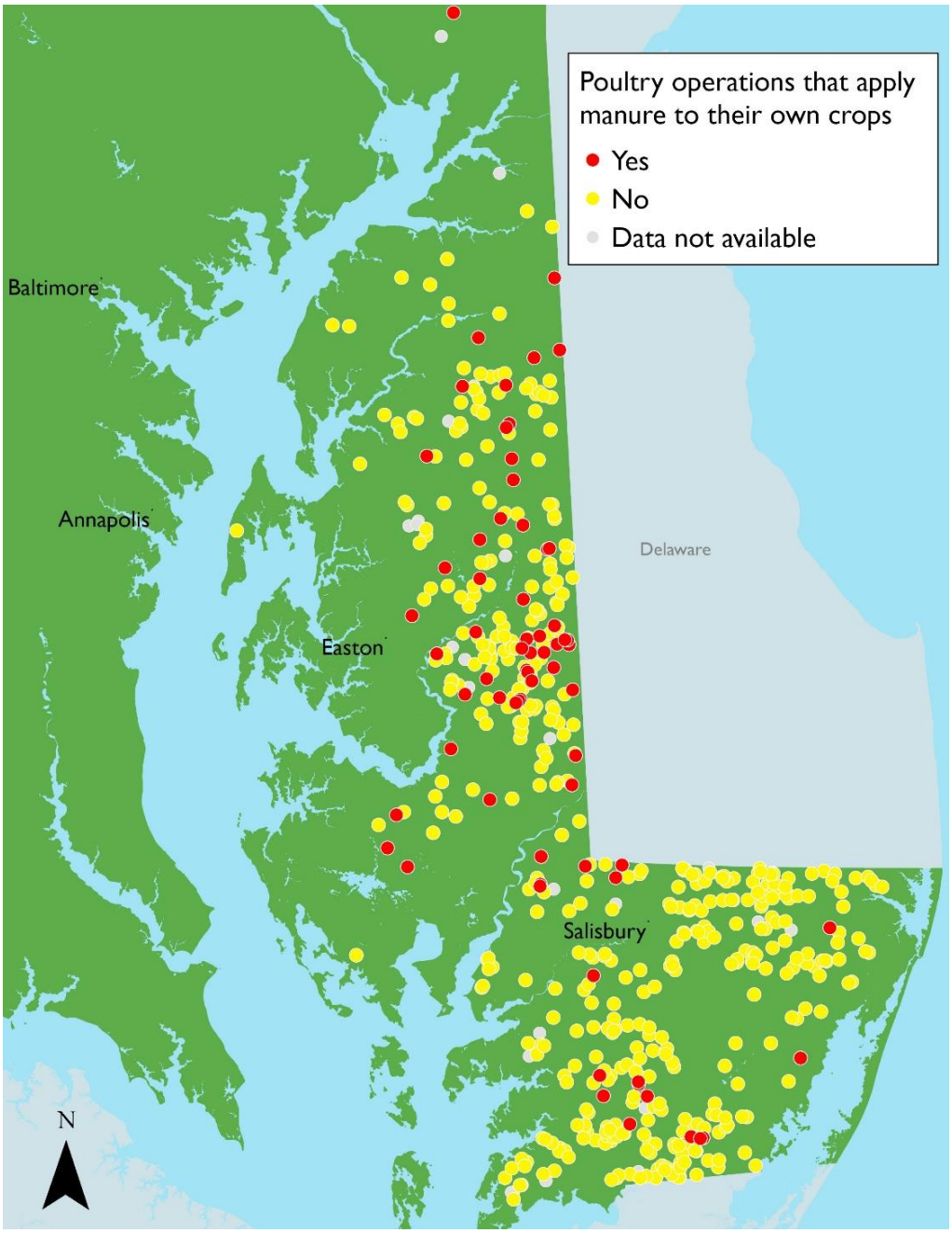
To identify vegetative buffers, we relied on the same imagery mentioned above. We used the following criteria to characterize vegetative buffers around poultry houses:

