Appendix B
Review of Fertilizer Use on Public Lands and State/Local Fertilizer Regulations

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Distribution of Public versus Private Turf

For this section, Tetra Tech reviewed the Chesapeake Stormwater Network's *Technical Bulletin No. 8: The Clipping Point: Turf Cover Estimates for the Chesapeake Bay Watershed and Management Implications* (Schueler and Claggett 2010). Table 1 (modified from Schueler and Clagget 2010) shows the distribution of turf grass in Maryland, Virginia, and New York by urban land use type. In the table, Tetra Tech added the *land ownership* designation on the basis of the *turf sector* description in the reference document. This was done to better understand the distribution of turf grass to ownership type.

The percent for the land ownership was summed from data presented by Schueler and Claggett (2010) and land ownership type as classified by Tetra Tech (Table 2) to generalize the overall percent private turf versus public turf (or mixed use). Maryland and New York had roughly 85 percent of turf grass on private lands. Virginia had the most on public lands—mainly on rights of way—at 26 percent. These are illustrated in Figure 1.

Table 1. Distribution of turf grass by land use type in Maryland, Virginia, and New York

Land use type	Land ownership[a]	1989–1998[b]	Maryland 2005	Virginia 2004	New York 2005
Home lawns	Private	70%	82.6%	61.6%	82.1%
Apartments	Private	nd[c]	0.6%	nd	0.8%
Roadside right of way	**Public**	**10%**	**4.3%**	**17.5%**	**nd**
Municipal open space	**Public**	**7.0%**	**3.5%**	**6.0%**	**nd**
Parks	**Public**	**3.5%**	**1.9%**	**2.5%**	**1.9%**
Commercial	Private	nd	nd	5.0%	0.3%
Schools	**Public/private**	**3.0%**	**3.4%**	**2.9%**	**1.6%**
Golf course	Private	2.5%	1.4%	2.25	3.0%
Churches/cemeteries	Private	2.0%	1.2%	1.4%	1.1%
Airports/Sod farms	Private	1.0%	1.1%	0.9%	0.6%
Other[d]	**Public/private**	**nd**	**nd**	**nd**	**8%**

Source: Schueler and Claggett 2010.

[a] Tetra Tech designation

[b] Average of three states: Maryland, Pennsylvania, and Virginia

[c] nd = no data because the indicated turf sector was not sampled or estimated

[d] Other = Correctional facilities, lawn care, and fairgrounds

Table 2. Summary of turf grass distribution by land ownership type in Maryland, Virginia, and New York

Land ownership type	Maryland 2005	Virginia 2004	New York 2005
Private	87%	71%	88%
Public	**10%**	**26%**	**2%**
Public/Private	**3%**	**3%**	**10%**

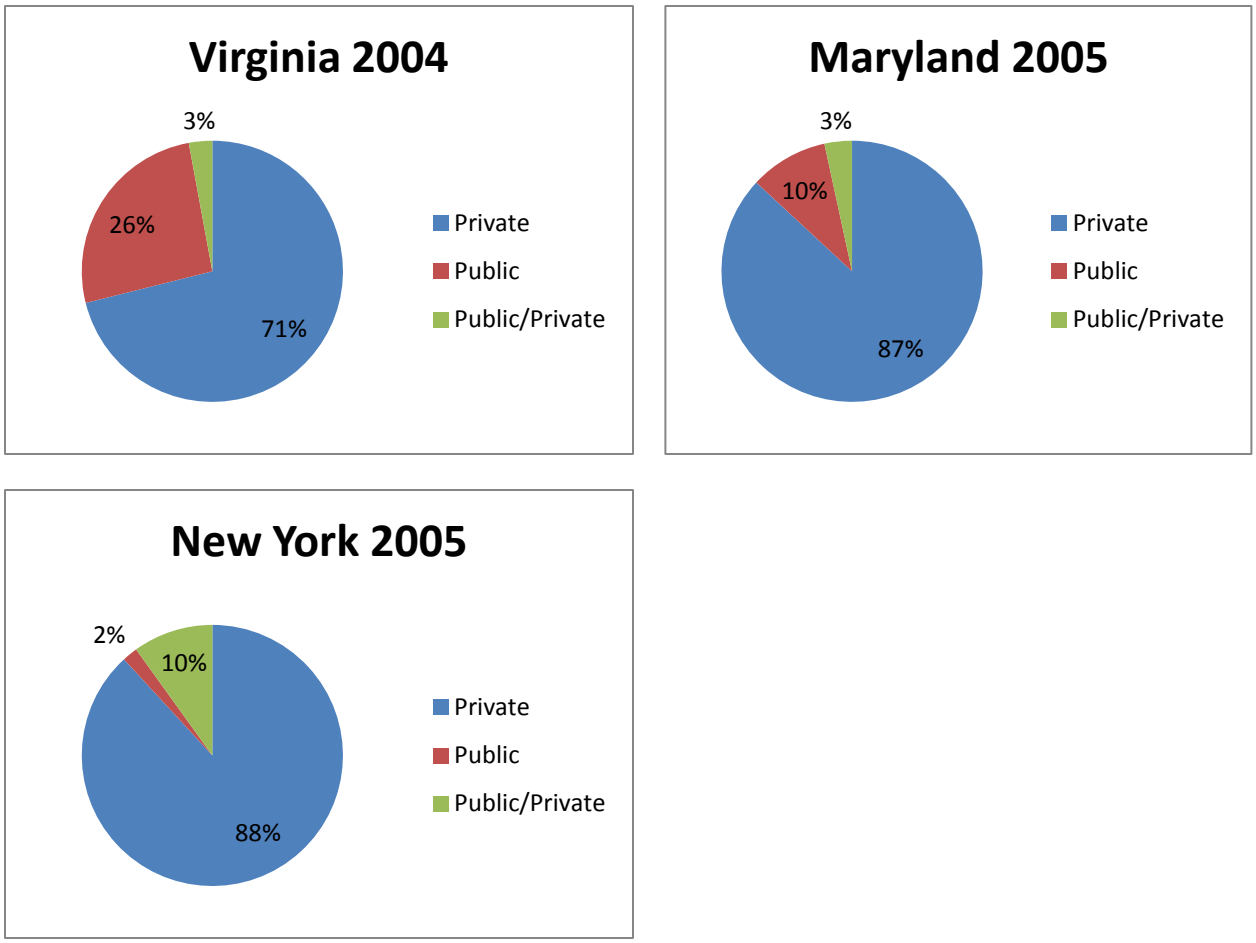

Figure 1. Summary of turf grass distribution by land ownership type in Maryland, Virginia, and New York

What is the Subset of Public Lands Being Fertilized?

Tetra Tech performed a literature review of fertilizer application at the county and local levels in the Chesapeake Bay watershed. No data were found regarding the percentage of public lands being fertilized (i.e., acres of county property fertilized versus county property owned). However, the literature review showed that some jurisdictions identify specific land use types that received fertilizers. Commonly fertilized public spaces included ball parks, golf courses, and athletic fields. Such areas are often considered high use, and fertilizer application is used to promote grass growth and limit erosion that might otherwise occur after heavy use.

What Municipalities Have Analyzed Their Land Application and Changed Their Policies—Outside the Chesapeake Bay Watershed?

Tetra Tech reviewed references in the *Landscape and Park Maintenance* section of the Center for Watershed Protection's *Urban Stormwater Restoration Manual 9* for landscape/park best

management practices (BMPs) for municipal housekeeping (Novotney and Winer 2008). Unfortunately, the majority of applicable work is being conducted in Washington State.

- **Seattle, Washington.** In January 1998 Seattle Parks and Recreation convened a group of in-house experts in landscape maintenance, horticulture, and urban forestry to develop BMPs for landscape maintenance operations. This project was undertaken at the request of the Superintendent of Parks and Recreation as part of Seattle's Environmental Management Program. Revised in 2005, the guidance document provides an integrated pest management plan, BMPs for natural areas, nursery operations, plant bed management, trees in landscaped areas and developed parks, and turf management. The level of detail regarding fertilizer application varies in each section. (http://www.seattle.gov/parks/projects/bmp.htm)
- **Bellevue, Washington.** The city does not use fertilizers on any agricultural lands. (http://bellevuewa.gov/pdf/Document%20Library/2006_EBMP_DS_Manual.pdf)

Summary of Accompanying Excel Sheet

Public Lands Literature.xlsx has two tabs: Read Me and Literature Review.

- The *Read Me* tab includes a description of each data column provided in the *Literature Review* tab of *Public Lands Literature.xlsx*. See below.

- The *Literature Review* tab provides a summary of the available information for local level (county/town/municipality level) fertilizer reduction programs in the Chesapeake Bay states. All documents referenced in this table have been uploaded to the SharePoint site. Keyword searches were conducted broadly for the entire state and targeted searches for the most populated five to seven cities in each state. Common keywords for the literature review included the following keywords or combinations of keywords: MS4, Chesapeake, fertilizer, annual report, fertilizer reduction, and targeted jurisdiction/city name.

Contents of the Read Me Tab of Public Lands Literature.xlsx

- **Program (based on the document title):** Describes the title of the PDF in which the program is described.
- **PDF Name:** File name of the document as downloaded from the Web and saved.
- **State:** The state in which the program is implemented.
- **Schools and Universities:** A subset of public land type. *Y* is indicated for any program that discusses reducing fertilizer use on school and university properties. *N* is indicated if schools and universities are not discussed as part of the program elements. Disclaimers are included as appropriate. If a disclaimer is provided, read column I, *Brief Description of Program*, for additional details.
- **State/County/Municipal Land:** A subset of public land type. *Y* is indicated for any program that discusses reducing fertilizer use on state, county, or jurisdictional land. *N* is indicated if state, county, or jurisdictional lands are not discussed as part of the program

elements. Disclaimers are included as appropriate. If a disclaimer is provided, read column I, *Brief Description of Program*, for additional details.

- **Parks:** A subset of public land type. *Y* is indicated for any program that discusses reducing fertilizer use on park land. *N* is indicated if park land is not discussed as part of the program elements. Disclaimers are included as appropriate. If a disclaimer is provided, read column I, *Brief Description of Program*, for additional details.
- **Turf grass (including fields open space and lawns:** A subset of public land type. *Y* is indicated for any program that discusses fertilizer use on turf grass including open spaces, lawns, and golf courses. *N* is indicated if turf grass is not included as part of the program elements. *Unknown* is indicated if it could not be determined that turf grass is included as part of the program elements.
- **Land type unspecified:** A subset of public land type. *Y* is indicated if a fertilizer program is discussed but the land type could not be determined. *N* is indicated if a public land type is identified by the program.
- **Other:** Text has been added where appropriate if a public land type is identified but not identified in columns D–G.
- **Changes to local landscaping:** *Y* is indicated for any program that discusses changing local landscaping to reduce fertilizer use—including programs that are using native plants to reduce fertilizer use, converting turf to natural landscape, retrofits, and such. *N* is indicated if changes to local landscaping are not discussed as part of the program elements.
- **Purchasing and contracting policies:** *Y* is indicated if restrictions are placed on the type or quantity of fertilizer that could be purchased. *N* is indicated if fertilizer purchasing restrictions are not discussed as part of the program elements.
- **Restrictions for Fertilizer Use:** *Y* is indicated for any program that restricts fertilizer use on certain land types or during certain times of the year. Examples include only applying fertilizer to ball parks, restricting fertilizer during the winter, and banning fertilizer use entirely within city/county/state limits. *N* is indicated if restrictions for fertilizer use are not discussed as part of the program elements.
- **Specific guidelines in place for [fertilizer] reduction:** *Y* is indicated for any program established specific benchmarks for fertilizer reduction including banning fertilizer entirely, reducing fertilizer by a set percentage, prohibiting fertilizer sale, establishing soil tests before fertilizer application, and such. *N* is indicated if fertilizer-reduction strategies are ambiguous, such as the city acknowledging *good housekeeping* guidelines for reducing fertilizer use, applying fertilizer in accordance with the manufacturer's instructions, targeting certain departments for reduced fertilizer application without specifying how reductions will be obtained.
- **Brief Description of Program:** Text describing the fertilizer reduction program, with specific details, where applicable, as summarized from the original PDF. For additional program details, see the original document.

