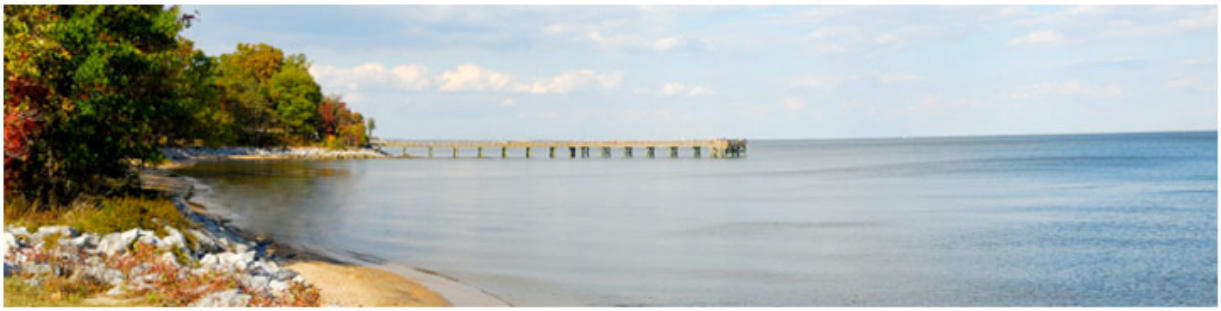

FACING FACTS IN THE CHESAPEAKE BAY

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EXECUTIVE SUMMARY

Without an ambitious effort to fairly but effectively regulate pollution coming from farm fields throughout the watershed, there is simply no chance that the Chesapeake Bay will recover. The time has come to solve the primary obstacle to cleaner water in the region's streams, rivers, and Bay: reliance on a failed voluntary approach to agricultural pollution and inadequate regulatory backstops.

For the better part of a generation, tens of thousands of farmers, along with thousands of conservation professionals at every level of government and in the nonprofit community, have worked diligently to reduce agriculture's heavy if unintended damage to the Bay. Without question the Bay would be far worse off today if not for those efforts.

But despite that commitment and hard work, along with billions of taxpayers' dollars spent to study and combat the Chesapeake's pollution problems, the Bay as a living ecosystem remains on the brink. Each of the previous three major clean up deadlines that politicians have set themselves has been missed by a wide margin. The impending 2010 restoration goals will be no different, and throughout, agriculture has been the primary reason.

Today, farming still loads an estimated 39 percent of the nitrogen pollution and 45 percent of the phosphorus pollution into the Bay, turning it into an oxygen-starved dead zone for many keystone species. Some 60 percent of the sediment that suffocates the Chesapeake's fabled underwater grasses and vulnerable aquatic nurseries comes from farm fields.

Furthermore, due to the relative cost-effectiveness of pollution reduction from farm practices compared to other sources, such as sewage treatment plant upgrades or

suburban storm water management systems, the six states draining into the Bay watershed continue to look to the agricultural sector for two-thirds of the nutrient reductions needed to restore water quality.

Evidence of the Bay's grim prospects can be found in decades' worth of scientific measurements of poor water quality, but even on paper, the official strategy for dealing with the Chesapeake's farm pollution problems is strikingly implausible.

The Environmental Working Group's (EWG) ongoing review of current state and federal policies for the Bay, of which this report is a part, makes clear that the patchwork of federal and state policies and programs that guide agriculture pollution control around the watershed cannot and will not come close to solving the problem. It's time for a new chapter in our collective efforts to save the Chesapeake.

EWG examined the reach of existing federal and state regulatory programs aimed at water pollution from agriculture in the Bay States. Taken as a whole, it is a regulatory framework shaped by political expediencies and more notable for its gaps than its coverage.

- Just one state has regulations addressing soil erosion and sediment pollution on all of the cropland within the state.
- Just 35 percent of the livestock animals (dairy, beef, swine) in the 5 Bay states with permitting programs are under clean water permits while nearly 80 percent of the poultry animals (broiler meat chickens and egg laying hens) are permitted or about to be permitted.
- Just two states have regulations addressing manure application on land by farms generating the manure and by farms using the manure.
- Just two states have regulations addressing the use of agricultural chemical fertilizers.

At the core of the current strategy for Bay clean up is the notion that the farmers responsible for much of the pollution will volunteer to control it by applying the right conservation practices to the right fields, with financial help, if they choose to accept it, made available under various state and US Department of Agriculture (USDA) conservation programs. Further, it is assumed that those programs will use government money to cover 75 percent or more of the cost of implementing farm conservation practices, year after year, with no end to the taxpayers' obligations in sight.

We found two basic reasons why the voluntary approach to implementing farm pollution control practices has achieved less than 50 percent of the overall Bay goals as set forth in each state's strategy. First, those farmers whose actions are indisputably causing pollution, such as farms that allow cows in streams resulting in streambank erosion and manure deposition, often do not participate in voluntary programs, even though taxpayers shoulder nearly all of the cost. Second, funding for the voluntary cost-share programs is perennially a fraction of the amount needed to achieve pollution prevention goals and agencies fail to target the funds they have to those geographic areas and agricultural operations responsible for most of the pollutant load.

Along with farm organizations, environmental groups, EWG included, have embraced this voluntary system. We have pressed hard on Congress and in statehouses—much harder, in fact, than agriculture interests have—to put sufficient money in government conservation programs to help farmers solve their pollution problem without having to resort to regulation. No serious student of the Bay ecosystem disputes that progress has been made. But the prevailing view among experts, at least privately, was expressed by a distinguished group of Bay scientists and policy makers in September 2008:

> *"We have concluded that after 25 years of effort, the formal Bay Program and the restoration efforts under the voluntary, collaborative approach currently in place have not worked…. We must transition…to a more comprehensive regulatory program that would establish mandatory, enforceable measures for meeting the nutrient, sediment, and toxic chemical reductions needed to remove all Bay waters from the Clean Water Act impaired waters list…."*

These experts further posited an "axiom" for Bay restoration: "*Require mandatory controls and increased accountability to reduce agricultural pollutants, including enhanced nutrient management and better manure management."*

We agree.

Expanding the reach of federal and state regulations designed to reduce agricultural pollution—and ensuring those regulations are well-targeted, effective, and sensible—must be part of any new strategy to restore and protect the Bay, even as we continue to press for adequate funding farm conservation programs at all levels of government.

President Obama's May 12, 2009 Executive Order on the Chesapeake Bay calls for seven federal agencies to update and improve their strategies for the ecosystem. As this EWG review is released (September, 2009), the Obama administration is preparing to announce what promises to be an ambitious overhaul of federal policies aimed at Bay restoration.

We commend the President for his leadership and urge him to ensure his Executive Order proves to be an important first step toward getting the federal house in order through badly needed initiatives to strengthen federal regulations and improve the targeting and effectiveness of federal voluntary programs.

Senator Cardin's (D-Maryland) effort to reauthorize the EPA Chesapeake Bay Program in the Clean Water Act is an important second step towards a cleaner Bay. The Senator's bill gives the Environmental Protection Agency: (1) the regulatory power to compel states to submit and implement plans that will meet their obligations to reduce pollution and (2) punitive powers if states fail to act.

These efforts to get the federal house in order are laudable and encouraging, but federal action alone will not save the Bay. The Chesapeake Bay States must take the third step

and develop a complementary effort to upgrade and strengthen their regulatory and voluntary programs. The reach of state regulatory programs must be expanded to close the gaping holes in the current programs that leave the most important agricultural sources of pollution unregulated. Moreover, state regulatory programs must make cost-effective use of the available but limited cost-share funds. These funds should be targeted in innovative ways, including but not limited to geographic priority areas, practice priorities, or economic priorities such as assisting farms that demonstrate significant economic hardship from compliance with the new regulatory framework.