1. Complete forested buffer: Poultry houses are surrounded by forest.

2. Partial forested buffer: Poultry houses are only partially surrounded by forest but are not unbuffered between the poultry houses and any offsite residences.
3. Complete forest/vegetative environmental buffer: Poultry houses are completely surrounded by a combination of installed vegetative environmental buffers and forested areas.
4. Partial forest/vegetative environmental buffer: Poultry houses are partially surrounded by a combination of installed Vegetative Environmental Buffers and Forested areas. Even if the poultry houses are in sight of residences, if a vegetative environmental buffer is present, the facility was designated as having a partial buffer.
5. Complete vegetative environmental buffer: Poultry houses are completely surrounded by a vegetative environmental buffer.
6. Partial vegetative environmental buffer: Poultry houses are partially surrounded by vegetative environmental buffers, with no forested buffer. Even if the poultry houses are in sight of residences, if a VEB is present, the facility was designated as having a partial buffer.

Appendix B:

POULTRY FARMS THAT SPREAD MANURE ON THEIR OWN CROPS, 2019:



The map above shows the locations of animal feeding operations in Maryland in 2019, with the red dots indicating poultry farms that reported apply manure to their cropland. Source: MDE data

Appendix C:

Questions and Answers from MDE

Questions asked by EIP to MDE about the agency's oversight of poultry operations and the answers provided by MDE spokesman via email on August 25, 2021, by MDE spokesman Jay Apperson, Deputy Director in the Office of Communications.

Question 1: How many employees does MDE have performing in-person inspections of Animal Feeding Operations today? How that number changed, on an annual basis, over the last decade?

Answer 1: Currently and in recent years, three employees perform AFO inspections. That number includes one supervisory employee who also has additional non-inspection duties that are performed in the office. During 2014 and 2015, there were two employees.

Question 2: The number of Animal Feeding Operations inspected, in person, by MDE on an annual basis has fallen by about 40 percent in recent years, according to MDE's annual Enforcement and Compliance Reports. Inspections have declined from an average of 218 a year from 2013 through 2017; to 134 per year from 2018 through 2020, with the decline predating Covid-19. Why the decline in inspections?

Answer 2: The number of inspections and number of sites inspected varies over time for a variety of reasons, including the number of follow up inspections that must be conducted to determine whether corrective actions have been taken, the number of new operations (which are a top priority for inspection), and the emphasis in certain years on inspecting larger CAFOs where more time is needed to complete the inspection process. In some years, external or unanticipated factors have also impacted the number of inspections, for example, in 2018 there were unanticipated events that affected employee availability to perform inspections and in FY 2020, in-person CAFO inspections were paused for a period of approximately 5 months as a result of the COVID-19 pandemic.

Question 3: What do MDE's in-person inspections of Animal Feeding Operations entail? Does MDE sample nearby waterways to check for bacteria or nutrient levels? Does MDE check the amounts of nutrients in the soil of the farm fields of operations that have crops to confirm that manure is applied at rates indicated in the nutrient management plan?

Answer 3: MDE inspectors conduct a complete records review consisting of up to 5 consecutive years and check the following: Registration Certificate and Permit, CNMP and or NMP/Conservation Plan, Compliance Schedules, Annual

Implementation Report, all required inspection forms, Nutrient Land Application Log, Weekly Storage and Containment Structure Inspection Log, Weekly Wastewater Facilities Inspections Log, documentation for all manure, litter, and wastewater storage structures, Manure Application Equipment Inspection Record and Calibration Record, Manure, Litter and Process Wastewater Transfer Record form, Water Line Inspection Log.