What Municipalities Have Analyzed Their Land Application and Changed Their Policies—Chesapeake Bay Watershed?

Tetra Tech reviewed literature of about 80 jurisdictions regarding fertilizer application at the county and local levels in the Chesapeake Bay watershed. Of the 80 jurisdictions, 34

jurisdictions have enacted specific guidance to reduce land application of fertilizers—most commonly following manufacturer's instructions for applying fertilizers, soil testing, BMPs, integrated pest management plans, or banning use of certain fertilizers. It is unknown what prompted the implementation of these plans (e.g., whether the jurisdiction analyzed its land application and as a result changed the fertilizer policy).

Fertilizer guidance is most commonly set to encompass all land uses at the state, city or jurisdiction level. More than one-third (14 out of 34) of the jurisdictions that had specific guidance in place to limit fertilizer application provide guidance at the state, city, or jurisdiction level. Specific guidance provided by these programs varies from complete fertilizer bans to testing soil before fertilizer application. Given the diversity of land use types encompassed at the state, city, and jurisdiction level, it is likely that fertilizer regulations and programs at this level will be effective in reducing the amount of fertilizer that enters the Chesapeake Bay.

Roadside rights of way represent the largest estimated public source of turf grass and second largest estimated source of turf grass overall (behind private lawns) for Maryland, Virginia, and New York (Table 1). Anne Arundel County, Maryland; the Delaware Department of Transportation; the New York Department of Transportation; and the Virginia Department of Transportation have programs in place to limit fertilizer in rights of way. Schools, jurisdictional property (excluding ball parks and athletic fields), and parks have the least specific guidance in place to limit fertilizer use. Seven jurisdictions—out of the 34 jurisdictions that have specific guidance in place for fertilizer reduction—have regulations limiting fertilizer use on at least one of these land use types.

Where fertilizer reduction plans exist, it is generally recognized by the jurisdiction that some degree of fertilization is needed on ball parks and golf courses to prevent erosion associated with precipitation events on high use areas. Three jurisdictions—out of the 34 jurisdictions that have enacted specific regulations to limit fertilizer—have included special clauses to allow fertilizer on ball parks, athletic fields, or golf courses. An additional five jurisdictions specifically address fertilizer application on ball parks, athletic fields, or golf courses outside the context of jurisdiction-wide regulations. Future programs designed to limit fertilizer on ball fields, athletic fields, and golf courses should recognize the importance of maintaining sod coverage and the role that fertilizer plays in maintaining such sod.

The following is the list of 34 states, cities, or jurisdictions that were reviewed and have enacted specific guidance for fertilizer reduction. For each state, city, or jurisdictions that has enacted guidance, a brief summary of the guidance for land application of fertilizers is provided (see column M of the associated literature review summary table or documents available in full text on the SharePoint site). The descriptions are grouped by land use type and sorted by state.

All (including state or citywide ordinances)

- **Maryland, statewide**: With the Urban Nutrient Management Plan, the Maryland Department of Agriculture (MDA) regulates individuals and companies that apply fertilizer to 10 or more acres of non-agricultural land. The state's Fertilizer Use Act of 2011 places reductions in phosphorous and nitrogen for manufacturers, requires annual reporting of fertilizer sales at retailers, sets application guidelines for professional applicators, applies restrictions for fertilizer use for homeowners.
- **City of Annapolis, Maryland.** City ban of lawn fertilizer containing phosphorous.

- **Fort Detrick, Maryland.** No longer applies fertilizer to turf grass except in research plots.
- **Ithaca, New York.** Fertilizers and pesticides are not used on most city property with the exception of the golf course.
- **Village of North Syracuse, New York.** No fertilizers or other chemicals should be used on municipal properties.
- **Onondaga County, New York.** The county implemented a turf management program limiting fertilizer applications containing phosphorous on county-owned property.
- **Rensselaer County, New York.** Fertilizers are not used in general city grounds or lawn maintenance. If need arises, fertilizer would be applied following the manufacturer's instructions.
- **Suffolk County, New York.** The county enacted a countywide ban on fertilizer application between November 1 and April 1. It bans using all fertilizer on all county properties, with the exception of golf courses, athletic fields, the Suffolk County Farm, and where establishing new turf along public works projects. The Organic Parks Maintenance Plan calls for the use of minimal amounts of slow-release fertilizers needed and limiting fertilizer application rates to 3 pounds of nitrogen per 1,000 square feet over a golf course.
- **Westchester County, New York.** Two executive orders, signed in 2008 and 2009, restrict the use of phosphorous fertilizer on county property and reduce nitrogen and other stormwater pollutants from county property
- **Virginia, statewide.** Virginia will prohibit the sale, distribution and use of lawn maintenance fertilizer containing phosphorous beginning December 31, 2013.

  The Code of Virginia requires that all state agencies, state colleges and universities, and other state government entities that apply fertilizer develop and implement a nutrient management plan. For all state-owned agricultural and forested lands where nutrient applications occur, state agencies, state colleges and universities, and other state governmental entities must submit site-specific individual nutrient management plans prepared by a Department of Conservation & Recreation (DCR)-certified nutrient management planner (certain exceptions apply). For all state-owned lands other than agricultural and forested lands where nutrient applications occur, state agencies, state colleges and universities, and other state governmental entities must submit nutrient management plans prepared by a certified nutrient management planner. State agencies, state colleges and universities, and other state governmental entities are required to maintain and properly implement any such nutrient management plan or planning standards or specifications on all areas where nutrients are applied. DCR has authority to conduct periodic inspections as part of its responsibilities authorized under this section.
- **Fairfax County, Virginia.** The county conducts soil tests before applying fertilizer and uses natural landscaping where possible.
- **City of Falls Church, Virginia.** The city does not apply fertilizer to turf areas; however, deteriorating turf areas might require fertilizer in which the city plans to develop nutrient management and integrated pest management plans.

- **Henrico County, Virginia.** The county sets fertilizer application at 2.5 to 3.5 pounds of nitrogen annually unless a field is renovated or a new field constructed. In the fall 1.5 pounds of pot ash is applied per 1,000 square feet.

Right of way

- **Delaware Department of Transportation, statewide.** DelDOT does not routinely fertilize its roadsides. Fertilizers are used only in establishing turf grasses from seed on freshly prepared bare ground. DelDOT requires that 50 percent of the nitrogen product be a slow-release form of ureaformaldehyde and specifies the amount of nitrogen and phosphorous applied.
- **Anne Arundel County, Maryland.** The county does not use fertilizer in its road maintenance and roadside vegetation management.
- **New York Department of Transportation, statewide.** State Standard Landscape Specifications were revised to remove any default references to rates or specific fertilizer types; reduced the number of fertilizer options, eliminating such items as superphosphate, applied fertilizer on the basis of soil tests demonstrating the need for specific purposes. The specifications provide further guidelines including not re-fertilizing where roadside slopes are stable and where exposed rock or clean gravel does not permit the growth of grass specifying granular commercial fertilizer such as 10-6-4, 10-10-10 or 10-20-10 and apply in spring and fall during specified date ranges.
- **Virginia Department of Transportation, statewide.** Nutrient Management Plan revisions for facilities maintained by VDOT will be based on nutrient recommendations included in the soil test report. Fertilizer use associated with seeding has been reduced by 300 pounds.

Golf courses and athletic fields

- **Baltimore County, Maryland.** Implemented reduction rates for nitrogen and phosphorous (reduction of 17 percent for nitrogen and 22 percent for phosphorous). Under the current Urban Nutrient Management Law, MDA regulates fertilizer applications on commercially managed lawns (i.e., golf courses).
- **Town of Herndon, Virginia.** The Centennial Municipal Golf Course will continue application practices using a Stormwater Pollution Prevention Plan (SWPPP) checklist annually.
- **New Castle County, Delaware.** The county conducts soil sampling to determine fertilizer application. Fertilizers are applied to athletic fields.
- **Baltimore County, Maryland.** Implemented reduction rates for nitrogen and phosphorous (reduction of 17 percent for nitrogen and 22 percent for phosphorous). Under the current Urban Nutrient Management Law, MDA regulates fertilizer applications on commercially managed lawns (i.e., athletic fields)
- **Springfield Township, Montgomery County, Pennsylvania.** Playing fields are treated minimally to maintain their safety.

- **Hampton Roads, Virginia.** Yearly soil testing is conducted on athletic fields to determine fertilizer needs.
- **Norfolk, Virginia.** The city follows an Urban Nutrient Management Plan. Fertilizers are applied only on ball parks. Data was collected on the application of fertilizer on city-owned lands to review the existing city nutrient management plan.

City or jurisdictional lands (including parks, schools, and open space)

- **Montgomery County Public Schools, Maryland.** The county public schools do not generally apply fertilizer.
- **New Castle County, Delaware.** The county conducts soil sampling to determine fertilizer application. Fertilizers are applied around county buildings.
- **Springfield Township, Montgomery County, Pennsylvania.** The areas around library and township buildings and other non-park areas are treated minimally.
- **Hampton Roads, Virginia.** Yearly soil testing is conducted on public building sites to determine fertilizer needs
- **Newport News, Virginia.** The city reduced the amount of turf managed by Newport News Waterworks property. As a result, the city reduced fertilizer used to maintain turf.
- **Springfield Township, Montgomery County, Pennsylvania.** The county parks are not treated with fertilizer.
- **Cohoes, New York.** No fertilizer is used in City Park.
- **Town of Owego, New York.** The town does not use fertilizers as part of the green space maintenance at Town of Owego Park.

Miscellaneous

- **City of Richmond, Virginia.** The city restricts fertilizer application in accordance with the manufacturer's recommendations.
- **Town of Herndon, Virginia.** The town applies fertilizer in accordance with the manufacturer's recommendations.
- **City of Alexandria, Virginia.** The city applies fertilizer in accordance with the manufacturer's recommendations.
- **New York State General Permit for Stormwater Discharges from MS4s, statewide.** Turf management practice and procedure would be implemented by December 31, 2010. Addresses proper fertilizer application on municipally owned lands including phosphorous application only after a soil test documents that soil concentrations are inadequate.
- **Town of Cortlandt, New York.** The town evaluated current landscaping and lawn care activities for town-owned facilities to identify opportunities to reduce the discharge of fertilizers. Practices include applying fertilizer in accordance with the manufacturer's instructions for application rates and quantities, using slow-release or naturally derived fertilizer, eliminating or drastically reducing the use of phosphorous fertilizer.

