TO: Chesapeake Bay Program's Management Board
RE: Comments on the Chesapeake Bay Watershed Agreement Draft

We Must Eliminate Practices that Capture No Storm Water and Leave No Pollinator Behind

Why should Maryland residents be forced to poison and starve our pollinators? Even ladybugs are in decline. Recent comments from former secretary of MDE and current Acting EPA Administrator Bob Perciacepe confirm the value of what I have been trying to do throughout Montgomery County and the state since 2009. On June 5th at the Choose Clean Water Conference in Baltimore, Perciacepe was pleased to say that his Washington (DC) townhouse rainscape has absolutely no stormwater runoff. He emphasized that the role of state and local governments is this next level of Bay friendly efforts. To effectively restore the Bay, the Anacostia, the Potomac, and all other water sources, he emphasized, efforts must be "house by house, building by building."

So why have my biodiverse, chemical-free, watershed friendly yards with native plants and robust bushes been destroyed more than thirteen times since 2008? My yards capture stormwater, return it to the aquifer and prevent runoff and flooding, and attract and feed pollinators and other beneficials.

Solution #1: MS4 Permits must remove turf grass from the MDE and local Departments of Permitting Services list of effective stormwater management vegetation. The consequences include treating Bay friendly yards as violations and ensuring that all new developments throughout the state go in with turf grass. This paradigm must change if there is to be any hope of restoring the health of the Chesapeake Bay and the vitally important water sources in between.

I am one of thousands of Montgomery County residents and tens of thousands of state residents prohibited from replacing turf grass (intensive noise and tons of CO_2 from mowers and leaf blowers; and still more soil erosion caused by trimmers) with a Bay friendly yard. This new Chesapeake Bay Watershed Agreement should also provide clover and dandelions with the ecological respect and protection they deserve. There should be an education campaign to reduce and eliminate pesticides and herbicides. The heads of DNR and MDE recently acknowledged the continued increase in polluted stormwater runoff into the Bay.

DNR and WSSC continue to maintain turf grass and to mow and water and use petroleum-based chemicals. MDA agriculture extension agents promote atrazine and glyphosate to Maryland conventional farmers as "textbook farming practices." These agents deny evidence of harm from the chemicals. Yet scientific evidence definitively links atrazine to disfigured frogs and fish and documents its widespread presence in water sources because of its extensive use on soy and corn fields.

Solution #2: Ensure that every resident has the right to replace turf grass with biodiverse, chemical-free, watershed friendly vegetation (also characterized as "Rainscapes") using the guidelines in the *U.S. Fish and Wildlife Service Guide for Chesapeake Bay Watershed Native Plants and Conservation Landscaping* (www.fws.gov/chesapeakebay). It is important to note

that traditional rain gardens and bioswales require excavating a large area and are high maintenance and costly. Conservation vegetation, on the other hand, can achieve the same positive stormwater management results without losing or even disturbing topsoil or incurring significant if any costs. It is important to preserve topsoil and protect and attract earthworms.

Solution #3: Stormwater management legislation should include lawns and yards and should promote replacing turf grass with low- or no-maintenance native plants, bushes, and ground cover; or plants that naturally emerge that capture stormwater and attract and feed pollinators and other beneficials. Recently passed state and local stormwater regulations in Maryland do not include lawns and yards.

Observation is important, because non-natives and native plants can look alike, and both can feed our beneficial pollinators and insects. Plants should be removed only if there is evidence of a problem. Let the critters themselves decide, as well as personal preference for what may naturally emerge and grow.

Solution #4: SHA and local DOT transportation projects must incorporate watershed friendly vegetation rather to eliminate flooding, mowing (CO_2), and pesticides and protect and plant as many trees as possible, as biodiverse as possible, than reseed projects for turf grass. Research shows that trees and tree canopy across roads calm and slow traffic, enhance walkability, and provide effective stormwater management.

Under former Mayor Adam Ortiz, The Green Street in Edmondston became a model streetscape that includes permeable surfaces in place of impervious surfaces, which local and state transportation agencies have been resistant to adopt. There should be hearings at the planning stage of each project to ensure that sidewalks, bike lanes, crosswalks, and pedestrian-activated lights where needed are in the project. This kind of input is not happening today, and as a former member of the Montgomery County Pedestrian, Bicycle, and Traffic Safety Advisory Committee, I saw too many projects that were unnecessarily incomplete and often devoid of these important public safety considerations because SHA and DOT refuse to consult with this Committee or to hold public hearings. These are opportunities to also reduce runoff and flooding and educate residents.