Additionally, MDE inspectors review the nine minimum standards listed in the permit to protect water quality. Specifically, inspectors check the following:

Nine Minimum Standards to Protect Water Quality:

1.) Ensure adequate storage capacity. Inspectors check the facility's CNMP to see if all of the required manure storage structures have been completed as scheduled. Inspectors also field verify these structures to see if they are utilized and maintained properly. The Inspector also checks to see if any manure is being stockpiled outside the designed storage areas.
2.) Ensure proper management of mortalities to prevent the discharge of pollutants into waters of the State. The inspector conducts an inspection of the mortality structures to make sure they are being utilized and operated properly as designed.
3) Divert clean water, as appropriate, from the production area to keep it separate from process wastewater. The inspector checks all clean water diversion devices within the facilities production area to make sure clean water has been kept separate from their process wastewater.
4) Prevent direct contact of confined animals with waters of the State. The inspector walks around the production area to ensure there are not animals having direct contact with waters of the State.
5) Chemical handling. The inspector checks all chemical handling / containment areas to make sure there are no leaks or discharges at the facility.
6) Conservation practices to control nutrient loss, including site specific conservation practices. The inspector reviews the facility's CNMP to see what site specific conservation practices are installed or planned at the site and also field verify the effectiveness of the practices.
7) Protocols for manure and soil testing. The inspector reviews the facility's Nutrient Management Plan to see if they have conducted the proper manure and soil testing as required by the permit.
8) Protocols for the land application of manure and wastewater. The inspector reviews the facility's CNMP/NMP and field verifies the proper application of manure and wastewater for land application that has been conducted at the facility based on the permit requirements.
9) Record keeping. The inspector reviews all the facility's records as required by the permit as stated in the above listing of record review items.

Site Inspection does entail a walk around the grounds of the production and land application areas to visually assess General Discharge Permit compliance with the following:

1.) Animal confinement and Heavy Use Area (HUA) area.

2.) Manure and process wastewater storage.
3.) Animal mortality area.
4.) Feed storage area.
5.) Chemical storage area.
6.) Stormwater routing and treatment areas.
7.) Land application areas of manure and process wastewater if applicable.

Field Inspection Reports are prepared and documented based on the inspector's observations as part of the site inspection process.

Water samples are collected when a surface discharge of pollutants is evident. Examples of how an unauthorized surface water discharge would be evident to an inspector include observation of foul smelling dark liquid leaking from a manure storage structure and discharging into a stream, dead fish in a nearby stream, broken waterline making contact with manure and resulting in flooding, etc.

Question 4: MDE performs less than half as many in-person, on-the-farm inspections of AFOs as it does remote paperwork reviews. Why so few in-person inspections?

Answer 4: MDE inspects 20% of CAFOs annually, as described under the MDE work plan approved by EPA. MDE inspects additional facilities as time allows. MDE has been restricted to only one poultry site visit a day due to biosecurity concerns.

Remote paperwork reviews consist of the review of Annual Implementation Reports (AIRs). AIRs are required to be submitted annually by all CAFOs and MAFOs, and all AIRs are reviewed annually for completeness, resulting in the large number of remote paperwork reviews.

Question 5: How often does MDE inspect each AFO in person?

Answer 5: MDE will inspect a permitted facility at least once in a 5-year permit cycle or 20% annually.

Question 6: MDE inspection reports show high rates of noncompliance with the requirements of Maryland's AFO general discharge permit, with 89 percent of poultry operations (154 of 173) failing their initial, routine inspections from 2017 to 2019. Almost half (45 percent, or 78 of 173) also failed their follow up inspections. The state imposed administrative penalties on only 8 of these farms with repeat failed inspections, and the state has collected the fines on four of these eight. Why so few penalties?

Answer 6: A high percentage of the noncompliance documented on inspection reports is generally attributed to the keeping of required records by operators. In some instances, records are available but are incomplete, in other cases, records are

not available to review. MDE inspectors provide the necessary record forms and/or explanation to return recordkeeping to compliance. Follow-up site inspections related to recordkeeping noncompliance issues may focus on evaluating the records to determine if compliance is satisfied. Penalties may be assessed if follow-up site inspections show that recordkeeping remains noncompliant with permit requirements.