Review of Statewide Regulations

This review of statewide urban nutrient management programs and regulations focuses on Delaware, Maryland, New York, Pennsylvania, and Virginia.

Delaware

The Division of Soil and Water Conservation (SWC)[1] is mandated to preserve and protect the state's soil, water and coastal resources. It manages Delaware's shoreline, coastal zone, and navigable waterways by regulating coastal and urban land use and construction activities, and by promoting wise agricultural and urban land management practices. SWC promotes water management practices to preserve agricultural interests, protect urban communities, and provide for public safety.

The Delaware Nutrient Management Act (Title 3, Chapter 22 of the Delaware Code) was enacted in June 1999 as an effort to address water quality concerns. The main points of the Act are (Delaware Nutrient Management Commission 2006):

- To regulate activities involving the generation and application of nutrients to (1) help improve and maintain the quality of Delaware's waters and (2) meet or exceed federally mandated water quality standards in the interest of the overall public welfare
- To establish a certification program that encourages the implementation of BMPs in the generation, handling, or land application of nutrients
- To establish a nutrient management planning program
- To formulate a systematic and economically viable nutrient management program that will maintain agricultural profitability and improve water quality

The Delaware Nutrient Management Commission developed the *Water Quality BMPs: Nutrients, Irrigation and Pesticides for Golf Course, Athletic Turf, Lawn Care and Landscape Industries* (2006), which contains guidance or regulations on fertilizer use on golf courses.

- For high maintenance areas, no more than 3 pounds of nitrogen per year per 1,000 square feet (131 pounds per acre) maybe applied, of which no more than 1 pound of nitrogen per 1,000 square feet (44 pounds per acre) may be applied in a single application. For site-specific reasons, the annual total nitrogen application may exceed 3 pounds per 1,000 square feet per year with written justification by a certified consultant. The following recommendations are based on the maintenance degree and turf species. High and low maintenance must be determined by each area and should represent management intensity including mowing, travel, stress levels, compaction, pest pressure, irrigation, and others.
- No more than 2 pounds of phosphorous as P_2O_5 per 1,000 square feet (87 pounds per acre) per year may be applied unless justified by a certified nutrient consultant. For soil phosphorus levels greater than 150 fertility index value (or University of Delaware

[1] http://www.dnrec.delaware.gov/swc/Pages/AboutUs.aspx. Accessed April 16, 2012.

equivalent to P, to pounds P/acres, by Mehlich-3 soil test), the application rates may not exceed 1 pound/1,000 square feet per year; and
- No fertilizer shall be applied within 10 feet of the vegetative edge of any stream, pond, lake, river or any drainage conveyance or stormwater management facility.
- No nitrogen fertilizer may be applied on frozen ground or from December until February, however there might be situations where the above standards are not practical for business operations. In these situations, a nutrient management plan approved by a certified consultant is recommended.

If nutrients are applied to 10 acres or greater of combined lands or water owned, leased or otherwise controlled by such handler, a Nutrient Management Certification—through the Department of Agriculture—is required.

Golf Courses

For golf courses and athletic fields, improperly located mixing pads facilitate nutrient transport. In Delaware surveys, as reported by superintendents, overflow from runoff/irrigation ponds could enter wetlands on 21 percent of golf courses and 37 percent of golf courses runoff/irrigation ponds could enter surface waters (Delaware Department of Natural Resources. 2012).

- Estimated total golf course acres in Delaware = 3,762 (range of 24–400 acres)
- Total Delaware golf course acreage in greens and tees = 290
- Reported application rates are within rates the University of Delaware Soils Lab recommends
  - *Greens* receive 5–30 applications: 0.125–1.0 pounds N/1000 ft^2
  - *Tees* receive 4–8 applications: 0.16–1.0 pounds/1,000 ft^2/yr
  - *Fairways* receive ≤ 4 applications: 0.33–1.0 pounds/1,000 ft^2/yr
  - *Roughs* receive 0–2 applications: ≤ 1 pound/1,000 ft^2/yr

Maryland

On May 19, 2011, Governor Martin O'Malley signed the *Fertilizer Use Act of 2011*, an environmental law designed to reduce the amount of nutrients washing into the Chesapeake Bay from lawns, golf courses, parks, recreation areas and other non-agricultural sources (MDA 2011). The law limits the amount of phosphorus contained in lawn fertilizer products sold to the public, establishes a training, certification and licensing program for people who are hired to apply fertilizer to nonagricultural landscapes, limits fertilizer amounts applied to turf, and requires the implementation of a homeowner education program about BMPs to be followed when using fertilizers. A county, municipality, or MDA may enforce these requirements for homeowners. MDA has enforcement authority over the fertilizer manufacturers and retailers.

The *Fertilizer Use Act of 2011* will be implemented in phases over 2 years—fully implemented by October 1, 2013—by MDA and the University of Maryland (MDA 2011). Highlights of *Fertilizer Use Act of 2011*(MDA 2011):

- Restricts phosphorus amounts in lawn fertilizer with certain exceptions for specially labeled starter fertilizer and organic fertilizer products.

- Decreases the total amount of nitrogen that may be applied to turf and specifies that 20 percent is to be applied in a slow-release form.
- Prohibits labeling a fertilizer product as a deicer.
- Requires fertilizer products to contain the following statement, "Do not apply near water, storm drains or drainage ditches. Do not apply if heavy rain is expected. Apply this product only to your lawn and sweep any product that lands on the driveway, sidewalk, or street, back onto your lawn."
- Establishes the State Chemist Section of MDA, as the enforcement authority for content and labeling requirements.

Turf grass

Nutrient management laws passed by the Maryland Legislature in 1998 require that University of Maryland nutrient management guidelines be followed on state property and certain commercially managed turf grass sites. The annual nitrogen requirements for maintaining established stands of the most common turfgrass species grown in Maryland generally fall into the ranges listed in Table 3 below.

Table 3. Total nitrogen annually (pounds N/1,000 ft^2)

Season	Grasses	Years 1–2	Subsequent years
Cool Season	Kentucky bluegrass	3.0–4.5	3.0–4.0
Cool Season	Turf-type tall fescue	3.0–4.0	2.0–3.0
Cool Season	Fine fescue	1.0– 3.0	0–2.0
Cool Season	Perennial Ryegrass	3.0–4.0	3.0–4.0
Warm Season	Bermudagrass	3.0–4.0	3.0–4.0
Warm Season	Zoysiagrass	1.0– 3.0	0–2.0

Source: Turner 2003.

Golf Courses

Approximately 16,400 acres of maintained grass exist in golf courses in Maryland, of which approximately 6,360 acres are considered receiving moderate to intensive management (Turner 2007). The remaining acres receive less intensive management, including no to moderate rates of fertilization. The maintained grass is often surrounded by large areas receiving no or minimal management inputs, including non-mowed and forested areas. Research has shown that properly fertilized and maintained grass on golf courses will have minimal impact on elevating nitrogen and phosphorus levels of ground or surface water (Turner 2007). However, it is imperative that a sound nutrient management plan be implemented on each course.

New York

The New York State Department of Environmental Conservation (DEC)[2] is responsible for chemical and pollution control to protect New York's natural resources. The New York portion of the Chesapeake Bay watershed consists of the Chemung and Susquehanna River basins and

[2] http://www.dec.ny.gov/25.html. Accessed April 16, 2012.

includes more than 6,250 square miles in 19 counties. New York makes up about 10 percent of the total bay watershed (NY DEC 2006).

The New York State *General Permit for Stormwater Discharges* from municipal separate storm sewer systems (MS4s) was originally issued in April 2010 and became effective May 1, 2010. Turf management practice and procedure would be implemented by December 31, 2010. The permit addresses proper fertilizer application on municipally owned lands, including phosphorous application only after a soil test documents that soil concentrations are inadequate. A January 2012 decision from the Westchester Supreme Court, in Westchester County, New York ruled that the 2010 *General Permit for Stormwater Discharges* from MS4s violated the Clean Water Act (CWA) and the provisions of New York law (Shiah 2012).

Stormwater Management Program (SWMP) Plan

The SWMP Plan describes the program implemented to protect New York water quality from stormwater runoff from State-owned highways, roadsides, rest areas, and maintenance yards. The New York State Department of Transportation (NYSDOT) revised the state standard landscape specifications to better reflect more sustainable practices.

Fertilization guidelines prohibit reapplying fertilizer where roadside slopes are stable and where exposed rock or clean gravel does not permit the growth of grass. Granular commercial fertilizer should be used; such as 10-6-4, 10-10-10 or 10-20-10. Application can be done in the spring between April 1 and June 1 and in the fall from August 15 to October 1 in most areas of the state (NYSDOT 2011).

Pennsylvania

The Pennsylvania Lawn Fertilizer Bill (SB 1191) has been introduced, but at the time of this document, is still pending in the Pennsylvania State Senate. The bill applies only to fertilizer applied to turf and prohibits local regulation of turf fertilizer and to turf care at locations such as private residences, business, golf courses, public properties and others; but does not apply to fertilizer used in agricultural production or commercial sod production (Chesapeake Bay Commission 2012).

Content and Labeling Restrictions

No fertilizer product may be labeled for uses as a deicer. Fertilizer cannot contain more than 0.7 pound of readily available nitrogen and cannot be applied at a rate more than 0.9 pound total nitrogen per 1,000 ft^2 of application. At least 20 percent of applied nitrogen must be slow-release nitrogen, except enhanced-efficiency nitrogen fertilizer may contain up to 2.5 pound of nitrogen per application with a monthly release rate not to exceed 0.7 pound of nitrogen per 1,000 ft^2.

Phosphorus cannot be used in fertilizer, except (Chesapeake Bay Commission 2012)

- When specifically labeled for providing nutrients as determined by a soil test, re-establishing or repairing turf, or establishing vegetation.
- When the product is a natural organic fertilizer, organic base fertilizer, or enhanced-efficiency phosphorus fertilizer, in which case the phosphorus content cannot exceed 0.25 pound phosphorus per 1,000 ft^2 with an annual maximum of 0.5 pound phosphorus per 1,000 ft^2.

Labels must contain the statement, "Do not apply near water, storm drains or drainage ditches. Do not apply if heavy rain is expected. Apply this product only to your lawn and sweep any product that lands on the driveway, sidewalk, or street, back onto your lawn." (Chesapeake Bay Commission 2012).

Fertilizer application is not permitted to frozen (to a depth of 2 inches), snow-covered ground, or impervious surfaces. Lawn fertilizer cannot be applied before March 1 or after November 15. Professional applicators may apply fertilizer after the November 15 or before March 1 at the reduced rate of less than 0.5 pound/1,000 ft², subject to the restrictions for frozen or snow-covered ground. Fertilizer cannot be applied within 5 feet of the top of a bank of a perennial or intermittent stream. No phosphorus may be applied to soil when a recent (within 3 years) soil test indicates a soil phosphorus level equal to or greater than 200 ppm according to a Mehlich-3 test or equivalent.

Professional applicators must be certified by the Pennsylvania Department of Agriculture (PDA) or be acting under the supervision of a certified professional fertilizer applicator that is present or immediately accessible.