Solution #5: Knowing what we do about stormwater management, benefits from trees and vegetation, and the importance of wildlife to our ecosystems, clearcutting mature trees (denuding the site) cannot continue to be permitted. Recently passed state and local legislation to protect trees is inadequate, and profits over public health is a bad idea. That is how the Bay and the water sources in between became so degraded. We know that. The failure to protect any vegetation includes the destruction of turtles, snakes, and entire stormwater management ecosystems. There should be biological and ecological assessments for new developments and re-development projects on a site-by-site basis with the involvement of the community.

These five solutions should be integrated into an impervious surface “rain” tax that permits property owners to balance existing impervious surfaces with modifications for pervious surfaces and watershed friendly vegetation ratios, which is how the DC bill is crafted. So those who oppose the “rain tax” really cannot be criticized until these inconsistencies and hypocrisies in

current stormwater management practices are corrected and the destructive practices are replaced.

There are watershed steward academies in Howard County, Ann Arundel County, and the National Capitol Region watershed steward academy serving DC, Montgomery County, and PG County. I am one of many watershed stewards throughout the state trying to educate my community about the best stormwater management practices for clean water and the health of the Chesapeake Bay. A scientific consensus in the state agrees that the most effective stormwater management practices include robust and biodiverse, chemical-free, native conservation vegetation. My yards attracted and fed honeybees, bumble bees, harmless ground-nesting beneficial wasps, magnificent dragonflies, and delicate blue damselflies amidst a host of other wonderful beneficials. When it rained, I could see a distinct difference in the color of the sidewalks next to both of my sloping yards (back and front) compared to my neighbors' sidewalks adjacent to their sloping mowed turf grass.

Robust bushes can provide the same benefits that trees provide. Trees can capture as many as 57,000 gallons of stormwater, provide habitat and food for pollinators and other beneficials, stabilize the soil and reduce sediment runoff and soil erosion, and insulate buildings. Trees can reduce energy demand by as much as 50 percent, and so can robust bushes next to a structure. Tall, thick bushes especially against a building can capture tens of thousands of gallons of stormwater from the roof and return the water to the aquifer, thus preventing runoff and flooding. Robust bushes also provide significant amounts of food and habitat for birds and insects.

Turf grass attracts and feeds nothing. Research from the USGS, NAS, NOAA, and EPA 2005 and 2007 studies criticize practices to maintain a manicured and monocultured turf grass—including mowing, trimming, and synthetic chemicals. These environmentally destructive practices deposit more pollutants into the Bay than what most farms deposit, except for the chicken confined animal feeding operations on the Eastern Shore. *Chesapeake Storm Water Network Bulletin #8* documents that turf grass is now the largest land mass in the Chesapeake Bay Watershed.

More than 50 percent of the pollution in the Bay is from atmospheric sources—vehicles, power plants, lawn mowers, and leaf blowers, according to a U.S. Forest Service official. The U.S. Fish and Wildlife Service Guide documents that lawn mowers emit ten times as much hydrocarbons as a typical auto emits; blowers emit 34 times as much; and trimmers, 21 times as much. Lawn mowers, leaf blowers, and trimmers run nonstop in my development of 600 units from 7am to 6pm four to six days a week in the warmer months. The organophosphate 2,4-D, a molecule of Agent Orange (see beyondpesticides.org), is lavished by residents four to six days a week. The stormwater management ponds fill with algae and overflow as a result of the absence of any onsite capture of stormwater; the ensuing sediment and chemicals from turf grass end up in the ponds, the Anacostia, the Potomac, and the Bay.

Even though clover is a bona fide wildflower according to the Maryland Native Plant Society and dandelions are listed as heirloom vegetables, and both feed pollinators and enhance the health of the soil, local lawn and yard codes continue to list both plants as weeds, thus encouraging the use of toxic chemicals too many residents believe are safe because the

government permits them to buy and use those products. I personally witnessed a bee die-off this past July 23rd after True Green (a true misnomer) applied an herbicide to my neighbors' yards on both sides of me. The corpses were on my steps, and the bees did not return. And the chemicals certainly ended up in the Bay and water sources in between.

Although the Montgomery County Department of Environmental Protection (DEP) conducts stormwater management classes for landscape companies, DEP does not verify that these companies actually change their lawn care practices before putting the names of these companies on an online list that promotes them just because they attended the class. This list misleads residents and offers no incentives to the companies to change, so the companies do not change. True Green, for example, is on that list.

It is painful to see birds poke around for food in grass that was just saturated with a poison. Neighbors all around me use 2,4-D once a week every week for four to five months out of the year (2,4-D contains a molecule of Agent Orange and is banned in at least five countries including Canada); synthetic pyrethrum another day every week four to five months out of the year; roundup another day each week four to five months out of the year (also banned in industrialized countries such as the UK); and nitrogen and salts about every two weeks four to five months out of the year. The applicators saturate the yards and the common areas with all of these chemicals, often combining three at a time. So multiply these pollutants countywide and statewide in addition to the amount of runoff, sewage overflows, and polluted sediments as a result of these practices.