INTRODUCTION

The Bay is important and it is in trouble

Seventeen million people reside within the 64,000 square mile Chesapeake Bay watershed that spans the District of Columbia and six states (Maryland, Virginia, Pennsylvania, Delaware, West Virginia, and New York). People rely on the streams, rivers, and lakes within the watershed and the Bay for their livelihood, recreational activities, and clean drinking water. President Obama recognized the Chesapeake Bay as a "a national treasure."[1]

However, the Bay and its tributaries remain so polluted that water quality is rated as a 29 out 100;[2] 98 percent of the oyster population has been wiped out;[3] blue crabs are down 70 percent;[4] and a third of the drinking water wells on the Delmarva Peninsula (75 percent of the Peninsula drains into the Bay) exceed safety standards for nitrate pollution.[5]

Agriculture is a major source of pollution to the Bay.

According to estimates by the EPA Chesapeake Bay Program, agricultural fertilizers, livestock waste, and topsoil remain responsible for an estimated 39 percent of the nitrogen, 45 percent of the phosphorus, and 60 percent of the sediment pollution harming the Bay.[6] Other major sources include sewage treatment plans, as well as urban and suburban stormwater runoff.

Scientists have identified two primary sources of the agricultural nutrient (nitrogen and phosphorus) pollution problem. Bay-wide, animal manure and chemical fertilizers are about equally responsible for the nitrogen problem from the agricultural sector. Using long-term average hydrology simulations, the EPA Chesapeake Bay Program estimates that the agricultural sector contributes 39 percent of the nitrogen load to the Bay – 17 percent from manure, 15 percent from commercial fertilizer, and 6 percent via atmospheric deposition to the watershed from agricultural sources.[7]

Bay-wide, animal manure is a much larger source of phosphorus to the Bay than agricultural chemical fertilizers. Agriculture contributes an estimated 45 percent of the phosphorus load to the Bay – 26 percent coming from manure and 19 percent form chemical fertilizers.[8]

We can't protect the Bay unless agricultural practices improve

The Bay states are counting on agriculture to achieve their Tributary Strategy goals because it remains the largest source of the problem and because policy experts consider pollution reduction from the agricultural sector as the most cost-effective approach.[9]

According to the 2008 EPA Chesapeake Action Plan, "The six Chesapeake Bay watershed states are calling for getting two-thirds of the nutrient reductions needed to restore Bay water quality from the agricultural sector."[10]

Facing facts—Regulation is needed to drive improvement

The Bay states have acknowledged that they will miss the 2010 deadline to clean up the Chesapeake. As a result, the EPA has begun developing what's known as a Total Maximum Daily Load (TMDL), a pollution budget for the Bay. The Clean Water Act calls for states to develop such pollution budgets, which establish how much nitrogen, phosphorus, and sediment pollution can still enter a polluted water body, yet enable the water body to become healthy again. Consequently, the TMDL specifies how much pollution reduction needs to occur to achieve the "TMDL cap" on the pollution load.

The TMDL will likely be broken up into 92 sub-TMDL budgets and then again divided further by political jurisdiction. Each TMDL will spell out how much pollution from point sources (e.g. sewage treatment plants and permitted concentrated animal feeding operations (CAFOs)) and from nonpoint sources (e.g. agricultural cropland and pastureland and urban/suburban runoff) can continue to enter the Bay and how much pollution needs to be reduced to achieve cleaner water and a restored Bay. Each state will have to develop watershed implementation plans that will spell out how they will accomplish the numerous TMDL pollution budgets in their state.

According to the scientists, the TMDLs will set even greater pollution reduction goals for agriculture, wastewater treatment plants, and from urban and suburban development than were set under the Tributary Strategies.

And unlike the existing, failed voluntary policy approach, the TMDL will be mandatory for the states and the federal government to achieve.

However, the regulatory power of the Clean Water Act only affects point sources of pollution such as sewage treatment plants, industrial facilities, and CAFOs. Nonpoint source agricultural pollution is exempted under the Clean Water Act. Thus, it is reasonable to question how the Bay TMDL will change the current failed policy approach and help reduce additional pollution from the agricultural sector. Since the late 1990s, some 35,000 TMDLs[11] have been written for impaired streams and lakes across the country with little evidence of reduction in agricultural pollution.

To achieve the agricultural and other nonpoint source pollution reductions in the Bay TMDL, the Clean Water Act requires states to provide what's called Reasonable Assurance that their voluntary and regulatory programs will be able to deliver those pollution solutions. Because the upcoming Chesapeake Bay TMDL, like the existing Tributary Strategies, will continue to rely on most of the pollution reductions from agriculture and because of the failure of the voluntary programs, EWG surveyed the Bay states to assess whether their regulatory programs, at least on paper, are up to the task. Our conclusion: they are not.

WHAT WE DID

The upcoming TMDL development process will spawn policy discussions about alternatives to the current voluntary cost-share program approach for implementing best management practices for all pollution sectors. These policy discussions will likely include policy proposals for a) new ways to allocate the limited cost-share funding, b) nutrient trading programs, c) expanded federal and state regulations, and d) new federal and state regulations.

President Obama's Executive Order calls on the EPA to identify and enhance existing federal regulatory authorities to accelerate restoration of the Bay. On September 9th, the EPA plans to release a draft report outlining how the federal government can do more with its current regulatory framework to lower pollution from all major sources (farms, sewage plants, urban and suburban runoff) to clean up the Bay.[12] However, since the federal reach over agricultural water pollution is restricted to the point sources at concentrated animal feeding operations, cleaning up the Bay will require new policies from the states addressing the nonpoint sources of farm pollution from crop- and pastureland and from animal farms too small to be permitted.

For each state, EWG sought tried to determine if there were regulatory programs being implemented to address agricultural nutrient and sediment pollution. We analyzed what types of agricultural production were affected by the regulations (i.e. animal agriculture versus crop production and concentrated animal operations versus grazing animal operations). We identified the regulatory requirements that might reduce the unintended nutrient and sediment pollution from farms. We also tried to estimate how much of a reach these regulations had by estimating how many animals and acres were currently affected by the regulations and what proportion of animals and acres were under a regulatory framework.

Thus, we reviewed state regulations addressing agricultural soil erosion and sediment pollution; manure management and manure use as fertilizer; and chemical fertilizer use. We also reviewed the regulatory scope of the federal Concentrated Animal Feeding Operation (CAFO) National Pollutant Discharge Elimination System (NPDES) permit program and state permit programs for CAFOs.

Given that this was an initial review of the presence or absence of agricultural water pollution regulations, EWG did not attempt to assess how well these regulatory programs were designed, implemented, enforced, or working to reduce agricultural nutrient and sediment pollution. In addition, EWG did not attempt to evaluate the a) quality of the regulatory requirements or b) the quantity, age and quality of the nutrient management plans or soil conservation plans required by some of the regulations.

Finally, EWG reviewed the primary approach to reducing agricultural pollution in the Chesapeake Bay: the voluntary agricultural conservation cost-share approach. We

surveyed reports, news articles, policy statements by politicians, policy statements by scientists, and conducted interviews with various stakeholders in the Bay, which helped us formulate an assessment of why the voluntary policy approach has failed.

FINDINGS

SUMMARY OF THE HOLES IN THE REGULATORY FRAMEWORK

Table 1. Huge holes in the existing regulatory framework to address agricultural nutrient and sediment pollution

Regulations addressing	Maryland	Virginia	Pennsylvania	Delaware	West Virginia	New York
Cropland erosion and sediment pollution on all acres			✔			
Permits for concentrated animal feeding operations	✔	✔	✔	✔		✔
Manure use by all farms	✔			✔		
Chemical fertilizer use by all farms	✔			✔		
Adoption of all practices listed in the Tributary Strategies						

Note: Checks represent presence of a regulation addressing water pollution sources and reach of the regulations and regulations requiring specific requirements. See state-by-state descriptions of these regulations in the report text for full detail.