- PDA must recognize a third party's training program if it meets all the criteria established for the PDA program.
- PDA must, to the maximum extent practicable, align fertilizer certification requirements with the education and training opportunities for commercial applicators of pesticides
- PDA may require continuing education and training of professional applicators.
- PDA must keep a list of certified professional fertilizer applicators and publish list on its website.

Civil penalties may be assessed of no more than $50 per person for each violation. The PDA may suspend or revoke the certification of a professional applicator for a violation. All the monies received from certification fees and penalties will be paid into the Agronomic Regulatory Account established under section 6725 of Title 3.

Virginia

Virginia DCR runs the Water Quality Improvement Agreement Program[3] (for urban lawn care retailers and lawn care companies. Businesses in the program offer their customers information about lawn care or applying nutrients within established criteria that minimize nutrient loss by controlling application rates and timing.

Urban Nutrient Management Planner Training and Certification was initiated in fall 2009. The *Urban Nutrient Management Handbook* [4] was developed to support the training effort.

Since 1985, nitrogen and phosphorus loadings have been reduced by 24 percent and 37 percent, respectively, despite an increase in population of approximately 2 million people in Virginia (VA DCR 2010).

Examples of aggressive nutrient reduction strategies in Virginia are listed below (Goatley 2010).

[3] http://www.dcr.virginia.gov/stormwater_management/nutmgt.shtml. Accessed April 16, 2012.
[4] http://pubs.ext.vt.edu/430/430-350/420-350_sml_pdf.pdf. Accessed April 16, 2012.

- Virginia Department of Agriculture and Consumer Services will publish a list of contractor-applicators who have completed required training and encourage consumers to consult the list when hiring a lawn care professional (part of the Certified Fertilizer Applicator program)
- Beginning December 31, 2013, no lawn maintenance fertilizer containing phosphorus can be registered in Virginia. Retailers will be allowed to sell any existing inventory. This will not affect starter fertilizers with phosphorus.
- Contractor-applicators who are in compliance with training and nutrient management standards cannot be regulated by local government with regard to fertilizer use and application.
- Annual reporting by contractor-applicators is limited to those who apply lawn fertilizer on more than 100 acres beginning in calendar year 2012.
- Virginia Standards and Criteria provide for total application levels of water soluble nitrogen up to 1 pound N/1,000 ft^2 (depending on the timing, source, and such).

Golf Courses (Goatley 2010)

- As promoted by the golf course industry, all courses must have a nutrient management plan by 2017 and DCR is to create a cost-share program by 2015 to help with the expense.
- Golf courses that have a nutrient management plan cannot be regulated by local government with regard to fertilizer use and application.

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Virginia Cooperative Exten-

A partnership of Virginia Tech and Virginia State University

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May 14, 2012

Stormwater Site Visit Report

Site: All Saints' Anglican Church **GPIN:** 8291-54-6654

Contact: Kerry Walters, Parish Executive

To whom it may concern,

It was requested by the staff at All Saints' Anglican Church that Virginia Cooperative Extension (VCE) Prince William conduct a stormwater site visit and assistance with landscape recommendations for the property listed above.

A site visit was conducted on March 30, 2012 by VCE Staff, Master Gardener Volunteers, Mr. Kerry Walters, and church representatives, Ron Van Houtan and John Jagielski. After the site visit, Master Gardener Volunteers returned to the property to take soil samples from the pre-approved areas listed in the report.

The attached report contains detailed Nutrient Management Plans (NMPs) based on these soil tests as well as recommendations from Extension staff based on concerns of the site representatives and discussion during the site visit. The five soil tests were paid for by Teresa Blecksmith, Master Gardener Volunteer and church member.

We appreciate your interest in managing these sites with a focus on sustainability and environmental responsibility.

By participating in this program, conducting a parking lot clean up with documentation, and returning a signed copy of this cover sheet within 90 days of the date on the report, you are eligible to receive a 20% rebate on your stormwater fees for 2012 in 2013 for the property(s) listed above.

Should you have any questions, please contact our office.
Thank you,

Paige Thacker
Extension Agent, Horticulture

All Saints' Angligan Church intends to implement nutrient management plan and the practices recommended in the attached site visit report to the best of our ability.

Signed: _____ Date:_____

Virginia Cooperative Extension

A partnership of Virginia Tech and Virginia State University

VirginiaTech
College of Agriculture and Life Sciences

VIRGINIA STATE

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Stormwater Site Visit Report – All Saints' Anglican Church

All Saints' Anglican Church contacted Virginia Cooperative Extension for assistance with stormwater and landscape practices on their property. A site visit was done on March 30, 2012 with Extension staff and Master Gardener Volunteers Teresa Blecksmith and Don Peschka as well as church representatives Ron Van Houtan and John Jagielski and Kerry Walters, Parish Executive. Concerns expressed were in the areas of erosion control, turf and landscape maintenance and condition of existing plantings. Additionally, there are forested areas, a stormwater pond and areas that the church would like to develop a sports playing field, a community garden, and an outdoor amphitheater in the future. Staff from the church expressed interest in having a welcoming entrance to the church with landscape design mirrored on both sides of the entrance. Staff was open to suggestions regarding alternatives to turf for several areas as funds become available in the future. Recommendations in this report will include some of those suggestions.

General Comments

Any changes in planting on the property should reference the planting requirements in the original site plan developed with Prince William County. In addition to the plants recommended in this report, you may refer to additional plant lists in the Buffer Areas, Landscaping & Tree Cover Requirements section of the Prince William county Design and Construction Standards Manual http://www.pwcgov.org/government/dept/planning/Pages/DCSM.aspx

All Saints' Church is a newly built property on over 27 acres on Gideon Drive in Woodbridge. This property adjoins Hylton Chapel. The church began operating in this new building in the fall of 2011.

For all planting recommendations regular irrigation of 1" per week is necessary until plantings are established when rainfall is insufficient. Gator bags for trees can also be considered, but be checked at each filling to ensure that the bags are draining properly and to inspect for signs of pests under the bag. Gator bags are designed to deliver slow watering to the roots over 4-5 hours, rather than creating run-off. Planting areas should be amended according to the soil rest recommendations noted in the nutrient management plans that accompany this report.

Care should be taken to ensure trees and shrubs planted are at the appropriate planting depth and mulched correctly. Mulch should not exceed 3 inches in depth and should be at least 1 inch from the trunk. Ideally, mulch should extend out to the dripline of the tree, or as far as is practical. Over mulching can lead to disease issues and severely affect the health of trees and shrubs. It is recommended that native plants to the Piedmont
Region of Virginia be used as much as possible, since these are well suited to native soils and climate. Natives also tend to be more drought tolerant after initial establishment. During establishment they require 1" of irrigation per week when rainfall is insufficient. Please refer to this publication for lists of suitable plants http://www.dcr.virginia.gov/natural_heritage/documents/pied_nat_plants.pdf

Trees and turf grass are commonly planted together in landscapes. These two plants are incompatible and interfere with one another, above ground and below. Turf grass can severely retard tree growth in terms of competition for water, light and nutrients and “allelopathy”, which refers to one plant inhibiting the growth of another. Urban situations usually restrict trees' lateral root spread with foundations and pavements. Poor aeration

or drainage of clayey soils prevents root development in deeper soil layers. Reduction of fine tree roots by competing turfgrass compounds the problem. A tree with a poorly developed root system has a reduced ability to absorb moisture and nutrients from the soil. Most absorbing tree roots are in the upper few inches of soil and are quite shallow, and they spread well beyond the dripline when unrestricted. Roots will grow where the conditions are best for root growth; in most cases, that is near the soil surface. Oxygen, nutrients, and moisture are usually best near the surface, so the roots of trees, turf, and other plants share this space. Removing turf near trees and mulching to the dripline will help to correct this competition.

General Nutrient Management Recommendations

Fertilizer rates vary by plant type. Some areas should be fertilized annually, some more often and some less often. Lime applications are used to balance the soil pH to a range suitable for plant growth and uptake of nutrients. Depending on the type of plants grown and the existing soil chemistry, lime may or may not be needed. Soil pH changes over time. It is recommended that soil be re-tested every three years. Re-testing will keep soil in a range where plants are best able to absorb necessary nutrients. Only 50 lbs of lime per 1,000 square feet can be absorbed at any one time. Where liming rates exceed this, the total amount of lime is broken into multiple applications. There applications should be made at least 30 days apart and longer if the weather has been dry. Lime can be applied anytime that the ground is not frozen.

Urban soils, in general, are generally low in organic matter. Organic matter helps drive nutrient cycling and promotes beneficial organisms in the soil. Additionally, it can help with water handling in times of both drought and deluge. Adding organic matter annually benefits all types of plants. Compost can be added any time of year either as a top dress application or by incorporating into soil at planting time. Turf is a high maintenance, high input crop. In the future, conversion of areas to non-turf plantings can be considered to lessen maintenance cost to the church and the environment.

Nutrient Mangement Plan Recommendations – Five soil samples were taken at the All Saints’ Church property and the areas: Zones 1-4 and Zone C, are roughly demarcated on the chart and map below:

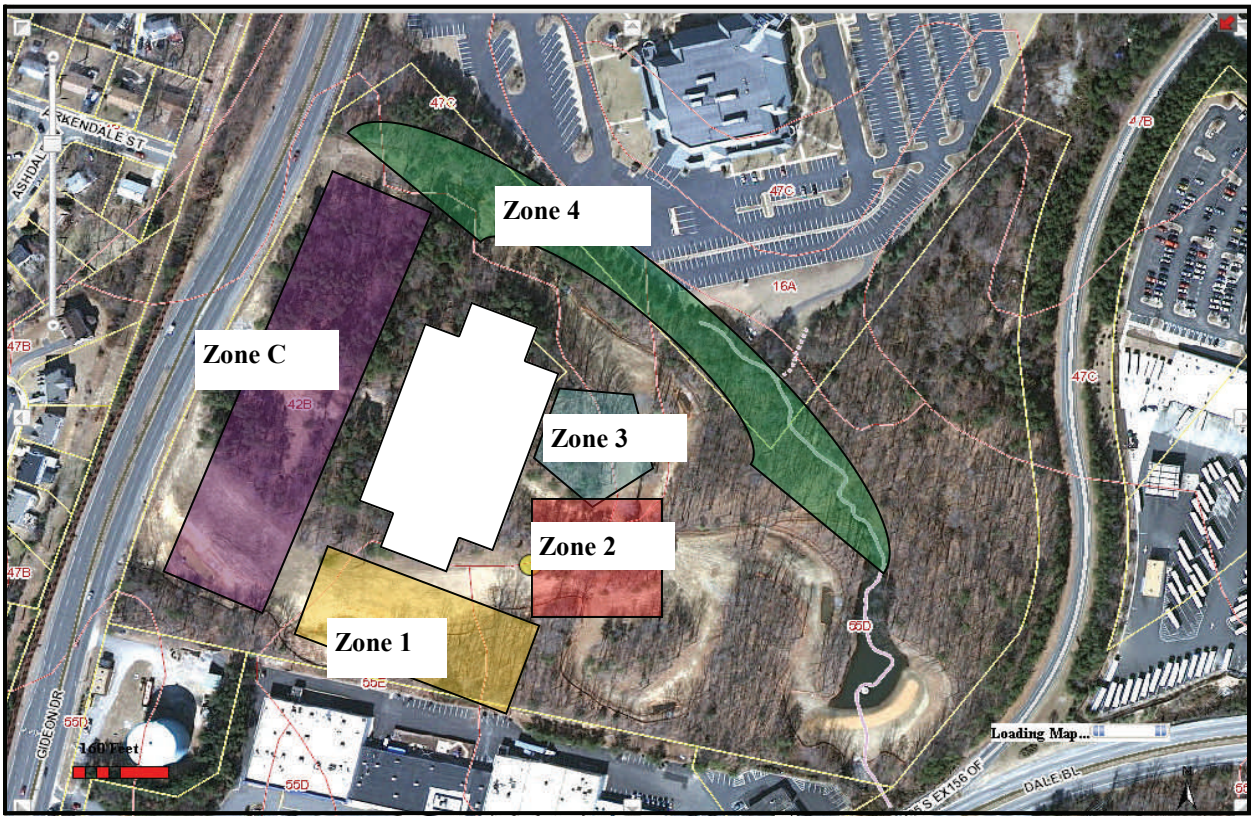
Sample	Area sq.	Color	Sampled for
Zone 1	13,521	Yellow	Cool season turf maintenance
Zone 2	196,484	Red	Cool season turf maintenance
Zone 3	13,920	blue	Cool season turf maintenance
Zone 4	1,850	green	Warm season grass establishment
Zone C	97,642	purple	Cool Season grass maintenance

Zone 1

This area is located on the side of the church facing Ashdale Plaza and is 13,521 sq. feet. It is a sloped area with predominantly cool season turf with significant weed presence including winter and spring annuals, crown vetch, and plantains.