Certain other noncompliance issues may involve best management practices (BMPs) not functioning at the designed capacity and therefore would require corrections to return that practice's ability to full functioning capacity. Corrections to these practices may not be immediate due to contractor's schedules, building material source availability, and operator involvement in state and federal funding-cost sharing programs.

To return these facilities to compliance, MDE initially follows a compliance assistance approach. Following the initial compliance assistance, MDE may need to conduct follow-up site visits to assure that the operator is meeting the corrective action schedule to achieve compliance.

MDE further evaluates each case and dependent on the nature (level of severity based on surface water discharge) of the General Discharge Permit violation as well as the operator's corrective actions to achieve compliance. These and other statutory factors, including the penalty factors in §9-342 of the Environment Article, are used to determine whether further enforcement action, including penalties, are necessary to achieve a return to compliance.

Question 7: Given the high failure rate of AFOs during inspections, what, in the Department's view, would help improve farmer compliance with the AFO general permit?

Answer 7: Among the noncompliance identified at AFOs, recordkeeping issues are common. MDE inspectors have recognized this issue and found that it is helpful during their inspections to provide outreach to operators regarding completion of records and logs required under the Permit. MDE routinely educates the operators of AFO facilities regarding the permit requirements during their inspections.

Other opportunities for outreach have been conducted at county/regional grower meetings arranged by UMD-Extension, Delmarva Chicken Association, and other private organizations. Outreach assistance has also been provided to operators through on-site visits by Maryland Department of Agriculture and USDA-Natural Resource Conservation Service.

Question 8: MDE has not found a single "significant violation" at an AFO since fiscal year 2017. Why is that? From 2010 through 2017, the state agency found an average of about five "significant violations" a year – or 41 total over those eight

years. What does MDE consider a 'significant violation' at an animal feeding operation?

Answer 8: Following the first-time issuance of the general permit in 2009, AFOs were required to follow surface water discharge requirements based on conditions outlined by EPA's and the State's regulatory requirements. As a result of new requirements and learning adjustments farm operators were faced with, relatively more significant Permit violations occurred in the years following 2009. With the annual outreach opportunities and routine site inspections conducted by MDE inspectors, significant violations began to decrease as these types of violations were not being observed as frequently. Also, for many of the more minor violations observed during inspections, MDE provides corrective actions with timeframes for correction, which encourage operators to return to compliance before the violations are considered significant.

Significant violations may include violations that persists or recurs over a period of time after it is identified and the operator is given an opportunity to return to compliance, or violations that are significant in nature because of their adverse environmental impact.

Question 9: From 2018 through 2021, MDE has failed to collect or has cancelled (revoked) as many penalties to AFO's as it has collected. During this time period, MDE imposed 24 penalties on 24 operations totaling $20,750. The state agency collected $8,250 in penalties, but forgave or revoked another $6,000 in penalties and has so far failed to collect $6,500. Why such a low collection rate on the fines the state does impose?

Answer 9: MDE has issued penalties for violations not only associated with site inspections but also for the failure to submit completed Annual Implementation Reports (AIRs). In some cases, AIRs are filed incomplete, in other cases farm operators fail to file their AIRs by the prescribed annual deadline of March 1.

Depending on the nature of the underlying violations, the operator's response to MDE and correction of the violations, and the stage in the enforcement process at which the penalty was imposed, MDE may agree to settle cases for reduced penalties. Where an operator fails to respond to or pay a penalty that was imposed, MDE continues to pursue the case, which may require escalating to the next stage in the enforcement process in order to gain compliance.

Question 10: Is MDE responsible for making sure that AFOs with crop fields follow the fertilizer application limits in their nutrient management plans and the state's Phosphorus Management Tool? Or is enforcing the PMT the responsibility of MDA's?

Answer 10: MDE completes a records review during a facilities inspection and reviews the facilities NMP for fields that have applied manure combined with commercial

fertilizer to verify application rates are within their NMP recommendations. MDA is responsible for the enforcement of the PMT.