- **Just one state (Pennsylvania) has regulations addressing soil erosion and sediment pollution on all of the cropland within the state.**

Despite the fact that 60 percent of the sediment pollution load to the Bay comes from agriculture and that the voluntary policy approach is clearly not adequate to address the problem, five of the six Bay states have very little regulatory oversight over this significant problem.

Federal regulations do not address agricultural soil erosion and sediment pollution on most cropland or pastureland but do require a permit for construction of agricultural structures (barns, chicken houses, etc.) that disturb more than one acre of soil. In addition, farmers that operate cropland designated as “Highly Erodible Land” (HEL) are required to obtain and follow a soil conservation plan under the federal “Conservation Compliance” program in order to be eligible to receive federal crop subsidies. The HEL designation was designed to protect fragile, erosion-prone land. It was not designed to reduce sediment damage to streams, lakes, rivers, or Bays by preventing erosion from

fields adjacent to water bodies.

Using state-level data from the 2003 National Resources Inventory for each of the six Bay states, EWG found that nearly half (47 percent) of the total cropland in the Bay states is designated as Highly Erodible (see Appendix).[13] More importantly, from a soil fertility perspective, a quarter (26 percent) of the total cropland in these six states is eroding at an unsustainable rate, resulting in long-term soil productivity loss. Because program managers at the U.S. Department of Agriculture (USDA) Farm Service Agency (FSA) do not tally the number of acres that are HEL-designated and operated by farms that receive farm subsidies, it is difficult to know the reach of Conservation Compliance.[14]

The USDA Natural Resources Conservation Service (NRCS) staff aims to review only one percent of farm tracts subject to Conservation Compliance per year. Using NRCS data, EWG estimated that only 63,000 acres have been reviewed each year over the last five years in the six Bay states.[15] Altogether, 63,000 acres represents less than one half of one percent of the 15.2 million total acres of cropland in the six states. Thus, the federal Conservation Compliance program is very limited in its annual review effort.

Conservation District offices in each of the six states work voluntarily with farmers and other landowners to develop voluntary soil and water conservation plans. The state program managers were unable to tell us how many farmers had voluntary or Conservation Compliance plans, how many acres are under such plans, when the plans were written, how effectively the plans are being implemented or how well they are working to reduce soil erosion and sediment pollution.

- **Of the five Bay states (MD, PA, NY, DE, and VA) that implement federal or state animal feeding operation permits, only about 35 percent of all major livestock animals (dairy, swine, and beef animals on concentrated and grazing farms) are under permits while 80 percent of all poultry animals (broilers and layers) are permitted or on the verge of being officially permitted.**

Three of the Bay states (MD, PA, NY) implement the federal CAFO NPDES permit program while Delaware and Virginia implement a state AFO permit. West Virginia does not currently have a permit program for animal feeding operations.

The reach of the federal and state animal permitting programs is currently limited in addressing manure pollution from animals. First, the permits affect only concentrated animal feeding operations that raise animals under a roof for the majority of the animal's lifetime and ignore farms where animals mostly graze outdoors. Only the largest concentrated operations are required to obtain a permit, leaving unpermitted thousands of farms that have too few animals to meet the size threshold. Collectively, these few animals at thousands of farms amount to the majority of animals in some states. Most importantly, a major loophole exists in the regulatory framework in many states that do not have regulations to address manure use by "end-user" farms that take manure from

the permitted animal farm and apply it to land as fertilizer.

Estimating the numbers and percentages of operations and animals permitted by either the federal or the state permitting programs is very difficult. EWG was surprised to learn that program managers at the state permitting authorities did not know the number of operations or animals that are eligible to be permitted let alone the numbers of operations or animals located in their state. EWG was also surprised that these state program managers and even managers at the EPA CAFO program and managers at the USDA Census had trouble understanding how to interpret the 13 EPA CAFO Animal Categories. Furthermore, these managers found it difficult to correlate the EPA CAFO Animal Categories with animal data in the USDA Agriculture Census. For example, managers did not know what "cattle and cow/calf pairs" or "mature dairy cattle" CAFO animal sectors meant or which Census table and column of data best represented those animal sectors.

These managers concurred that there are many limitations to their having to rely on the USDA Census data for their estimates of a) the universe of *all* operations and animals in their state or b) the universe of *eligible* operations an animals in their state, such as: the Census does not distinguish between concentrated versus grazing operations; Census disclosure rules hide data for the few largest operations in the state because this might compromise the identity of the farm; and the CAFO Animal Categories come with weight and manure handling criteria but there is no such distinguishing data in the Census.

- **Just two states (Maryland and Delaware) have regulations addressing all manure management and manure use in their states. Both states regulate a) the manure-generating farms *and* the "end-user" farms and b) the application of animal manure on all types of farmland (cropland *and* pastureland).**

Despite the fact that an estimated 19 percent of the nitrogen problem and 26 percent of the phosphorus problem ailing the Bay comes from agricultural manure,[16] only two states have regulations in place that may be able to better address this problem.

- **Just two states (Maryland and Delaware) regulate application of chemical fertilizer on cropland and pastureland.**

Despite the fact that an estimated 17 percent of the nitrogen load and 19 percent of the phosphorus load to the Bay is from agricultural chemical fertilizers,[17] only two states have regulatory programs in place that may able to address this problem. There are no federal regulations addressing use of agricultural chemical fertilizers.

STATE-BY-STATE REVIEW OF THE HOLES IN THE REGULATORY FRAMEWORK

1. Just one state (Pennsylvania) has regulations addressing soil erosion and sediment pollution on all of the cropland within the state.

- Pennsylvania requires a written Erosion and Sediment Control Plan and implementation of best management practices on all land engaged in "agricultural plowing or tilling activities" if disturbing more than 5,000 square feet (about 1/10th of an acre). For all agricultural construction activities (e.g. barns, silos, chicken houses) disturbing more than 5,000 square feet, an Erosion and Sediment Control Plan is required. On less than 5,000 square feet of agricultural construction activities, persons must implement and maintain erosion and sediment control best management practices (BMPs). If the construction disturbance has the potential to discharge to "High Quality or Exceptional" water, an additional five "Special Protection BMPs" are required.[18] Thus, Pennsylvania has regulations that address soil erosion and sediment pollution on all of its 4.9 million acres of cropland but not on any of its 1.3 million acres of pastureland.

- New York's soil erosion rules apply only to construction activities, such as barns and silos, or to large scale structural best management practices, like terraces or grassed waterways, but not to normal field practices like crop production. Thus, almost all of New York's 4.3 million acres of cropland and 1.2 million acres of pastureland likely are unaffected by NY's soil erosion construction and storm water permit requirements.[19]

- Delaware's Sediment and Stormwater Regulations exempt
  > "…agricultural land management practices unless the local Conservation District or the Department determines that the land requires a new or updated soil and water conservation plan and the owner or operator of the land has refused either to apply to a Conservation District for the development of such a plan, or to implement a plan developed by a Conservation District."[20]

  State program managers do not tally the number of farms that possess voluntary or mandatory soil and water conservation plans nor do they estimate what proportion the 433,000-cropland acres or 18,000 pastureland acres in Delaware are covered by these plans.