Cool season turf varieties are best fertilized in the fall. The recommended rate is for two applications of 1 lb of nitrogen at least 30 days apart during the window of September 1st through November 30th. Please see the attached Nutrient Management Plan that lists several readily available turf-type fertilizer formulas to choose from with specific amounts of product. If another formulation is used, it should be balanced to apply 1 lb of nitrogen for each of the fall applications. The plan also includes an optional light fertilizer application of ½ lb of nitrogen in early spring. This spring fertilization can provide some improved performance, but the drawback is an increased need for mowing and an increase of fungal diseases.

The pH for this area is 5.4 and requires 3 applications of lime with the first two applications of



676 lbs and a third application of 270 lbs for the third application – all thirty days apart. Soil can only absorb 50 lbs of lime per 1,000 square feet every 30 days. An excess of 50 lbs of lime per application will damage the turf and the surrounding watershed. Lime application is NOT to be considered annual maintenance. Retest soil in 3 years and only apply lime if test results indicate lime is needed. Top-dressing the area annually with ¼ inch of fine textured compost to enhance microbial activity and improve soil texture is recommended. This area would need approximately 10.5 yards of compost annually. This is typically applied with the 1st application

of fertilizer. Annual core aeration is also recommended. If there are drought conditions, please irrigate the area first before attempting to core aerate.

This landscape area has two holly trees that were donated to the church, but no other plantings. In the future, staff may consider converting the slope to ornamental grasses or groundcovers for ease of maintenance so that church members will not have to risk mowing. Grasses such as those shown in the chart below would be appropriate for this area.

Botanical/common name	height	Environmental tolerances	Conditions	Associated problems/ comments
Andropogon virginicus broomsedge	1-3'	DR, WS	full sun	Useful for meadow or natural setting
Andropogon gerardii big bluestem	2-6'	DR; erosion control,	full sun to partial shade	Useful for meadow or natural setting. Occasional mowing needed to keep this grass contained
Calamagrostis x acutiflora - feather reed grass	3-4'	Drought tolerant; tolerant varied soils/conditions	full sun	Smaller cultivar – 'Overdam'
Molinia litorialis Tall purple moor grass	2-3'	average to poor soil;	full sun	
Panicum virgatum 'Dallas Blue', 'Heavy Metal', 'Hanse Herms' 'Prairie Sky' 'Rehbraun'		average to poor soil;	full sun	
Phalaris arundinacea Ribbon Grass	2-3'	Moderately drought tolerant	full sun to partial shade	
Schizachyrium scoparium or Andropogon scoparius - little bluestem	1.5-4'	tolerates poor soil	full sun	Useful for meadow or natural setting
Achnatherum calamagrostis Silver Spike Grass	2-2.5'		needs well drained soil, full sun	
Arrhenatherum elatius	1-2'	DR	full sun to partial sun	needs to be cut back in summer
Calamagrostis x acutiflora 'Stricta' Feather Reed Grass	up to 5'	Tolerates average soil	full sun to partial sun	
Carex morrowii 'Aurea Variegata'	1- 1.5'	acidic, rich soil	full sun to partial shade	
Deschampsia caespitosa Tufted Hair Grass	1.5-2'		full sun to partial shade	
Festuca ovina Blue Fescue	.5-1'	well drained soil	full sun	
Imperata cylindrica Japanese blood grass	1-1.5'	well drained soil	partial shade	
Koeleria macrantha	1'	tolerates poor or well drained	full sun	
Pennisetum alopecuroides Fountain Grass	3-4'	fertile soil; adequate moisture needed	full sun	Hamln, "Little Bunny", small cvs.
Pennisetum villosum Feather top	1.5-2.5'	fertile soil; adequate moisture needed	full sun to partial shade	
Pennisetum japonicum	3-4'	Drought tolerant; tolerant of varied soils	full sun	
Themeda triandra japonica Japanese themeda	2-3'	Drought tolerant; tolerant of varied soils	full sun to partial shade	
Sorghastrum nutans 'Sioux Blue'	3-5'	tolerant of varied soils	full sun	blooms August with good winter color
Spodiopogon sibericus	3-4'	not drought tolerant	light shade	red/burgundy fall color
Saccharum ravennae Ravannae grass	.5-1.5'	best in well drained soils	full sun	bronze color in winter
Bouteloua gracilis Mosquito grass	1.5-2'	Drought tolerant; suitable for xeriscaping	full sun	blooms mid-late summer; early fall
		well-drained,		

Alternately, groundcovers such as *Hypericum calycinum*, *Hemerocallis spp*., *Abelia x grandiflora 'Prostrata', Gelsemium sempervirens*, *Juniperus communis, J. conferta, J. horizontalis, Oenothera speciosa,* or *Sedum spp.* could be considered.

Zone 2

This 196,484 sq. foot area near the church building may eventually be used for an outdoor amphitheater. At the present, the plan is to maintain the cool season turf.

Cool season turf varieties are best fertilized in the fall. The recommended rate is for two applications of 1 lb of nitrogen at least 30 days apart during the window of September 1st through November 30th. Please see the attached Nutrient Management Plan that lists several readily available turf-type fertilizer formulas to choose from with specific amounts of product. If another formulation is used, it should be balanced to apply 1 lb of nitrogen for each of the fall applications.

The plan also includes an optional light fertilizer application of ½ lb of nitrogen in early spring. This spring fertilization can provide some improved performance, but the drawback is an increased need for mowing and an increase of fungal diseases. This area has a pH of 5.3 and requires 2 applications of lime of 9,824 lbs, thirty days apart. An excess of 50 lbs of lime per application will damage the turf and the surrounding watershed. Top-dressing the area annually with ¼ inch of fine textured compost to enhance microbial activity and improve soil texture is recommended. This area would require approximately 152 yards of compost. Annual core-type aeration is also recommended.

Zone 3

This area is located in the back of the church and is 13,920. It is a fairly flat area that may be used in the future for a sports field.

There was significant weed presence including winter and spring annuals, crown vetch, and plantains. Cool season turf varieties are best fertilized in the fall. The area was soil sampled for cool season turf. Cool season turf varieties are best fertilized in the fall. The recommended rate is for two applications of 1 lb of nitrogen at least 30 days apart during the window of September 1st through November 30th. Please see the attached Nutrient Management Plan that lists several readily available turf-type fertilizer formulas to choose from with specific amounts of product. If another formulation is used, it should be balanced to apply 1 lb of nitrogen for each of the fall applications. The plan also includes an optional light fertilizer application of ½ lb of nitrogen in early spring. This spring fertilization can provide some improved performance, but the drawback is an increased need for mowing and an increase of fungal diseases. The pH for this area is 5.1 and this area requires 7 applications of lime of 696 lbs for applications 1 through 5 and a final application of 139 lbs. Applications should be spaced thirty days apart, and can be done anytime the ground is not frozen. Please see attached Nutrient Management Plan for Zone 2 for the quantity of bags of lime needed. An excess of 50 lbs of lime per 1000 square feet will damage the turf and the surrounding watershed. Lime application is NOT to be considered annual maintenance. Retest soil in 3 years and only apply lime if test results indicate lime is needed. Top-dressing the area annually with ¼ inch of fine textured compost to enhance microbial activity and improve soil texture is recommended.
This area would require approximately 10.8 yards of compost annually. This is typically applied with the 1st application of fertilizer. Annual core-type aeration is also recommended annually.

Zone 4

This 1,850 square foot area is parallel to a convex drainage area that seems to serve as a stormwater run off area for both All Saints and Hylton Chapel. This approximately 15-25% slope is characterized by Watt channery silt loam riparian zone and runs from a trail from the church to the stormwater pond. The Prince William County Soil Survey indicates that surface run off potential in these soils is rapid and the erosion hazard is "severe". The area surrounding this drainage area is typified by a mixture of mature hardwoods, understory shrubs and vines, invasive plants and cool season turf with some bare areas and a foot path with no vegetation. There are issues with trash accumulating in this area and overnight homeless visitors. Due to the sloping conditions and potential for erosion, it is recommended that native warm season grasses be considered for this area. The addition of permanent trash receptacles in this area may help with the litter problem.

This soil area was sampled for warm season turf, which is best fertilized in late spring through summer. The plan recommends 2 fertilizer applications of 1 lb of Nitrogen per 1000 square feet applied 30 days apart after spring green up, (typically one in late April and one in late May). Please see the attached Nutrient Management Plan that lists several readily available fertilizer formulas to choose from with specific amounts of product. These recommendations are based on a 1-2-1 formulation. If another formulation is used, the amounts will need to be adjusted. Please contact our office for assistance with recalculating. The plan also includes two optional fertilizer applications in June and July. These applications may increase performance, but will also increase the need for mowing.

This area has a pH of 5.6 and requires 4 applications of lime of 93 lbs for applications 1 through 3 and a final application of 74 lbs. Applications should be spaced thirty days apart, and can be done anytime the ground is not frozen. Soil can only absorb 50 lbs of lime per 1,000 square feet every 30 days. Please see attached Nutrient Management Plan for Zone C for the quantity of bags of lime needed. An excess of 50 lbs of lime per application will damage the turf and the surrounding watershed. Lime application is NOT to be considered annual maintenance. Retest soil in 3 years and only apply lime if test results indicate lime is needed. Top-dressing the area annually with ¼ inch of fine textured compost to enhance microbial activity and improve soil texture is recommended. This area would require approximately 1.4 yards of compost annually. This is typically applied with the 1st application of fertilizer. Annual core-type aeration is also recommended annually.