The TMDL paradigm addresses nutrients one at a time on a very slow track—but not sediment runoff and chemicals from urban and suburban residential and commercial sectors. The TMDL paradigm is seriously flawed because it claims that there are safe levels of substances that harm the Bay. Toxicologist Janette Sherman, M.D., maintains that harmful substances have no safe levels of exposure and we should not be misled.

In Maryland nutrient management plans, farmers have consistently been painted with the same broad brush without distinguishing individual farming practices. So farmers who use cover crops and riparian buffers or organic/biodynamic/ecological practices are treated the same as conventional farmers without those practices and who use synthetic chemicals and apply raw liquid manure. I have seen such supposedly legal applications on hillsides above water sources.

There should be no opting out of effective stormwater management practices, but such practices must be in place. It is no mystery why the Anacostia River and the Bay are still polluted and characterized by dead zones and algae.

Thank you.

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CSN releases turf cover estimates for the Chesapeake Bay watershed, CSN Technical Bulletin No. 8:

The potential impacts to the Bay due to turf cover are expressed in terms of annual biomass production, nitrogen fertilization, pesticide application, water use, runoff from compacted soils, energy use, carbon sequestration, VOC emissions and the cost to maintain such a large fraction of watershed area as a grass crop…initial estimates suggest that turf has a strong influence on water quantity and quality in the Bay watershed…An estimated 6.1 million "turf grass farmers" exist in the watershed who currently spend nearly 5 billion dollars a year (including more than $600 million expended alone for fertilizers and chemicals). By changing their attitudes and behaviors about what constitutes a green lawn, it may be possible to achieve major runoff and nutrient reductions to the **Chesapeake Bay. Turf cover arguably constitutes the single largest fraction of pervious area in the watershed, exceeding the total individual acreage devoted to row crops, pasture, hay/alfalfa or freshwater wetlands, respectively**…Given the steady growth of turf cover over the last four decades, we have reached a clipping point whereby turf is the most significant non-forested pervious area in the watershed.

CHOPTANK RIVER EASTERN BAY CONSERVANCY

Lawn Fertilizer Contributions in the State of Maryland to Nutrient Loading in the Chesapeake Bay

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Note: This research will be expanded upon in a Master's Project for a Master in Environmental Management at Duke University; the finished product will be available in May, 2011.

A nation of lush lawns, however, has severe but often overlooked economic, health, and environmental impacts. Green lawns require constant maintenance: at least two fertilizations a year and applications of pesticides, herbicides, and fungicides as needed. It requires watering when it turns brown in the summer. Frequent mowing is required. Water and oil are depleted in lawn maintenance which results in air pollution from gas exhaust, and water and soil

pollution from the leaching and runoff of synthetic chemicals. Perhaps it is time for Americans to alter the way they think about green lawns.

The Chesapeake Bay faces a multitude of pressures today from pollution sources. Effluent from waste water treatment plants, animal waste from concentrated animal feeding operations, and agricultural fertilizer are all culprits (Fisher et al., 1995; Fisher et al., 2010). An often overlooked and even less understood culprit is home lawn fertilization. Of these nutrient contributors, residential turf is the most fragmented and has the largest number of owners, making nutrient loading from home lawns the most difficult to measure and regulate.

Home lawns from Virginia to upstate New York, from West Virginia to Delaware – 2.85 million acres of green lawns– contribute to the nutrient-loading that has so severely degraded the Chesapeake Bay's waters (Shueler, 2010)(Figure 1).

The uniform green lawn presents a twist on the Theory of the Commons; lawn care practices on individually owned pieces of land contribute to large-scale degradation of a publicly owned estuary. The opportunity exists, though, to make a significant difference by changing individual practices.

The state of Maryland provides an ideal study area for better understanding the extent of nutrient application to residential lawns in comparison to that of agricultural fields. Central Maryland has some of the highest percentages of land area covered by turf in the entire Chesapeake Bay watershed while the Maryland Delmarva Peninsula is heavily agricultural (Figure 1). This research project focuses on the state of Maryland in order to compare the use of fertilizer on residential lawns with its use for agricultural purposes. It seeks to discover the scope and trends of nutrient application to home lawns in the Chesapeake Bay watershed as an indicator of nutrient loading in the Bay from residential turf and thereby assess the need for increased management of turf lawns. Several questions are posited and sought to be answered:

- What is the scope of lawn fertilizer on Maryland turf?
- How does this compare with the use of agricultural fertilizer in Maryland?
- How much of a contributor to water pollution is lawn fertilizer going to be in the future?
- In what ways can the negative effects of lawn fertilizer on water quality be significantly reduced?