- West Virginia exempts "Any introduction of pollutants from non-point source agricultural and silvicultural activities, including runoff from orchards, cultivated crops, pastures, range lands, and forest lands, but not discharges from concentrated animal feeding operations" from needing a State NPDES permit. Agricultural construction activities that disturb more than one acre, such as chicken houses,

barns, and access roads require permit coverage. EWG was unable to determine how many of West Virginia's 942,000 cropland acres or 1.75 million acres of pastureland have regulatory oversight.[21]

- Maryland's regulations addressing soil erosion, sediment pollution, or stormwater apply only to agricultural construction activities and exempt normal field practices like crop production or livestock grazing.[22] Within the state's Critical Areas (defined as within 1,000 feet of the high water line of tidal waters or tidal wetlands of the Chesapeake Bay), Maryland's "Chesapeake Bay Critical Area Law" requires a soil conservation plan for both crop and pastureland.[23] The Critical Areas Commission estimates there are 680,000 acres of land within the Critical Areas.[24] The Department of Agriculture estimates that farms, which have a portion of their land within the Critical Areas, have soil conservation plans covering 580,000 acres including acreage outside of the Critical Areas.[25] Maryland requires stormwater management plans for construction activities that disturb more than 5,000 square feet of soil. Because the regulations do not specifically mention or exempt agricultural construction activities, and because implementation of agricultural soil conservation efforts is conducted by the Soil Conservation Districts, program staff at the Department of the Environment were uncertain whether this requirement has been carried out.[26] As of July 13, 2009, construction permits are needed for agricultural construction activities disturbing one or more acres of soil, which may entail a soil erosion and sediment control plan and a stormwater management plan.[27] However, if agricultural land or practices allegedly "emit soil or sediment into waters of the State,"[28] the state can impose penalties unless farmers can prove they have implemented a voluntary "soil conservation and water quality plan" (SCWQP).[29] Thus, except for the 580,000 acres under mandatory soil conservation plans, most (65 percent) of Maryland's 1.4 million acres of cropland and 254,000 acres of pastureland operate without mandatory soil conservation plans.

- Virginia has been implementing the "Chesapeake Bay Preservation Act" since 1988.[30] The agricultural component of the Act requires all agricultural land (cropland, pastureland, and feedlot operations) within "Chesapeake Bay preservation areas" to have a "soil and water quality conservation assessment" conducted evaluating

  > "…the effectiveness of existing practices pertaining to soil erosion and sediment control, nutrient management, and management of pesticides and, where necessary, results in a plan outlining additional necessary practices needed to ensure water quality protection…"

  Funding for such assessments and plans resulting from those assessments ceased in 2002. When funding was available from FY 1992 through FY 2002 approximately 5,800 Soil & Water Quality Conservation Plans were developed, covering roughly 282,000 acres of agricultural land, primarily in the "Resource Protection Areas" in the Tidewater region of Virginia.[31] The Act does not affect all of Virginia's Chesapeake Bay watershed but only the Tidewater area in the eastern part of the State. In addition, it is likely that this law is actually voluntary in nature because it does not require farmers or landowners to pay for the assessments themselves but relies on

state funds to pay the Conservation District employees to conduct the assessments. State program managers did not know how many of Virginia's 3.3 million acres of cropland and 3.1 million acres of pastureland are located in the Tidewater area and thus would be required to receive an "assessment" should funding be restored to this quasi-regulatory requirement.

Recent or proposed regulatory changes to state soil erosion and sediment control regulations:

EWG learned that two states in the Chesapeake Bay watershed are in the process of releasing proposed changes to their soil erosion and sediment pollution regulatory framework affecting agriculture:

- Pennsylvania released a proposal on August 29, 2009 to extend its Erosion and Sediment Control permit to "animal heavy use areas" on the farm where animals congregate and are at risk for soil erosion and sediment pollution, e.g. mud holing areas near feeding troughs, watering systems, milking barns.[32]

- Delaware is in the process of finalizing a proposal to require poultry operations that are building new chicken houses and disturbing more than one acre of soil to obtain a state Sediment and Stormwater Construction permit.[33]

2. **Within the five Bay states (MD, PA, NY, DE, and VA) that implement federal or state animal feeding operation permits, only about 35 percent of all major livestock animals (dairy, swine, and beef animals on confined and grazing farms) are covered by permits while 80 percent of all poultry animals (broilers and layers) are permitted or on the verge of being officially permitted.**

- Pennsylvania permits about 34 percent of the major livestock animals and 70 percent of the poultry (broiler chickens for meat and layer chickens for eggs) in the Bay watershed through the federal CAFO NPDES program.[34] Only 6 percent of its dairy cows and 1 percent of its beef cattle are permitted and 58 percent of its pigs are permitted. (See tables in the Appendix.)

- New York permits 58 percent of its major livestock animals and 92 percent of its poultry statewide through its federally designated CAFO NDPES program.[35] Eighty-three percent of the dairy cows, 71 percent of the pigs and just 5 percent of the beef cattle are permitted. (See tables in the Appendix.)

- Maryland permits just 14 percent of its major livestock animals through its federally designated CAFO NPDES program. Twenty-eight percent of the dairy cows, 10 percent of the pigs, and 6 percent of the beef cattle are permitted in Maryland. None of the state's poultry operations (either broiler or layer) are officially permitted, but

broiler farms raising 84 percent of the broiler chickens in the state have filed "Notice of Intent" forms as of February 2009 to obtain a federal CAFO permit. The EPA is currently reviewing Maryland's poultry CAFO NPDES permit program.[36] (See tables in the Appendix.)

- Delaware does not participate in the federal CAFO NPDES program but implements a state level permit program. Delaware's state CAFO program permits 75 percent of their major livestock animals. Thirty-six percent of the dairy cows, 20 percent of the pigs, and 28 percent of the beef cattle are permitted in Delaware. Like Maryland, Delaware recently encouraged its broiler and layer farms to file "Notice of Intent" forms to obtain a federal CAFO permit. Chicken farms raising 42 percent of the broiler and layer chickens in the state have filed those forms. The EPA is currently reviewing Delaware's poultry CAFO permit program. [37] (See tables in the Appendix.)

- Virginia does not currently operate a federal CAFO NPDES program but implements a state-level permit program called the Virginia Pollution Abatement (VPA) Permit Program.[38] Just 23 percent of Virginia's major livestock animals are covered by the VPA permit. Nearly 40 percent of the dairy cows, 96 percent of the pigs, and less than one percent of the beef cattle in the state are permitted. Using EWG's estimation methods, 109 percent of Virginia's poultry animals seem to be covered by the VPA permit. This may be because Virginia collects "maximum capacity" information from the permitted facilities while the USDA Census asks farmers how many animals are on their farm at a specific point in time. See tables in the Appendix.)

- West Virginia does not implement either a federal or a state animal feeding operation permit. Beginning in 1993, West Virginia's Groundwater Protection Rules required concentrated animal feeding operations with greater than 1,000 animal units (about 833 beef cows or 333,333 broiler chickens)[39] to obtain and follow a certified Nutrient Management Plan.[40] However, West Virginia chose to implement the program voluntarily by encouraging 30 CAFOs to obtain voluntary nutrient management plans.[41]

Recent or proposed regulatory changes to animal permitting program regulations

EWG learned that several states in the Chesapeake Bay watershed have recently made changes, proposed changes, or are working on changing their animal operation permitting framework:

- West Virginia, in consultation with EPA Region 3, is developing a federal CAFO NPDES Permit. The regulatory program will be introduced in the state legislature in 2010. This will be the first animal permit program in the state.