Appendix D:

Questions and Answers from MDA

Email from Jason Schellhardt, Director of Communications, Maryland Department of Agriculture, to Environmental Integrity Project (EIP) on August 25, 2021, in response to EIP's questions.

Question 1: How often has MDA inspected, in-person, poultry Animal Feeding Operations on an annual basis over the last five years?

Answer 1: The Maryland Department of Environment has regulatory oversight of AFOs and CAFOs. MDA is only involved in the inspection of the operations' Nutrient Management Plans (NMP).

Question 2: When MDA inspects a poultry Animal Feeding Operation, what exactly do those inspections include? Do MDA employees take samples from the fields, if the operations have crops, to see if they are applying manure in excess of their nutrient management plans or the PMT?

Answer 2: Again, this is not specific to AFOs/CAFOs, but MDA routinely inspects implementation of NMPs to ensure compliance. This includes evaluation of soil tests, manure analysis, and other recommendations from the NMP, including PMT requirements. The department is not authorized to collect soil samples, but does verify soil analysis provided by commercial labs in the farm's NMP.

Question 3: How does MDA confirm that farmers are following the limits of the PMT and their nutrient management plans?

Answer 3: Farmers are required to submit Annual Implementation Reports (AIR) which are reviewed by the department to ensure compliance with the PMT and any other applicable requirements.

Question 4: How often has MDA fined poultry Animal Feeding Operations over the last five years, and for what exactly? How much in penalties has been collected from how many poultry farms over the last five years?

Answer 4: MDA has levied financial penalties against AFOs for late submission of their AIR. In the last five years a $250 fine has been given to 72 CAFO operations.

- 2016: 14 fines
- 2017: 30 fines
- 2018: 18 fines
- 2019: 6 fines
- 2020: 4 fines

Additionally, farmers found to be out of compliance with their NMP are issued a warning and ordered to take corrective action. If corrective action is not taken, the farmer can be fined up to $5,000. MDA has not had to issue any fines for NMP compliance to date.

Question 5: Have the Phosphorus Management Tool's limits on phosphorus and manure application taken effect yet? If not, when exactly do they take effect for what levels of FIV?

Answer 5: The PMT is fully implemented as of July 1, 2021.

Question 6: What does MDA do to help or guide farmers whose soils have too much phosphorus for more manure application?

Answer 6: In close consultation with the PMT Advisory Committee and various stakeholder groups, the department continues its broad approach to providing resources and technical support to impacted farmers, as well as identifying new opportunities for alternative uses and relocation of manure.

Most notably, the department has leveraged increased state and private funding for the Manure Transport Program to relocate litter that cannot be used on farmland that is high in phosphorus, moving it to alternative use facilities or areas where it can be land applied safely. The department has also launched outreach campaigns to farmers across the state who are able to accept manure, promoting the benefits of manure as a crop fertilizer.

Question 7: How many farms – if any -- have been fined so far for spreading poultry manure in excess of the limits in the PMT?

Answer 7: No farms have been fined at this time.