Fertilization Quantities in Maryland

Cropland is one of the largest contributors to nutrient loading in the Chesapeake Bay (Fisher et al., 2010); however, turf lawns often receive comparable amounts of fertilizer (Guillard and Kopp, 2004). Fertilizer typically contains a mixture of nitrogen, phosphorous, and potassium, nutrients that all plants need to grow. Nitrogen and phosphorous have limited natural availability in soils and waters, thus restricting plant growth. However, when these two nutrients are no longer limited, as is the case when nutrients from fertilizers enter waterways, there is no restriction to plant growth. This results in eutrophication, an excess of nutrients. Excess nutrients in the water fuel algae growth. Algae blooms cloud the water and prevent sunlight from reaching submerged aquatic vegetation, causing these underwater grasses and the organisms dependent on them, such as crabs and fish, to die. Algae

populations increase to a point where there are no longer sufficient nutrients to support them, causing the algae to die and fall to the bottom. Bacteria that decompose the dead algae utilize oxygen in the water column. If enough algae die to sustain significant bacterial populations, the bacteria substantially reduce benthic dissolved oxygen levels and thus create dead zones where nothing can live.

There are two main forms in which nutrients from fertilizer reach waterways: leachate and runoff (Kenna, 2008). Leachate is the liquid that percolates from the surface of the lawn down through the soil and runoff is the liquid that moves horizontally across the surface of the lawn; both movements have the potential to carry nutrients with them (Kenna, 2008).

Excess nutrients from lawn fertilizer and from agricultural fertilizer are impossible to differentiate once in the Bay…

While fertilizing turf lawns in the fall is widely recommended to improve spring turf color and root mass, …Fertilizing lawns after October 15th does not improve spring turf quality and actually results in an increased amount of nutrients entering waterways (Mangiafico and Guillard, 2006).

Review and Recommendations

Trends in Maryland fertilizer sales over the past 20 years show an increase in fertilizers sold for non-farm use, an indication of increasing turf acreage. The state of Maryland needs to regulate and restrict the use of fertilizers on these turf lawns in order to reduce nutrient loading to the Chesapeake Bay.

The data clearly show that lawn fertilizer use is increasing in the state of Maryland and therefore is becoming a significant contributor to nutrient loading in the Chesapeake Bay.

On July 22, 2010, the front page article of The Washington Post Local Living section for Montgomery County suggested "Lose the Lawn: The case for creating a front-yard garden" (Higgins, 2010). The article details four yards in the DC Metropolitan Area and their transformation from uniform, green swaths of grass to rectangles of vibrant, diversified gardens interspersed with meandering pathways. These lawn gardens have multiple advantages over grass lawns; besides providing year-round beauty and decoration, one couple's lawn garden shields them from the noise and glare of a busy intersection (Higgins, 2010). Another woman uses her time outside caring for her lawn garden as an opportunity to connect with neighbors and to tell them how her garden is better for the Chesapeake Bay than traditional lawns (Higgins, 2010). These lawn gardens are environmentally friendly as well, reducing runoff from impervious surfaces, filtering rainwater, increasing plant diversity, and promoting wildlife (Higgins, 2010). One lawn gardener exclaimed, "I don't like to look at lawns; they're boring" (Higgins, 2010).

The data show that the maintenance of a green lawn negatively affects water, soil, and air quality; a uniform green lawn should no longer be an indicator of social status. In fact, a uniform green lawn is a sign of social irresponsibility for the waste of valuable resources and the degradation of public resources. As suburban landscapes continue to replace agricultural land across the Eastern Seaboard it will become increasingly important to understand and mitigate the negative environmental effects on the Chesapeake Bay of maintaining a uniform green lawn.

The report, "Technical Report on Toxic Contaminants in the Chesapeake Bay and its Watershed: Extent and Severity of Occurrence and Potential Biological Effects" is based on a review of integrated water-quality assessment reports from the jurisdictions in the Bay watershed (Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, and Washington, D.C.), Federal and State reports, and articles in scientific journals. It notes that nearly three-fourths of the Bay's tidal waters are "fully or partially impaired" by toxic chemicals, with people warned to limit fish consumption from certain areas. Contamination is severe in a handful of "hot spots" around the Bay, including Baltimore's harbor, largely a legacy of past industrial and shipping activity.

Any precipitation in an urban or suburban area that does not evaporate or soak into the ground, but instead pools and travels downhill, is considered stormwater. Stormwater is also referred to as urban stormwater, runoff and polluted runoff. Increased development across the Bay watershed has made stormwater runoff the fastest growing source of pollution to the Bay and its rivers.

Population growth, development named key players in Potomac River pollution

Plumes of sediment, floating trash and pathogens that make once-swimmable water unsafe: pollution of all kinds continues to plague the Potomac River, as populations grow, pavement expands and stormwater runoff pushes various hazards into the 405-mile long waterway.