- New York began a state-level permit for concentrated animal operations on July 1, 2009. New York decided to develop a state-level permit out of concern that some Large and Medium-sized CAFOs that currently have a federal CAFO permit will seek

to be removed from permit coverage by stating that they "do not discharge or propose to discharge manure or stormwater or have animals in contact with waters." The Final 2008 CAFO Rule concluded that the size of a concentrated animal operation is not sufficient to require permit coverage but the state has to prove that the operation "discharges or proposes to discharge" if it is a Medium-sized facility or it is a "significant contributor of pollutants" if it is a Small-sized facility. Thus, any operation that seeks to remove its federal permit will be required to obtain a New York state permit.[42]

- Virginia released a proposal June 22, 2009 to extend some nutrient management requirements beyond the permitted animal operations to the "end-users" – farms that use manure generated by the permitted animal farms. These end-user farms will be given four options for obtaining an appropriate land-application rate for manure. One of the four options is a site-specific certified nutrient management plan.[43]

- Virginia is currently working with EPA Region 3 to bring its federal CAFO NPDES permit program up to date to meet the 2008 Final CAFO Rule.[44] Currently, there are no animal feeding operations with permit coverage under the Virginia Pollutant Discharge Elimination System Permit (VPDES) for CAFOs.[45]

- Maryland's new CAFO permit regulations took effect January 2009. The regulations update the state's existing livestock CAFO permit program, include a new poultry CAFO permit program, and include provisions to regulate Maryland Animal Feeding Operations (MAFOs), which are large farms that do not discharge to surface waters. However, the permit is not yet in effect for MAFOs or CAFOs, as it awaits the results of a legal challenge and EPA approval of the CAFO permit. [46]

3. Just two states (Maryland and Delaware) have regulations addressing all manure management and manure use in their states. Both states regulate a) the manure-generating farms *and* the "end-user" farms and b) the application of animal manure on all types of farmland (cropland *and* pastureland).

- Maryland regulates the use of manure on virtually all crop and pastureland in the state. The Maryland Nutrient Management Law requires that farm operations with more than 10 acres or $2,500 in farm sales obtain and follow a certified Nutrient Management Plan prescribing the rate of manure use allowed on cropland and pastureland. Thus, Maryland regulates manure management and use by virtually all animal farms, regardless of their being confined or grazing systems; manure use by all end-users; and manure application on both crop and pastureland.[47]

- Delaware also regulates the use of manure on virtually all crop and pastureland in the state. The Delaware Nutrient Management Law requires individuals with more than eight Animal units (about 6 dairy cows or 2,666 broiler chickens)[48] or who apply

nutrients to more than 10 acres of land to obtain and follow a certified Nutrient Management Plan prescribing the rate of manure allowed on cropland and pastureland. Thus, like Maryland, Delaware regulates manure management and use by virtually all confined or grazing animal farms, manure use by all end-users, and manure application on both crop and pastureland.[49]

- Pennsylvania regulates only the manure use by some confined animal farms leaving unregulated a) the manure transferred off these farms and b) the manure generated at the unregulated animal farms. State program managers report there are 334 federally permitted CAFO operations in Pennsylvania (including 10 duck and 2 turkey operations) that have a mandatory Nutrient Management Plans. However, because some farms raise more than one type of animal, Pennsylvania sent to EWG permitting data with counts for each animal type (see Appendix) showing 465 permit counts instead of just 334 permits. For example if a farm raises dairy cows and chickens, that farm would receive one permit but also be counted as having two sets of animals. In addition to the CAFO program, about 695 additional concentrated animal operations ("CAOs" that are not also CAFOs) comply with Pennsylvania's Nutrient Management Law representing 976 sets of animals.[50] Thus, roughly 1,029 farms raising 1,441 sets of animals in Pennsylvania are required to obtain and follow a certified Nutrient Management Plan. The plans apply only to these few regulated farms and do not regulate manure use that is transferred off the generating farm to other farmers who are "end-users" of the manure other than to require the end-use farm to obtain a Nutrient Balance Sheet (but not a certified Nutrient Management Plan). Pennsylvania does have a Clean Streams Law that requires all animal operations to develop and follow a Manure Management Plan.[51] However, the state does not have to approve those plans nor does it systematically check these plans and the standards to prepare the plan are not as rigorous as the modern and certified nutrient management plans required in Maryland and Delaware.[52]

- New York only regulates the manure use by some of its confined animal farms, leaving end-users and unregulated animal farms without any regulatory oversight. There are 540 concentrated animal operations raising the major livestock and poultry animals under the federal CAFO NPDES permit in New York who are required to follow a certified Nutrient Management Plan when using their manure as fertilizer on their own farms.

- Virginia only regulates the management and use of manure by some of its confined animal farms, leaving end-users of the manure and all other animal farms in the state unregulated. There are 793 confined animal operations raising the major livestock and poultry animals regulated under a state permit called the Virginia Pollution Abatement (VPA) permit. Virginia permits an additional 262 turkey operations. Virginia does not implement the federal CAFO program but the VPA permit regulates more confined animal operations than would be regulated under the federal program by size criteria alone.

- West Virginia does not regulate the manure use by any of its confined animal farms, unconfined animal farms or end-user farms.

4. Just two states (Maryland and Delaware) regulate application of chemical fertilizer on cropland and pastureland.

- Maryland's Nutrient Management Law, as mentioned earlier, requires farmers to obtain and follow nutrient management plans that prescribe manure and chemical fertilizer application rates on virtually all cropland and pastureland in the state.
- Delaware's Nutrient Management Law, like Maryland's, requires farmers to obtain and follow nutrient management plans that prescribe manure and chemical fertilizer application rates on virtually all cropland and pastureland in the state.
- Virginia's 1,055 confined animal operations with the state VPA permit have nutrient management plans that prescribe the rate of application of chemical fertilizers. Thus, chemical fertilizers applied on cropland operated by these farms are regulated.
- Pennsylvania, New York, and West Virginia do not have any state laws specifically addressing chemical fertilizers on cropland or pastureland. Only the animal operations permitted in Pennsylvania and New York have to develop nutrient management plans, which specify chemical fertilizer application rates.

THE VOLUNTARY PROGRAM APPROACH

Voluntary approaches have failed to clean up the Bay

Maryland, Virginia, and Pennsylvania – the three so called, "Signatory States" to the Chesapeake Bay Agreements have been trying to clean up the Bay since the 1970s. These three states have repeated their commitment to a cleaner Bay four times (in 1983, 1987, 1992, and 2000) via a regional voluntary partnership approach. Four times the states have missed their goals. New York, West Virginia, and Delaware joined the Bay Agreement as "Partner States" in 2003 and 2004.

In 2000, the states signed the historic "Chesapeake Bay Agreement 2000" (also know as "C2K") outlining "Tributary Strategies" plans that identified the types and numbers of best management practices (BMPs) that each major source sector (agriculture, sewage treatment plans, urban and suburban runoff, etc) would voluntarily implement by 2010.

According to the best available science at the time, if the states achieved implementation of these Tributary Strategy practices, the Bay's health would recover and the EPA could remove the Chesapeake from its "Dirty Waters List". If the Bay states failed to achieve this goal by 2010, the federal EPA would have the opportunity to

rescind the authority it gave the states to implement the Clean Water Act programs and could take over implementation of those programs itself.

Two years shy of their 2010 deadline, the Bay states acknowledged that they would not achieve their Tributary Strategy goals in time.[53]

This led many in the scientific and policy community to conclude in December 2008 that the 25-year voluntary partnership to clean up the Chesapeake Bay has failed.[54] However, an indication that the voluntary approach would be inadequate came as early as 1983 when the first Bay Agreement was signed. Shortly after the Agreement, the Chesapeake Bay Commission (a Secretariat for the Governor's of the three Signatory States) questioned whether a voluntary approach to reducing farm runoff would be adequate.[55]

For the agricultural portion of the Tributary Strategies, the Bay states have failed to achieve the clean-up goals because of the continued reliance on the voluntary program approach. Most states pay farmers who come forward voluntarily to participate in their state and federal cost-share programs between 75 and 87.5 percent the cost of installing and maintaining environmentally protective practices. However, literally hundreds of thousands of acres of annual practices like cover crops and nutrient management planning and hundreds of one-time, permanent structures like manure sheds and soil erosion terraces are called for in each state's Tributary Strategies to reduce agricultural pollution.[56]

According to the EPA 2009 Bay Barometer report, after more than two decades of effort (1985 to 2008) to voluntarily reduce pollution from agriculture in the entire Bay watershed, approximately half of the pollution reductions called for in the agricultural Tributary Strategies have been accomplished (50 percent of the farm nitrogen goal, 49 percent of the farm phosphorus goal, and 48 percent of the farm sediment goal).