End Notes

[1] Based on Annual Implementation Reports (AIRs) filed with the Maryland Department of the Environment in 2019, obtained by the Environmental Integrity Project through a Public Information Act request. There are 529 total operations, but only 503 of them were active in 2019.
[2] Ibid. Based on 2019 AIRs numbers. Farmers reported removing 345,527 tons of manure in 2019, or about 608 million pounds. Sixty-one operations did not report removing manure from their poultry houses in 2019.
[3] Environmental Integrity Project, "Poultry Industry Pollution in the Chesapeake Region," April 22, 2020, available at https://environmentalintegrity.org/wp-content/uploads/2020/04/EIP-Poultry-Report.pdf
[4] Based on Annual Implementation Reports submitted by poultry operations in 2019. Twenty nine of 57 poultry operations, which apply manure to their own land, reported applying manure in excess of their nutrient management plans, which is a violation of both Maryland's 1998 Water Quality Improvement Act and the state's National Pollution Discharge Elimination System (or NPDES) general permit for poultry operations, which requires farms to follow their nutrient management plans.
[5] Review of MDE inspection reports for 182 Maryland poultry operations between June 8, 2017, and November 12, 2020, obtained through the Maryland Public Information Act.
[6] Email from Jason Schellhardt, Director of Communications, Maryland Department of Agriculture, on August 25, 2021, to EIP, in response to questions about CAFO oversight. "The department is not authorized to collect soil samples, but does verify soil analysis provided by commercial labs in the farm's NMP (nutrient management plan)," Schellhardt wrote.
[7] Ibid.
[8] Email from MDE Deputy Communications Director Jay Apperson to EIP on August 25, 2021, in response to EIP's emailed questions about CAFO enforcement. (See Appendix C). When asked whether MDE checks streams near poultry farms for pollution, MDE responded: "Water samples are collected when a surface discharge of pollutants is evident. Examples of how an unauthorized surface water discharge would be evident to an inspector include observation of foul smelling dark liquid leaking from a manure storage structure and discharging into a stream, dead fish in a nearby stream, broken waterline making contact with manure and resulting in flooding, etc."
[9] Christine Condon, "Court Decision Will Require Maryland to Regulate Gaseous Ammonia Emissions from Poultry Farms," The Baltimore Sun, March 16, 2021. Link: https://www.baltimoresun.com/news/environment/bs-md-court-decision-gaseous-ammonia-emissions-poultry-farms-eastern-shore-20210316-lplqea7l6jgj3e3h6zpoevjvpy-story.html
[10] MDE, "Lower Eastern Shore Ambient Air Quality Monitoring Project Beginings," viewed October 14, 2021. Link: https://mde.state.md.us/programs/Air/AirQualityMonitoring/Pages/Lower-Eastern-Shore-Monitoring-Project_Beginings.aspx
[11] Environmental Integrity Project report, "Stagnant Waters: Despite Two Decades of Bay Cleanup Efforts, No Improvement for Phosphorus Pollution on Maryland's Eastern Shore," released October 28, 2021. Link: https://environmentalintegrity.org/wp-content/uploads/2021/10/MD-Stagnant-Waters-Report-EMBARGOED-for-10-28-21.pdf
[12] Email from MDE Deputy Communications Director Jay Apperson to EIP on August 25, 2021, in response to EIP's emailed questions about CAFO enforcement.
[13] Annual Enforcement and Compliance Reports, Maryland Department of the Environment. Available at: https://mde.maryland.gov/Pages/enforcementcompreports.aspx
[14] The date range for the 182 inspected poultry operations was January 1, 2018 to October 21, 2020 for the Lower Eastern Shore, and from June 8, 2017 to November 12, 2020 for the upper Eastern Shore.
[15] Review of MDE inspection reports for 182 Maryland poultry operations between June 8, 2017, and November 12, 2020, obtained through the Maryland Public Information Act. The count of violations only includes waste management and record keeping violations.
[16] Enforcement logs from Maryland Department of Environment obtained by Environmental Integrity Project via a request under the Public Information Act.
[17] Ibid.
[18] 2019 Annual Implementation Reports sent to the Maryland Department of the Environment, obtained by the Environmental Integrity Project through the state Public Information Act.

[19] Philip Moore et al., "Evaluation and Management of Ammonia Emissions from Poultry Litter," USDA Agricultural Research Service, June 1, 2006. Available at: https://www.ars.usda.gov/research/publications/publication/?seqNo115=193555.
[20] Annual Implementation Reports for 2013 and 2019 crop-growing years obtained through a Maryland Public Information Act request.
[21] Ibid.
[22] U.S. Department of Agriculture reports, "Poultry Production and Value: Final Estimates 2013-2017," released in June 2019, and "Poultry - Production and Value: 2020 Summary," released in April 2021. Link for 2019 report:https://downloads.usda.library.cornell.edu/usda-esmis/files/df65v786z/z029pf98x/jh344321h/ppdvsb19.pdf Link for 2020 report: https://www.nass.usda.gov/Publications/Todays_Reports/reports/plva0421.pdf