Native warm season grasses (nwsg) are historically native to Virginia and when managed properly can provide excellent wildlife habitat for birds and small mammals. Unlike cool season grasses which show active growth during spring and fall, nwsg grow during warmer months of the year. Native warm season grasses for Virginia include big bluestem, little blue stem, Indian grass, eastern gamagrass, and switchgrass and broomsedge. Nwsg communities can be developed by releasing existing native grasses and forbs (wildflowers and beneficial broadleaved plants) from competition with invasive exotics, or by planting nwsg and forbs into a prepared seedbed. Several excellent publications are available for more detailed information on planting and managing nwsg and are available from the Department of Game and Inland Fisheries. The turf in this area now could be maintained in easy to mow areas, but the slopes can be converted to nwsg for ease and safety during maintenance. Treating the area that will be converting to nwsg with herbicide at the proper time of year can release native grasses and forbs from cool-season grass (e.g. fescue) competition. Please note that a Certified Commercial Pesticide Applicator must do any herbicide or pesticide applications on this property. Fes-

cue is best controlled in the fall. Mow the area in late August or September in preparation for spraying herbicide. Allow cool season grasses (fescue) to grow 6-10 inches, and then spray with 2 quarts glyphosate preferably after a killing frost. Spraying at this time will not harm most native grasses and wildflowers since they are already dormant. Cool season grasses must still be green and growing when you spray. Spray on a warm sunny day for best results. Monitor the field for undesirable species (fescue, Johnson grass, serecia lespedeza) and spot spray infestations as soon as possible. Re-treat in spring if necessary. Read and carefully follow all herbicide label directions.

Planting native warm season grasses requires care and patience. There are several critical factors to be aware of to achieve a successful nwsg stand:

- Place at least an 80% product of "pure live seed" no deeper than ¼ inch from May 1 through June 30 in Virginia
- Some seed should be evident on the soil surface
- Ensure that enough vegetation is removed to get good seed/soil contact.
- Weeds that emerge soon after planting must be controlled to avoid competition with nwsg seedlings.
- Use high quality seed. Purchase seed with high germination rates and calculate the amount of pure live seed in the lot before planting.
- Be patient! It can take up to two years before a nwsg stand shows its full potential.
- To establish wildflower and forbs in this area at a later date disc (1 disc wide) scattered strips through the established nwsg, broadcast forb seed, then roll the seed. Partridge pea and black-eyed Susan are some varieties that can be added directly to the nwsg mix.
- Late summer (Sept-November) is the best time to mow these grasses to avoid interfering with nesting birds.

For more information or for seed mixture suppliers please see these publications

http://www.dgif.virginia.gov/habitat/wild-in-the-woods/grow-a-native-grass-meadow.pdf
http://www.portal.state.pa.us/portal/server.pt?open=514&objID=699845&mode=2

Zone C

This area, measuring 97,642 square feet is in the front of the church along Gideon Drive and incorporates the parking lot islands, church roadside sign area, and the trash/recycle bin area. This area has cool season turf at this time, but in the future garden beds for annuals and perennials will be incorporated.

Cool season turf varieties are best fertilized in the fall. The recommended rate is for two applications of 1 lb of nitrogen at least 30 days apart during the window of September 1st through November 30th. Please see the attached Nutrient Management Plan that lists several readily available turf-type fertilizer formulas to choose from with specific amounts of product. If another formulation is used, it should be balanced to apply 1 lb of nitrogen for each of the fall applications. The plan also includes an optional light fertilizer application of ½ lb of nitrogen in early spring. This spring fertilization can provide some improved performance, but the drawback is an increased need for mowing and an increase of fungal diseases. This area has a pH of 5.0 and requires 4 applications of lime of 4,882 lbs, thirty days apart and one final application of 976 lbs. Soil can only absorb 50 lbs of lime per 1,000 square feet every 30 days. An excess of 50 lbs of lime per application will damage the turf and the surrounding watershed.

Top-dressing the area annually with ¼ inch of fine textured compost to enhance microbial activity and improve soil texture is recommended. This area would need about 75.7 cubic yards of compost.

The road frontage is planted with uniform rows of a variety of trees including *Cornus serica and Cornus florida, Quercus, Liquidimbar* and *Cercis canadensis*. Many of these trees have been planted too deeply and too close together. The *Cornus* have scale insects and cankers It is recommended that the infested trees be removed and a third row of alternative trees be added behind the existing row to comply with the Design and Construction Standards Manual requirements for this property. Alternative small to medium sized trees may include: *Acer griseum, Carpinus caroliniana, , Chionanthus virginicus Lagerstroemia indica x fauriei, , Magnolia x soulangiana, , Magnolia virginiana, , Prunus virginiana, , Cladrastis kentuckea.* Please refer to this Virginia Tech Publication for suitable trees for hot sites, such as parking lots. http://pubs.ext.vt.edu/430/430-024/430-024_pdf.pdf

It is also recommended that the trees be irrigated 1" per week if there is insufficient rainfall in that amount. Alternately, gator bags can be used. Gator bags are designed to deliver slow watering to the roots over 4-5 hours, rather than creating run-off. The trees along the property frontage should be joined into one mulched bed for lower maintenance. Please see General Recommendations for mulching/planting instructions. Tree stakes should all be removed in this area and in the parking lot islands.

Incorporating a variety of drifts of native perennials into the traffic islands and turf areas in the future would add beauty and sustainability to this front landscape. The circular island near the front door would benefit from the addition of drought tolerant annuals such as:
Antirrhinum majus
Catharanthus roseus
Celosia cristata
Cosmos bipinnatus
Cosmos sulphureus
Calendula officinalis
Gomphrena globosa
Melampodium paludosum
Nicotiana alata
Petunia x hybrida
Salvia splendens
Salvia farinacea
Tagetes erecta
Tagetes patula
Viola x wittrockiana
Zinnia elegans
Zinnia linearis
Zinnia Profusion series
Zinnia Pinwheel Series

Native perennials for full sun that would be appropriate for this site in the future as time and funds allow, include: *Achillea, Allium, Asclepias, Aster, Baptisia, Chrysogonum virginianum, Coreopsis, Eupatorium, Geranium, Helenium, Helianthus, Heliopsis, Liatris, Monarda, Oenothera, Penstemon, Phlox, Physostegia, Pycnanthenum, Rudbeckia, Sedum, and Solidago.*

A dumpster for recycling is also located in this area and could be trellised with native ornamental vines such as *Bignonia capreolata, Campsis radicans, Celastrus scandens, Clematis virginiana, Lonicera sempervirens, Parthenocissus quinquefolia, or Passiflora incarnata* could be considered to improve the appearance of this area.

The cemetery area is characterized by mature hardwoods and conifers, understory and invasives. Invasives can be hand removed or treated with glysophate in the late fall when the hardwoods are dormant. Understory trees such as *Cercis candadensis*, *Lindera Benzoin, Hamamelis,* or *Cornus florida* or groundcovers could be added to cover bare ground so that the invasive plants do not re-vegetate this area.

The pesticide storage area should remain locked, with warnings posted about its contents. Chemicals stored should be protected from extremely hot or cold temperatures and moisture inside the building. Labels should be easy to read and containers kept closed. Original containers for mixtures should be used. Volatile products should be stored separately. An inventory of chemicals stored should be kept on the premises. Only certified pesticide applicators should be utilizing these chemicals on the property.

Recommendations for Impervious Areas

Stormwater that falls upon and/or runs across impervious surfaces like concrete and asphalt will pick up a variety of pollutants. Keeping hard surfaces frees of leaves, grass clippings; trash and sediments will prevent them from being washed into ponds and streams. Parking areas should be regularly inspected for evidence of automotive fluids to ensure leaks and spills are contained and cleaned before these products are washed into the soil or waterways. Cat litter can be used to absorb most small leaks for easy clean up. Additionally, storm drains should be kept clear of debris to prevent localized flooding. It is important to train staff and volunteers in the proper storage, handling, use and clean up of potential pollutants such as fertilizer, pesticides, paints, gas, road salt, etc. Avoid cleaning paint brushes and containers in a parking lot, gutter, or storm drain. Minimize on-site storage by implementing “just enough product, purchased just in time”. In the winter months, reduce the amount of road salt used on sidewalks and in parking lots, or use ice melt, sand, kitty litter, or ashes to prevent salt damage to plants and aquatic life. Snow should be cleared to the lower end of the pavement to reduce the need for ice melts during the thaw-freeze cycle.

December 21, 2011
Meeting Minutes
Urban Fertilizer Management Expert Panel

EXPERT BMP REVIEW PANEL Urban Fertilizer Management		
Panelist	***Affiliation***	**Present?**
Jonathan Champion	DDOE	Yes
Karl Berger	MWCOG	Yes
Dr. Stu Schwartz	UMBC	Yes
William Keeling	Virginia DCR	Yes
Dr. Gary Felton	U of MD	Yes
Dr. Neely Law	CWP	No, briefed 12/19
Marc Aveni	Prince William County DPW	No, briefed 12/19
Dr. Mike Goatley	Virginia Tech	Yes
John.Schneider/Jenny Volk	DEN REC	Yes
Chris Brosch	CBPO/ U of MD	Yes
Tom Schueler	CSN (facilitator)	Yes
Rachel Streusand	CBPO	Yes
Non - Panelists: Mark Sievers- Tetratech, Norm Goulet (NVRA), Lucinda Powers EPA CBPO		

ACTION ITEMS

Tom to contact fertilizer industry reps to get info on market trends in P-fertilizer sales states w/o P bans in the Bay watershed (DE/DC/WV)

Tom to contact Bevin Buchheister, Chesapeake Bay Commission to get state by state summaries of recent urban fertilizer legislation for panel review.

Gary F to do a mass balance check on the nutrient application rates assumed in Watershed Model (attachment C and Chris Brosch's powerpoint), and provide Stu S his data on yearly non-urban fertilizer sales

Stu S volunteered to do a conceptual model for nutrient mass balance on pervious lands and possible monte carlo approach to estimate uncertainty, and present it at our next meeting

Peter C agreed to Stu S suggestion of comparing his turf estimates in Baltimore City/County with object oriented methods used by Forest Service/University of Vermont as a check.

All panelists agreed to review the P ban modeling assumptions described in Attachment D prior to the next meeting, and be ready to discuss them in detail then.

Tom requested the states to provide their most current nutrient recommendations for lawns

Mark Sievers (tetratech) will compile a spreadsheet bibliography of existing references supplied by Felton, Law, Goatley and Schueler by December 29. Mark will also create a sharepoint system

so panelist's can access the full papers by January 5. the system will have the following topic folders:

- general reviews,
- homeowner behavior,
- urban nutrient management practices,
- nitrogen dynamics on urban lawns,
- phosphorus dynamics on urban lawns,
- p ban impact research
- urban soil considerations
- effective of local outreach efforts changing lawn behaviors

The panel is asked to review the bibliography to identify any important black and grey literature that they feel should be added no later than Tuesday January 10, 2012 .

All new material should be e-mailed to our support consultant, Mark Sievers of tetratech at mark.e.sievers@tetratech.com .

In addition, panelists are asked to nominate individual topic areas for which more google/literature search by Tetratech no later than January 10.