EWG has concluded there are three fundamental reasons why the voluntary approach to cleaning up the Chesapeake Bay has failed and in particular, why the voluntary agricultural Tributary Strategies approach has failed: lack of funding, lack of participation in the program regardless of funding, and lack of motivation to undertake pollution reductions without public funds.

1. Lack of Money

Governments in the six Bay states have never chosen to allocate sufficient taxpayer resources to pay for all the agricultural practices, waster water facility upgrades, septic tank upgrades or replacements, and urban and suburban stormwater practices called for in the states' Tributary Strategies. More importantly, efforts to estimate a) the costs of implementing the Strategies, b) the availability of public funds, and c) the funding shortfall have come only recently in the 25-year effort to restore the Bay.

A 2005 report by the Chesapeake Bay Commission called "2007 Federal Farm Bill Concepts for Conservation Reform in the Chesapeake Bay Region" estimated that an additional $700 million per year over existing funding levels was needed to implement

all the agricultural practices called for in each state's Tributary Strategies by 2010. The report assumed an average cost-share rate with farmers of 75 percent, leaving a $525 million per year tab for taxpayers to pick up.

Many cost-shared best management practices for constructing manure storage structures or fences to keep livestock out of streams involve one-time contracts. Other practices must be contracted every single year because the practices must be done annually: planting cover crops in the fall, using conservation tillage every time a crop is planted, and developing or updating nutrient management plans that optimize fertilizer and manure use to grow crops while reducing loss of nutrients to the environment.

Given that the cover crops, conservation tillage, and nutrient management plans ideally must be implemented or developed and followed every single year, the current voluntary program approach essentially commits public funds to cost-sharing annual practices *forever*. Some will argue that whatever the cost and whatever the duration of funding obligation from the State coffers, the Bay is worth it. Others will maintain that payments should be time-limited and that the pollution controls should become the sole financial responsibility of the polluter. The Bay can be regarded as invaluable but the failed approach of the past 25 years is not going to clean it up.

To put into perspective the funding requirements and fiscal obligations necessary to achieve the Tributary Strategies through a cost-shared voluntary approach, let us consider one best management practice – cover crops – and one state - Maryland.

The annual acreage of cover crops needed to achieve Maryland's Tributary Strategy goals is 750,000 acres per year. Thus, 57 percent of the state's 1.4 million acres of cropland must be planted with cover crops every year *ad infinitum*.

Maryland provides $25 to $85 per acre for cover crops depending on when the crops are planted (the earlier the better), what kind of crops are planted (rye is ideal), and other factors. If we assume an average rate of $45 per acre, cover cropping will cost the state roughly $34 million per year.

To put that figure into perspective, $34 million for just one practice represents 1.4 times more than Maryland's federal and state funding in 2007 for all of its Tributary Strategy practices ($24 million).[57]

Thus, with the new infusion of $9 million in to Maryland's "Chesapeake Bay Trust Funds" and $4 million from the Farm Bill Chesapeake Initiative funds, Maryland has roughly $37 million - enough to pay for one year of this single annual practice but insufficient to pay for the thousands of acres of other annual practices or hundreds of permanent, structural practices.

How much and for how long should taxpayers be expected to pay for most of the cost to reduce Bay pollution from agriculture?

Furthermore, all of the annual practices mentioned above generate economic benefits for the individual farm operation. Cover crops improve organic matter, conservation tillage reduces fuel costs and saves topsoil, and nutrient management plans can save money by reducing excess manure or chemical fertilizer purchases. For these reasons,

many farmers profess to planting cover crops, using conservation tillage, and obtaining nutrient management plans without cost-share funds.

2. Lack of Participation

The second fundamental factor explaining why the voluntary approach has failed is closely tied to lack of funding: lack of participation.

Even with exceedingly high cost-share rates for planting economically and environmentally beneficial cover crops, farmers have not joined in a voluntary paired watershed study. The Maryland Department of Natural Resource's Corsica River Paired Watershed Study has not officially started, according to an interview with MDNR program manager, because they cannot get the necessary number of farmers to agree to enroll in the voluntary program to plant the requisite number of cover crops in the treatment watershed. The study managers are surprised at this low rate of participation because they are offering $85 per acre to farmers to plant cover crops. Customarily, cover crop cost-share rates are on the order of $25 to $45 per acre.

3. The Voluntary Approach Doesn't Motivate

The third basic factor explaining why the voluntary approach has failed lies at the heart of the approach: it's voluntary.

A voluntary program that a) offers cost-share rates below what would motivate behavior change and b) lacks sufficient funding to cover all farmers who must participate is inherently doomed to fail. The voluntary approach lacks sufficient legal or economic signals to motivate individuals to change their behavior.

University of Maryland economics professor Dennis M. King explained in 2007 why Maryland's largest river, the Patuxent, remains polluted after decades of voluntary effort to clean it up:

> "Economic theory predicts and the evidence shows that without credible enforcement and meaningful penalties, many private decision-makers will not only ignore appeals for voluntary environmental restraints, but will also ignore environmental laws."[58]

As early as 1999, the EPA argued that the voluntary approach to implementing the state Tributary Strategies would not guarantee sufficient adoption of the necessary best management practices. The EPA said, "There is no requirement associated with the Chesapeake Bay Program that would require point and nonpoint sources to participate at a level necessary to achieve the water quality standards."[59]

According to Naval Academy political scientist Howard Ernst, "And after three decades of stressing collaboration and voluntary programs, the Bay Program has been left with agreements instead of necessary laws, goals instead of legally binding pollution limits, endless committees instead of action—and a severely impaired Chesapeake Bay."[60]

CONCLUSION

The last 25 years of effort have made it clear that the voluntary approach won't save the Bay. Our review of the current regulatory framework reveals that the existing regulatory approach is not up to the task either.

The voluntary programs have failed because there isn't enough money in the programs, participation rates are not high enough even at exorbitant cost-share rates, and voluntary programs send too weak of a signal to farmers to make the necessary behavior changes.

The regulatory framework is frayed because most the important sources of pollution ailing the Chesapeake Bay remain unregulated.

Furthermore, none of the regulations appear to be designed to specifically achieve the Tributary Strategies goals. That is, none of the regulations seem set up to implement a specific number of practices called for in each state's Tributary Strategies.

For example, many of the states' Tributary Strategies call for thousands of acres of cover crops to be planted and thousands of acres of "off-stream watering systems with fencing" to keep livestock out of streams. None of the regulations we reviewed specifically require that cover crops be planted or that streams be free of livestock.

Alternatively, none of the regulations we reviewed were developed to achieve a specific pollution reduction goal for nitrogen, phosphorus, or sediment pollution.

Finally, none of the regulations we reviewed were developed to actually clean up agricultural nutrient or sediment pollution in a specific body of water (a specific creek, river, lake, or the Chesapeake Bay).

Even the new state animal permit in New York and the recent proposals to expand state nutrient and sediment regulations do not appear to be developed within the context of a larger strategy for cleaning up the Chesapeake Bay. Plus, these proposed changes are unlikely to result in significant additional pollution reduction from agriculture.

These are serious shortcomings and lost opportunities for the existing regulations.

Furthermore, because this report intended to provide an initial review of the presence or absence of regulations addressing agricultural water pollution, the next step is to conduct an evaluation of the performance of the existing regulations. We identified the gaps in the regulatory framework, but what we'd really like to know is if the federal and state regulations are making a difference.

For example, does permitting animal feeding operations really produce pollution control? Are farmers following mandatory nutrient management plans? Have the plans lowered chemical fertilizer and manure use on farms? Are soil conservation plans being

implemented and are they solving soil erosion and sediment pollution? Furthermore, we'd like to know if the regulations are a major drain on profit margins or they are helping farmers become more productive. We encourage an independent evaluation of each of these state and federal agricultural regulations.