[23] Analysis from the Environmental Integrity Project using satellite imagery and the Maryland Department of Environment's AFO database (available at: https://mdedataviewer.mde.state.md.us/Public/Land/CAFO/Public%20Search%20Tool). Three hundred fifty-seven households are within 400ft of a poultry CAFO.
[24] Read more in our report: Environmental Integrity Project (January 2018), "Ammonia Emissions from Broiler Operations Higher than Previously Thought", available at: https://environmentalintegrity.org/wp-content/uploads/2017/02/Ammonia-Report.pdf

[25] 2019 Annual Implementation Reports
[26] Farmers reported removing 354,379 tons of manure from Maryland poultry houses in 2013, according to Annual Implementation Reports filed by poultry operations.
[27] Nutrient Management - Required Plan Recommendations, COMAR 15.20.08.05, http://mdrules.elaws.us/comar/15.20.08.05 ; Agricultural Operation Nutrient Management Plan Requirements, http://mdrules.elaws.us/comar/15.20.07
[28] "Nitrogen & Phosphorus," The Chesapeake Bay Foundation, accessed February 17, 2021. Available at: https://www.cbf.org/issues/agriculture/nitrogen-phosphorus.html
[29] 2020 Report Required by AG § 8-807 - MSAR # 11904, Maryland Department of Agriculture, January 14, 2021. Available at: http://dlslibrary.state.md.us/publications/Exec/MDA/AG8-807_2020.pdf. Note: EIP confirmed with MDA that this report contained typos that inflated the amount of poultry litter used in Kent County. The manure totals we present in this report reflect the corrected figures.
[30] The annual report produced by the Maryland Department of Agriculture (MDA) has a larger scope for manure use and application. The data that we have collected only pertains to operations that raise animals on the Eastern Shore, while MDA's data includes any operations in the nutrient management program in Maryland. However, the report is still limited in that the data are based on self-reported Annual Implementation Report data, so there could be errors or omissions. MDA does not provide an explanation, methodology, or caveats for what they present in their annual report to the general assembly.
[31] Maryland Department of Agriculture, Phosphorus Management Tool Transition Advisory Committee (2017) "2017 Progress Report" Available at: https://mda.maryland.gov/resource_conservation/counties/PMTAdvisoryCommittee%20Report_2017.pdf
[32] Thirteen operations reported partial information for one or more of the fields they applied manure to and 26 operations reported partial information for all of their fields, so it is unclear where the operation over-applied manure. EIP excluded some reports from our analysis because of reporting errors and gaps. Six poultry operations reported applying 1,493 tons of non-poultry manure to their fields, although farmers do not delineate which specific manure was applied to which of their fields.
[33] The number of poultry farms reporting field-level information about their manure applications to crops decreased between 2013 and 2019, in part because fewer poultry operations had crop fields and so fewer were required to report applications to those fields. Ninety-three operations reported applying poultry litter containing phosphorus to about 18,000 acres in 2013, compared to 57 to about 10,000 acres in 2019. A similar proportion of poultry operations in 2013 reported spreading manure on soil that already contained an excessive amount of phosphorus (defined as a "fertility index value" of more than 100). In 2013, 90 of 93 farms reported spreading manure on fields with excessive amounts of phosphorus. In 2019, the number doing

that was 52 of 57 farms. However, far fewer operations in 2019 reported applying manure to cropland where phosphorus levels are so high that they are outright banned by state regulations (meaning, they had a "fertility index value" over 500): Only two in 2019 compared to 26 in 2013.

[34] Fifty-nine operations reported sufficient information to perform this analysis. This means, for example, that the farmer reported the type of crop grown, crop yield goals, soil test results with measurement units, the amount of phosphorus recommended for application, and the actual amount of phosphorus applied. Sixty-one operations reported partial information for one or more of the fields they applied manure to. Twenty-six operations reported partial information for all of their fields, so it is unclear where the operation over-applied manure.