Once the sharepoint system is populated in Mid- January, each panelist is requested to review (a) the general literature reviews (including four new ones) and (b) at least one topic area folder, and be prepared to summarize their results at the next meeting

The panel agreed to meet on Feb 9 for a 3/4 day meeting to review urban fertilizer research with location TBD. Tom will provide a draft agenda for the research review by January 9, including coordinating with EPA modelers

1. **Call to Order and Panelist Introductions**

Tom Schueler called the meeting to order @10:08

2. **Review of the Charge for the Panel, the BMP Panel Review Process and Panelist Responsibilities**

Each of the panelists introduced themselves and explained their background in urban fertilizer management practices in their jurisdiction. Tom briefly outlined the BMP review panel protocol by which the panel would conduct its business, and asked the panel whether they understood their role and had any questions about the protocol. **The panel** concurred with the protocol process.

Tom then outlined his role was to facilitate the panel, organize the research and methods, and document its progress, but not be involved in the decision-making process. Tom's role will be shifted over to Rachel Streusand in the coming meetings.

Tom indicated that the under the BMP review protocol, the panel's final product it would be a technical memorandum that describes the definition, rates, qualifying conditions and reporting mechanisms with an appendix that summarizes the scientific data evaluated.

The Panel then discussed and approved the draft charge for the urban fertilizer management panel, with the amendment proposed by **Jen Volk** of DE to evaluate the impact of decreased P-fertilizer sales in states that have not yet adopted a fertilizer P ban law. **Tom** will distribute the revised charge to the panel.

The panel concluded that while it was necessary to develop a general definition of urban nutrient management, it was not within its charge to make specific recommendations, as many states were in the process of revising their state-specific extension recommendations... Tom requested the states to provide their most current nutrient recommendations for lawns

3. **Background: How turf and pervious lands are estimated/simulated in the Watershed**

Peter Claggett describe the methods used to measure the extent of pervious lands and turf grass within the watershed (see attached presentation). **Chris** then described how nutrient and sediments are simulated on pervious lands, with a specific focus on how urban fertilizer applications are estimated/simulated. **Chris** concluded by describing the technical assumptions for recent Watershed Model Runs that have evaluated the effect of state-wide fertilizer P-bans. (see attached presentation) .

The panel had numerous questions and suggestions:

Gary F to do a mass balance check on the nutrient application rates assumed in Watershed Model (attachment C and Chris Brosch's powerpoint), and provide **Stu S** his data on yearly non-urban fertilizer sales

Stu S volunteered to do a conceptual model for nutrient mass balance on pervious lands and possible monte carlo approach to estimate uncertainty, and present it at our next meeting

Peter C agreed to **Stu S** suggestion of comparing his turf estimates in Baltimore City/County with object oriented methods used by Forest Service/University of Vermont as a check.

All panelists agreed to review the P ban modeling assumptions described in Attachment D prior to the next meeting, and be ready to discuss them in detail then.

Bill K volunteered to send his Virginia P-Ban model results to the panel

4. **Review of Recent Literature on Urban Fertilizer Management** *The* Panel agreed on the following approach to conduct the literature review

Mark Sievers (tetratech) will compile a spreadsheet bibliography of existing references supplied by Felton, Law, Goatley and Schueler by December 29. He will also create a sharepoint system so panelist's can access the full papers by January 5. the system will have the following topic folders:

- general reviews,
- homeowner behavior,
- urban nutrient management practices,

- nitrogen dynamics on urban lawns,
- phosphorus dynamics on urban lawns,
- p ban impact research
- urban soil considerations
- effective of local outreach efforts changing lawn behaviors

The panel is asked to review the bibliography to identify any important black and grey literature that they feel should be added no later than Tuesday January 10, 2012 . All new material should be e-mailed to our support consultant, Mark Sievers of tetratech at mark.e.sievers@tetratech.com . In addition, panelists are asked to nominate individual topic areas for which more google/literature search by Tetratech no later than January 10.

Once the sharepoint system is populated in Mid- January, each panelist is requested to review (a) the general literature reviews (including four new ones) and (b) at least one topic area folder, and be prepared to summarize their results at the next meeting

Thursday Feb 9, 2012
Meeting Minutes
Urban Fertilizer Management Expert Panel
Research Review Meeting

EXPERT BMP REVIEW PANEL Urban Fertilizer Management		
Panelist	***Affiliation***	**Present?**
Jonathan Champion	DDOE	Yes
Karl Berger	MWCOG	Yes
Dr. Stu Schwartz	UMBC	Yes
William Keeling	Virginia DCR	Yes
Dr. Gary Felton	U of MD	Yes
Dr. Neely Law	CWP	Yes
Marc Aveni	Prince William County DPW	No
Dr. Mike Goatley	Virginia Tech	No
Gary Shenk	US EPA CBPO	Yes
Tom Schueler, Cecilia Lane	CSN (facilitator)	Yes
Rachel Streusand	CBPO	Yes
Non - Panelists: Mark Sievers- Tetratech, Norm Goulet (NVRA), Lucinda Power EPA CBPO		

ACTION ITEMS

Rachel will work with **Mark Sievers** to upload power points and added literature from the meeting to the panel share point site
Tom will contact **Mark A and Mike G** to make sure they can make the next scheduled panel call on March 8

Rachel will follow up with **Mark Aveni** to see if he was able to review homeowner behavior papers and report back to Neely if he concurs with her summary.
Mark Sievers will get Tetra-tech staff to commence a literature search on (a) programs to limit fertilizer applications on public lands, with an emphasis on specific changes in local landscaping, purchasing and contracting policies that reduce the frequency of un-needed fertilizer applications (b) on impact of local outreach campaigns to change homeowner behavior on lawn fertilization and how it may be measured.
Norm will look into NoVa research on homeowner lawn behavior and share it with the panel if it is useful
Norm will look into any survey research on fertilizer use on municipal lands in Northern Virginia
Norm will talk to NFWF about getting better and up to date homeowner behavior survey data in Bay watershed and make this a research priority in their future grants
Neely will do some additional (limited) research to see whether long standing phosphorus ban in upper Midwest are still providing water quality benefits.
Gary Shenk will follow up with **Bill Keeling** on VA P ban model run
Tom will e-mail **Gary** about the technical model assumptions for how monthly urban fertilizer applications are distributed across the year
Gary Felton may provide about 5 additional papers to support the literature review in the next week or so.
Gary to share his PowerPoint on the details of Bay state P bans with **Tom** who will share it with panel, and include a summary of it in final report
Gary and Stu will cross-check non-ag fertilizer sales data from industry (Scotts +Vigoro) and state reports to see if they are in line with CBWM application estimates (circa 2008-2009
Tom will revise **Mike's** UNM straw man, and share it with him prior to the next meeting.
The papers provided by **Mike** prior to today's meeting will be added to the literature database
Karl will re-analyze lawn research to see if there are increased sediment and phosphorus load risk for un-fertilized (N) lawns, and discuss implications for decoupling N and P
Stu will work with tom to further work on lawn targeting breakout category for nitrogen credits
Stu to work with **Gary F** on his item above
Bill will summarize modeling issues for Gary S, and figure out why his P ban effect is lower than CBWM...Bill to take lead on panel on CBWM 2017 model improvements.
Tom will check with Scotts to check whether P fertilizer sales are also declining in non-ban Bay states, and whether industry phase out of P fertilizer is scheduled to occur (and what conditions in the future could prompt its return

MEETING MINUTES

Rachel Streusand called the meeting to order at 10:05 AM

Tom noted to the Panel that the Bay states are collectively relying quite heavily on the use of "urban nutrient management" -- in nearly 1.5 million acres of land in the watershed in their Phase 2 watershed implementation plans, which makes it extremely important for the panel to derive accurate rates.

Tom also expressed thanks to **Rachel** for her support work on the Panel, and indicated that her 3 year CRC fellowship would be expiring soon. **Cecilia Lane**, of CSN, along with **Mark Sievers** (Tetratech) will take over that responsibility at the next meeting

Background: Additional Information on Simulation of Pervious Lands. *Gary Shenk provided additional information on how nutrient and sediments are simulated on pervious lands in the context of the CBWM.*

- No manure goes on urban land, does not account for pets or geese
- BMPs continue to have an effect even in a large storm event, maximum 80% reduction in effectiveness, always have 20-30% effect – consider for 2017
- The panel discussed how atmospheric deposition rates influence inputs to urban pervious areas. Gary described how they are derived, and indicated that for nitrogen it can be about 15 to 25 lbs per acre, depending on what region of the Bay, and that these may decline somewhat in the future due to pending air quality regulations. Model currently does not have atmo dep P load for pervious areas
- Related to the phosphorus bans, Gary talked about the importance of the 50% sensitivity to phosphorus wash off/interflow loads, and that the technical assumptions end up achieving a 15% reduction in edge of stream loads in most situations.
- Model simulates fertilization by applying to all acres at a discounted rate to account for those that are not fertilizing. Model does not account for different turf species (e.g., warm season vs. cool season)
- The establishment of new lawns and site stabilization may be properly included into the "bare land" land use category, which is estimated in the CBWM as being several times the annual increase in impervious cover (with state specific coefficients). High fertilizer applications are applied to stabilize construction sites or get lawns started; however, there are not any current fertilizer application assumptions for the bare land category.

CONSENSUS: The panel agreed that they wanted to provide some specific recommendations on 2017 model refinements and pervious land characterization in their final report that could improve how urban fertilizer is simulated, and would discuss these at a future panel meeting.

Filling Remaining Literature Gaps. Tom commended the panel for the hard work they had done to review the large number of papers in the Tetra-tech lawn literature database.

CONSENSUS: The panel concluded that there was sufficient black and grey literature to make recommendations, subject to some late additions by Mike G and Gary F, and the narrow public lands and local outreach programs effort that Tetratech will complete prior to the next meeting. This is not to imply that there are not gaps in our understanding, but that the panel did indeed have all the pertinent literature that is currently available.

Session #1 Homeowner Behavior Papers

Neely Law present a brief PowerPoint presentation on what we know and don't know about homeowner fertilizer behavior in the watershed. Her key conclusions are provided on the PowerPoint, the following are some of the panel discussion highlights.

- Two major topic areas: factors of lawn management and human behavior
- Nowak "disproportionality paper" A small portion of the population is theorized to produce a disproportionate amount of the load, specifically from vulnerable sites, environmentally, with inappropriate lawn behavior. Outreach needs to be targeted towards this group.
- Gap in knowledge is tracking behavior over time to measure impact of outreach…panel probably needs to be very conservative in assigning load reduction credits due to outreach efforts.

Session #2 Phosphorus Dynamics and Research – Gary Felton provided his review of the available literature on phosphorus dynamics on urban lawns. His main conclusions can be found on his PowerPoint presentation. Some other observations:

- Due to P-Bans and industry trends, it appears that phosphorus will be phased out of most lawn fertilizer sold in Bay states in the next few years, except for more expensive starter fertilizer.
- Most lawns in Bay do not need P for fertility, most phosphorus need could be met by recycling lawn clippings, mowing in leaves in fall and modest P deposition from atmosphere.
- Watering prior to large storm events can prevent P loss
- A certain amount of P loss is independent of application, which is consistent with the model (lawn clippings, P attached to eroded soils)
- Soil test P did not have strong relation to runoff P
- P loss decreases significantly with increased infiltration
- Mixed species of grass results in lower P leaching

Panel Discussion on Phosphorus Modeling Ban Assumptions

The panel discussed the technical assumptions used by the Chesapeake Bay Program modelers in modeling the nutrient affects of phosphorus bans on the Bay.