The upcoming Chesapeake Bay TMDL is scheduled to provide 92 numeric pollution reduction goals for the Bay states to achieve. Under the current Tributary Strategies, two-thirds of the nutrient reductions needed to restore Bay water quality are assigned to agriculture.

If the new TMDLs continue to rely heavily on pollution reductions from agriculture, the only chance that states and the federal government will have at achieving the agricultural portion of the 92 pollution budgets is to achieve implementation of the necessary farm best management practices.

To achieve that end, the six Chesapeake Bay states and the federal government must develop an effective regulatory framework to specifically implement the necessary farm best management practices.

EWG suggests a three-step approach to cleaning up the Chesapeake is materializing. First, the President is leading the way with Executive Order Reports that identify ways to expand existing regulatory authority over agricultural pollution and improve the cost-effectiveness of existing voluntary cost-share funds. Second, Senator Cardin (D-Maryland) is leading the way to reauthorize the EPA Chesapeake Bay Program in the Clean Water Act to give EPA a) the regulatory power to compel states to submit and implement plans that will achieve clean-up of their portions of the TMDL and b) punitive powers if states fail to act. The third step has not yet begun. The third step is for state legislatures to promulgate laws that will establish a regulatory framework to achieve the agricultural pollution reductions over which the federal government does not have jurisdiction.

President Obama's May 12, 2009 Executive Order on the Chesapeake Bay calls for seven federal agencies to update and improve their strategies for the Chesapeake Bay. We commend the President for his leadership and support to this decade's long cause and are hopeful that the Executive Order reports will provide critical new regulatory and voluntary policy changes that will help accelerate Bay clean up.

However, as this report discusses, the federal government's regulatory programs fall short of what is needed to attain cleaner water, the federal voluntary agricultural programs lack funds and participation. Given the limited federal reach (over only concentrated animal feeding operations), it is clear that upgrades to the federal regulatory framework will be insufficient to deal with this major source of Bay pollution.

We commend Senator Cardin for his leadership on reauthorizing the EPA Chesapeake Bay Program, and we are hopeful that the Senate and House Committees that are drafting this legislation give EPA the necessary regulatory authority. Without a strong

reauthorization bill, EPA will be unable to compel the states to submit meaningful implementation plans to get the job done.

Finally, with or without the federal authorities contained in the Cardin bill, the states must pick up the torch. We suggest that the only option left to states seeking to provide *real* "Reasonable Assurance" that they are capable of achieving the agricultural pollution reductions in the new TMDL is if the states can ensure implementation of the necessary best management practices. And the only way it appears that the states and the federal government can ensure the implementation of those practices is to develop an effective – and shared – regulatory framework.

The states and the federal government must deliberate on what an effective regulatory framework would entail. At the very least, an effective framework will require tailoring existing state and federal agricultural regulations, developing new state and federal regulations, and using the voluntary cost-share funds to help farmers implement the regulatory framework.

Then, many additional options must be considered. For example, the regulatory framework could apply statewide, be limited to within the Bay watershed or limited to particular TMDL watersheds. The regulatory framework could be prescriptive, mandating adoption of the specific number and types of practices that equate to a reduction in agricultural nitrogen, phosphorus, and sediment pollution in each TMDL. The regulatory framework could be performance based, wherein each farm is assessed for its pollution load and then allowed the flexibility to determine how it will achieve a specific pollution reduction goal that when aggregated across all farms within each TMDL watershed will achieve each TMDL goal.

The regulatory framework should make cost-effective use of the available but limited cost-share funds. These funds should be rationed in innovative ways, including but not limited to geographic priority areas, practice priorities, or economic priorities such as assisting farms that demonstrate significant economic hardship from compliance with the new regulatory framework.

EPILOGUE

Dr. Oliver Houck, law professor at Tulane University and one of the country's preeminent TMDL experts concludes:

> "Reasonable assurances" are not provided by existing water quality standards, which set goals but do not by themselves abate pollution; nor by programs that are educational or voluntary and, in effect, penalize the good actor; nor by financial incentives that are subject to budgetary constraints. Clean Water Act assurances should be met through specific and mandatory best practices, as for all other water dischargers, industrial and municipal. Blueprints for these practices, by activity, are already developed in government publications and studies; they do not need to be invented. These requirements can be supplemented, but not replaced, by fee systems based either on the use of polluting materials (e.g. fertilizers, manure) and/or by rebates for practices that exceed regulatory requirements.[61]

APPENDIX

Table 1. Half the Cropland in the Bay States is "Highly Erodible" (HEL) and a Quarter of the Cropland is Eroding at Unsustainable Rates

Categories of land and erosion severity	MD	VA	PA	DE	WV	NY	Total
HEL Cropland Eroding AT OR BELOW Soil Loss Tolerance Rates*	218,000	971,400	1,768,100	no data	391,600	1,019,800	4,368,900
HEL Cropland Eroding ABOVE Soil Loss Tolerance Rates	298,600	341,900	1,329,300	14,900	76,600	656,500	2,717,800
Total HEL Cropland	516,600	1,313,300	3,097,400	17,600	468,200	1,676,300	7,089,400
Non-HEL Cropland eroding ABOVE Soil Loss Tolerance Rates	87,800	421,700	225,100	35,100	no data	426,000	1,195,700
Total cropland in each state	1,405,442	3,274,137	4,870,287	432,733	942,132	4,314,954	15,239,685
Percentage of cropland that is Highly Erodible **	37%	40%	64%	4%	50%	39%	**47%**
Percentage of cropland (HEL + non-HEL) that is eroding ABOVE Soil Loss Tolerance Rates	27%	23%	32%	12%	no data	25%	**26%**

Source: 2003 Annual NRI - State Report and USDA 2007 Agricultural Census. Data is in acres and is statewide.

*Soil Loss Tolerance Rates (SLTR) represents a soil fertility indicator rather than an environmental indicator. SLTR represents the maximum annual soil erosion rate that can be sustained with no long-term loss in soil productivity. Soils ABOVE the SLTR are losing soil fertility at an unsustainable level.

**Percentage of cropland in each state that is Highly Erodible and may be subject to Conservation Compliance if the landowner is receiving federal farm subsidies. The U.S. Department of Agriculture does not keep track of the number of cropland acres in each state that are subject to Conservation Compliance.[62]

Table 2. OPERATIONS - Total Livestock Operations in 5 States with Federal or State Animal Feeding Operation Permits

	Permitted	Unpermitted	Total	Percent Permitted
Total Operations:	1,060	65,835	66,895	**1.6%**
Virginia Operations	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	84	1,070	1,154	7%
Swine	63	1,177	1,240	5%
Beef	7	21,900	21,907	0%
Total	154	24,147	24,301	**1%**
New York Operations	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	499	5,184	5,683	9%
Swine	19	1,852	1,871	1%
Beef	12	6,791	6,803	0%
Total	530	13,827	14,357	**4%**
Maryland Operations	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	10	653	663	2%
Swine	1	411	412	0%
Beef	2	2,524	2,526	0%
Total	13	3,588	3,601	**0%**
Pennsylvania Operations	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	89	8,244	8,333	1%
Swine	170	3,467	3,637	5%
Beef	92	12,161	12,253	1%
Total	351	23,872	24,223	**1%**
Delaware Operations	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	10	73	83	12%
Swine	1	76	77	1%
Beef	1	252	253	0%
Total	12	401	413	**3%**

Note: Data is statewide. State program managers provided EWG with the number of permitted operations and animals covered by the federal CAFO program (MD, PA, and NY) and the state confined animal operation programs (VA and DE). The number of unpermitted operations and animals was estimated by subtracting the number of total operations and animals from the number of permitted operations and animals. The total number of operations and animals in each animal sector in each state was estimated using the 2007 Agriculture Census because state program managers were unaware of the total operations and animals in their respective states or how many operations were eligible for a permit. The number of dairy farms in each state was estimated from the state Census Table 17. Milk Cow Herd Size by Inventory and Sales: 2007: Total/Farms/Total. The number of dairy animals was estimated from Milk Cows/Number/Total. The number of swine farms was estimated from the state Census Table 19. Hogs and Pigs – Inventory: 2007 and 2002: 2007/Farms/Total hogs and pigs. The number of swine animals was estimated from 2007/Number/Total hogs and pigs. (We used Maryland's database query to find 33,000 swine in the state due to the disclosure problem with Census table data) The number of beef

farms was estimated from the state Census Table 16. Beef Cow Herd Size by Inventory and Sales: 2007 – Total/Farms/Total. Number of beef animals was estimated from Total/Number/Total.