[35] Operations were excluded if they did not report their soil test results in their annual report or if we were unable to locate their Phosphorus Management Tool Reports. Soil tests may be subject to farmer reporting error.

[36] 2019 Annual Implementation Reports obtained by Environmental Integrity Project via a request under the Public Information Act. Subject to reporting error since soil test results (used to determine FIV score) are reported by farmers in their Annual Implementation Reports.

[37] About MDE, Maryland Department of the Environment, accessed August 27, 2021. Available at: https://mde.maryland.gov/Pages/AboutMDE.aspx

[38] About MDA, Maryland Department of Agriculture, accessed August 27, 2021. Available at: https://mda.maryland.gov/about_mda/Pages/about_mda.aspx

[39] Maryland Department of Agriculture, "Report Required by AG § 8-807 - MSAR # 11904," provided to Governor Larry Hogan on January 14, 2021. Link: http://dlslibrary.state.md.us/publications/Exec/MDA/AG8-807_2020.pdf

[40] Annual Enforcement and Compliance Reports, Maryland Department of the Environment. Available at: https://mde.maryland.gov/Pages/enforcementcompreports.aspx

[41] Email from MDE Deputy Communications Director Jay Apperson to EIP on August 25, 2021, in response to EIP's emailed questions about CAFO enforcement.

[42] Maryland Department of the Environment, "Lower Eastern Shore Ambient Air Quality Monitoring Project Beginnings," 2019. Link: https://mde.state.md.us/programs/Air/AirQualityMonitoring/Pages/Lower-Eastern-Shore-Monitoring-Project_Beginings.aspx

[43] Email from MDE Deputy Communications Director Jay Apperson to EIP on August 25, 2021, in response to EIP's emailed questions about CAFO enforcement.

[44] Annual Enforcement and Compliance Reports, Maryland Department of the Environment, available at: https://mde.maryland.gov/Pages/enforcementcompreports.aspx. The overwhelming majority of AFOs in Maryland raise chickens on the Eastern Shore.

[45] The department reported an additional 233 operations with pending permits in FY13. MDE also recorded 24 permit withdrawals in FY18 and 27 permit withdrawals in FY19.

[46] Ibid.

[47] Email from MDE Deputy Communications Director Jay Apperson to EIP on August 25, 2021, in response to EIP's emailed questions about CAFO enforcement.

[48] Review of MDE inspection reports for 182 Maryland poultry operations between June 8, 2017, and November 12, 2020, obtained through the Maryland Public Information Act. Count of waste management violations excludes two that were only for poorly maintained roads, because this is not a manure management issue.

[49] Enforcement logs obtained by the Environmental Integrity Project from the Maryland Department of Environment via a request under the Public Information Act.

[50] Email from MDA Director of Communications, Jason Schellhardt, to EIP on August 25, 2021, in response to questions sent by EIP.

[51] Ibid.

[52] Ibid.

[53] Ibid.

[54] Michelle Perez, "Regulating Farmer Nutrient Management: A Three-State Case Study on the Delmarva Peninsula," Journal of Environmental Quality, March 2015. Available at: https://dl.sciencesocieties.org/publications/jeq/pdfs/44/2/402

[55] Ibid.
[56] Email from Jason Schellhardt, Director of Communications, Maryland Department of Agriculture, on August 25, 2021, to EIP, in response to questions about CAFO oversight.
[57] Ibid.
[58] Michelle Perez, "Regulating Farmer Nutrient Management: A Three-State Case Study on the Delmarva Peninsula," Journal of Environmental Quality, March 2015. Available at: https://dl.sciencesocieties.org/publications/jeq/pdfs/44/2/402
[59] Philip Moore et al., "Evaluation and Management of Ammonia Emissions from Poultry Litter," USDA Agricultural Research Service, June 1, 2006. Available at: https://www.ars.usda.gov/research/publications/publication/?seqNo115=193555.