Table 3. ANIMALS - Total Livestock Animals in 5 States with Federal or State Animal Feeding Operation Permits

	Permitted	Unpermitted	Total	Percent Permitted
Total Animals:	1,746,761	3,290,008	5,036,769	**35%**
Virginia Animals	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	39,384	59,533	98,917	40%
Swine	358,198	12,978	371,176	97%
Beef	7,760	1,258,820	1,266,580	1%
Total	405,342	1,331,331	1,736,673	**23%**
New York Animals	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	521,111	105,344	626,455	83%
Swine	60,577	25,164	85,741	71%
Beef	14,125	291,325	305,450	5%
Total	595,813	421,833	1,017,646	**59%**
Maryland Animals	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	15,785	41,387	57,172	28%
Swine	3,300	29,700	33,000	10%
Beef	4,300	73,590	77,890	6%
Total	23,385	144,677	168,062	**14%**
Pennsylvania Animals	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	33,853	519,468	553,321	6%
Swine	677,625	489,824	1,167,449	58%
Beef	4,625	366,374	370,999	1%
Total	716,103	1,375,666	2,091,769	**34%**
Delaware Animals	**Permitted**	**Unpermitted**	**Total**	**Percent Permitted**
Dairy	2,318	4,208	6,526	36%
Swine	1,800	7,155	8,955	20%
Beef	2,000	5,138	7,138	28%
Total	6,118	16,501	22,619	**27%**

Note: See note from Table 2.

Table 4. Estimates of Chicken (Broilers + Layers) Operations and Animals in Chesapeake Bay States with Federal or State Animal Feeding Operation Permits (data are state-wide)

CHICKEN OPERATIONS				
State	Permitted	Unpermitted	Total	Percent Permitted
New York	10	4,632	4,642	0%
Pennsylvania	102	9,001	9,103	1%
Delaware (NOI)	341	601	942	36%
Maryland (NOI)	450	1,562	2,012	22%
Virginia	639	3,553	4,192	15%
Total	1,542	19,349	20,891	**7%**
CHICKEN ANIMALS				
State	Permitted	Unpermitted	Total	Percent Permitted
New York	4,078,774	343,144	4,421,918	92%
Pennsylvania	34,790,982	14,700,157	49,491,139	70%
Delaware (NOI)	28,521,466	22,619,738	51,141,204	56%
Maryland (NOI)	57,300,000	10,866,264	68,166,264	84%
Virginia*	51,208,430	-4,254,879	46,953,551	109%
Total	175,899,652	44,274,424	220,174,076	**80%**

* Virginia's permitted broiler and layer chickens exceed the total number of broiler and layer chickens reported in the 2007 Agriculture Census. Possible explanations for this include that Virginia's DEQ records the maximum capacity of animals allowed in each chicken house and each farm covered by the permit while the Census asks farmers to report the number of animals on their farm on December 31 (an actual snapshot at a given point in time).

Note: States provided EWG with the number of permitted operations and animals covered by the federal CAFO program (MD, PA, and NY) and the state confined animal operation program (VA and DE). The numbers of unpermitted operations and animals were estimated by subtracting the number of Total operations and animals from the number of permitted operations and animals. The total number of poultry farms (broilers + layers) in each state was estimated using the 2007 Agriculture Census because state program managers were unaware of the total chicken operations and chickens in their respective states or how many operations were eligible for a permit. The number of chicken operations in each state was estimate from the state Census Table 27. Poultry – Inventory and Number Sold: 2007 and 2002: 2007/Farms/Layer inventory + 2007/Farms/Broilers and other meat-type chickens inventory. The number of chicken animals was estimated from 2007/Number/ Layer inventory + 2007/Number/Broilers and other meat-type chickens inventory.

[1] White House. Executive Order. Chesapeake Bay Protection And Restoration. May 12, 2009. http://www.whitehouse.gov/the_press_office/Executive-Order-Chesapeake-Bay-Protection-and-Restoration/

[2] Chesapeake Bay Foundation. "Water Pollution in the Chesapeake Bay." http://www.cbf.org/Page.aspx?pid=913.

[3] Chesapeake Bay Foundation. "Water Pollution in the Chesapeake Bay." http://www.cbf.org/Page.aspx?pid=913.

[4] Maryland Department of Natural Resources. "Protecting and Rebuilding the Chesapeake Bay Crab Population." http://www.dnr.state.md.us/dnrnews/infocus/blue_crab.asp.

[5] Lindsey, B.D., Breen, K.J., Bilger, M.D., and Brightbill, R.A. "Water Quality in the Lower Susquehanna River Basin, Pennsylvania and Maryland, 1992-95" U.S. Geological Survey Circular 1168. 1998,. http://water.usgs.gove/pubs/circ1168.

[6] "Simulated Source of N load (2007)" provided by Nita Slyvester, EPA Chesapeake Bay Program Model.

[7] "Simulated Source of P load (2007)" provided by Nita Slyvester, EPA Chesapeake Bay Program Model.

[8] "Simulated Source of Sediment load (2007)" provided by Nita Slyvester, EPA Chesapeake Bay Program Model.

[9] Office of Inspector Generals of the United States Environmental Protection Agency and the United States Department of Agriculture. "Saving the Chesapeake Bay Watershed Requires Better Coordination of Environmental and Agricultural Resources." http://www.epa.gov/oig/reports/2007/20061120-2007-P-00004.pdf. November 20, 2006.

[10] EPA Chesapeake Bay Program. "Chesapeake Action Plan." http://cap.chesapeakebay.net/goal3.htm. 2008.

[11] Houck, Oliver. The Clean Water Act TMDL Program: Law, Policy, and Implementation. Environmental Law Institute. Washington D.C. 2nd Edition. 2002.

[12] White House. Executive Order. Chesapeake Bay Protection And Restoration. May 12, 2009. http://www.whitehouse.gov/the_press_office/Executive-Order-Chesapeake-Bay-Protection-and-Restoration/

[13] Data from the 2003 National Resources Inventory. http://www.nrcs.usda.gov/technical/NRI/2003/statereports/2003summaryreport.pdf

[14] Personal communication with program staff at the USDA Farm Service Agency.

[15] Data provided by Leroy Hansen, USDA Natural Resources Conservation Service.

[16] EWG calculations based on latest available data provided by Nita Slyvester, EPA Chesapeake Bay Program Model . 2007 data.

[17] EWG calculations based on latest available data provided by Nita Slyvester, EPA Chesapeake Bay Program Model . 2007 data.

[18] Pennsylvania Code § 102.4. Erosion and sediment control requirements. http://www.pacode.com/secure/data/025/chapter102/s102.4.html

[19] New York State Department of Environmental Conservation. Environmental Conservation Law (ECL) CAFO SPDES General Permit. Appendix B – Permit Requirements for Construction Activities at CAFO Facilities. http://www.dec.ny.gov/docs/permits_ej_operations_pdf/eclcafopermit.pdf

[20] Delaware's Title 7 Natural Resources and Environmental Control. 5000 Division of Soil and Water Conservation. 5101 Sediment and Stormwater Regulations. http://regulations.delaware.gov/AdminCode/title7/5000/5101.shtml

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