- Large technical assumption for P ban is if urban pervious area has increased significantly from 5.3.0 to 5.3.2 the application rate decreases to account for this
- A real world paper from Minnesota seem to lead to a similar reduction in total P flux from the land as the modeling assumptions ~15%
- Should the credit be discounted for individuals who purchase out of state, use older fertilizer, starter fertilizer or apply 10-10-10.
- Going to 0 application does not make sense, could be quite small after 5+ year time period;
- P will still be available in starter fertilizer, which isn't always cheaper
- 0 overly optimistic due to human nature, need to determine a realistic reduction
- The effect of P ban might be different for pervious lands that are treated by an effective BMP compared to those that are uncontrolled...due to irreducible concentration effect for BMPS...i.e., BMP performance tends to decline with lower P inflow concentrations that may occur to P Ban.

Session # 3 Defining Urban Nitrogen Management – Tom briefly reviewed the short white paper by Mike Goatley, as well as the recent U Conn fertilizer recommendations for water quality.

Consensus: The panel agreed that it was critical to come up with a much better definition for urban nutrient management. With the pending phase out of P in most fertilizer mixes, the panel concurred that the definition should focus on the practices that could reduce nitrogen runoff or leaching. The goal of UNM is to establish a healthy lawn, and is some case, some nitrogen fertilization may be beneficial

The panel further agreed that the definition should meet the "Goulet Rule" -- the list of do's and don'ts should be short and understandable to the average homeowner, and be quantitative or

measurable enough to be verified by local agencies. The panel agreed that several of Mike's bullets and the bullets in the U Conn WQ paper might be merged into a definition.

The panel loosely defined several possible sub-classes of UNM: homeowner practices, lawn care company practices, and new lawn start up practices. These might be further sub-divided by physiographic province, warm vs. cool season grasses, or Site factors (sensu Schwartz). Tom and Mike to come up with several concepts for next meeting.

Session # 4 Nitrogen Dynamics on Urban Lawns – Stu Schwartz, with help from Bill Keeling, summarized recent research on nitrogen dynamics on urban lawns. Their primary conclusions are on their joint power point presentations. Some of the highlights of panel discussion include:

- Extension nitrogen fertilizer recommendations generally produce low N runoff due to high nitrogen retention/denitrification rates.
- There are some situations where site and application factors can cause significant N runoff, and these should be target for any UNM
- For example, late fall application is risky because it can applies too late and mobilized
- Low runoff from plots using recommended turf practices
- Consider water table?
- Need to know % of good versus bad or fertilizer versus unfertilized lawns in watershed
- Spatial distribution of warm versus cold season grasses in the watershed
- If we knew what fraction of the turf acres are in well management turf in which type of leaching propensity and could assign numbers to each of those areas we could come up with the total reduction and for each of those types what kind of credit we should get
- Not going to get full data so we need to establish number with uncertain
- P and S should improve even if N doesn't on unfertilized lawn?? – Berger
- Only 75% of turf is residential lawn, the remaining 25% is on public land and commercial areas. Panel still has questions about fertilization behavior of public lands/commercial sites. It appears to depend on budget, low for highway right-of-way and schools versus high rates for some high visibility government and commercial facilities. Panel wants to revisit this issue at next meeting
- Decouple N and P in discussion on UNM

March 8, 2012
Meeting Minutes
Urban Fertilizer Management Expert Panel

EXPERT BMP REVIEW PANEL Urban Fertilizer Management		
Panelist	***Affiliation***	**Present?**
Jonathan Champion	DDOE	Yes
Karl Berger	MWCOG	Yes
Dr. Stu Schwartz	UMBC	Yes
William Keeling	Virginia DCR	Yes
Dr. Gary Felton	U of MD	Yes
Dr. Neely Law	CWP	Yes
Marc Aveni	Prince William County DPW	Yes
Dr. Mike Goatley	Virginia Tech	Yes
Gary Shenk	US EPA CBPO	No
Tom Schueler, Cecilia Lane	CSN (facilitator)	Yes
Rachel Streusand	CBPO	Yes
Non - Panelists: Mark Sievers- Tetratech,		

ACTION ITEMS

General: Next Teleconference Scheduled for 1 to 3 PM on April 23rd.

All: Look at tetratech lit review on public land fertilizer restrictions and be prepared to discuss at next meeting

Norm will look into NoVa research on homeowner lawn behavior and share it with the panel if it is useful

Norm will look into any survey research on fertilizer use on municipal lands in Northern Virginia

Neely will do some additional (limited) research to see whether phosphorus bans in upper Midwest compare favorably to the 15% effect predicted by CBWM and whether the water quality benefits actually persists over time.

Check on the Watershed Model unit P and N fertilizer application rates of 1.3 and 43 lbs/pervious acre/year to see if matches up to sales data for non-agricultural fertilizer sales for 2008/2009 baseline. Need to ensure that this matches or be prepared to answer why.

Mark Aveni to work up some minimum elements for each outreach tier, and work with Tom on a rationale for devising rates

What discounts, if any. should be made for use of starter fertilizer, hoarding, cross-border "firework sales", use of 10-10-10 fertilizer, etc.? Karl and Norm will look into this issue and make a recommendation to panel.

Stu and **Tom** to meet in next few weeks to further refine the categories and discuss venn diagram technique and possible inclusion of a public land category

Coordinate with Gary F on the P and N application rate comparisons

bill Keeling will work with **Gary Shenk** to define the appropriate comparison for the Watershed Model Runs to evaluate the effect of state-wide fertilizer P-bans, and share it with the panel at next call.
Tom will check with other industry sources beyond Scotts to check whether P fertilizer sales are also declining in non-ban Bay states, and whether industry phase out of P fertilizer is scheduled to occur (and what conditions in the future could prompt its return).
Tom will work with Chesapeake Bay Commission to see if there are any differences in the construction of individual state P bans that may influence their relative performance
Mark Sievers to make sure all presentations from meeting are posted on sharepoint.Get Tetra Tech staff to commence a literature search on (a) programs to limit fertilizer applications on public lands, with an emphasis on specific changes in local landscaping, purchasing and contracting policies that reduce the frequency of un-needed fertilizer applications by 3/16/12

MEETING MINUTES

Tom called the meeting to order at 10:05 AM, and complimented Panel for completing most of its action assignments from last meeting.

The Panel reviewed the e-mail chronology (Keeling/Shenk/Berger/Goulet) on the CBWM modeling assumptions for the final P-Ban run

Tom noted that several panel members have been invited to attend Bay-wide stormwater retreat on May 24 and participate on an urban nutrient management panel, and that it would be a good platform to discuss survey/research needs to improve the practice.

Peter Claggett answered questions about his analysis of turf cover in Baltimore County, MD and how each of the three methods provided different estimates, but are consistent when their resolution and methodology were compared

Panel Discussion and Possible Consensus on Technical Assumptions for P Ban Credit Model Runs: Chris Brosch's model runs from last Spring were based on model version 5.3.0, prior to the major changes in urban pervious cover that were introduced version 5.3.2 of the model, using the same technical assumptions. The following are the state by state outcomes of a P Ban:

State	Change in Urban P load	Change in Total P load
DE	13.0%	0.8%
DC	6.0%	1.6%
MD	12.3%	2.6%
NY	16.5%	1.9%
PA	14.9%	1.6%
VA	14.6%	2.0%
WV	7.3%	0.9%
Total	13.8%	1.9%

The Panel then discussed whether the model run was a true apples to apples comparison. After some discussion, it was agreed that **Bill Keeling** will work with **Gary Shenk** to define the appropriate comparison for the Watershed Model Runs to evaluate the effect of state-wide fertilizer P-bans, and share it with the panel at next call.

The panel then turned its discussion to whether the Brosch technical assumptions defining the impact of a P-Ban were technically justifiable. The panel agreed that four analyses were needed to test them, as follows:

1. Check on the Watershed Model unit P and N fertilizer application rates of 1.3 and 43 lbs/pervious acre/year to see if matches up to sales data for non-agricultural fertilizer sales for 2008/2009 baseline. Need to ensure that this matches or be prepared to answer why. **Gary Felton and Stu Schwartz** will take the lead on this

2. See if the ~15% effect of the model compare favorably to real world experience in other parts of the Midwest and actually persists over time. **Neely Law** will check with researchers in Ann Arbor and upper Midwest

3. What does it mean when a state says they are doing a 'ban' or taking advantage of a ban, and what years will they actually take effect? **Tom** will work with Chesapeake Bay Commission to see if there are any differences in the construction of individual state P bans that may influence their relative performance

4. The technical assumptions assume that a P Ban means zero applications. What discounts, if any. should be made for use of starter fertilizer, hoarding, cross-border "firework sales", use of 10-10-10 fertilizer, etc.? **Karl and Norm** will look into this issue and make a recommendation to panel.

The panel agreed that it was ready to do the final CBWM run once concurrence on these analyses was achieved.

Panel Discussion on Revised Urban Nitrogen Management Definition. The panel discussed the proposed definitions for urban nitrogen management that Tom presented, including new lawns, mature lawns (homeowners), mature lawns (lawn care companies), mature lawns (public land). Tom indicated that the the four definitions can be defined at the local level with metrics, and each category could result in a different load reduction rate. The approach also allows localities to report the acres under each category, even if the CBWM uses a single blended pervious area.

The panel discussed it at length, and agreed to discuss it again at the next call.
Some highlights included:

- Consider new category of UNM on public lands
- Usual debate between "lumpers" and "splitters" (too many categories, too few)
- **Aveni**: definitions need to provide localities with answers re: practicality, tracking and enforcement. How it is defined and targeted at local level are key
- **Law**: fewer categories may be better, if nutrient requirements are the same when maintained by homeowner or company why should the requirements be different? Good to target high risk areas
- **Schwartz**: discussed what types of terrain, application formulations/timing, soil conditions, lawn conditions, seasonal factors and other conditions pose the greatest risk of nitrogen runoff or leaching, and therefore, should be targeted for intensive outreach. More categories useful so we can flesh out mental model of practices, behaviors and physical constraints and then re-aggregate for the representation in model world. Need to consider quality of practices, demographics on homeowner side, age of lawn.

- **Felton**: 100% slow release fertilizer does not exist on the market. Separate slow release from numeric recommendation for homeowner maintained, established lawns. Lawn care companies will take pH whereas homeowners will not; change hi-risk to 4 lbs/yr
- **Goatley:** Utilize state extension agencies, and reference their initial recommendation rates.

ACTION: Stu and Tom to meet in next few weeks to further refine the categories and discuss venn diagram technique and possible inclusion of a public land category. They would present a revised approach at next call

Initial Discussion: The Link Between Local Outreach and Behavior Change: Neely and Mark led a discussion on what kind of minimum local outreach efforts are likely to make a verifiable difference in nitrogen loss in the targeted areas. They concluded, based on the limited research available, that several outreach programs were able to show that local outreach had changed awareness or attitudes, few were designed to actually measure changes in behavior. Consequently, the panel should be conservative in defining effect of outreach on reducing N fertilizer behavior, and the current N reduction rate of 17% would be hard to support in the light of the research reviewed.

Mark A and Neely proposed that any outreach credits be based on a tiered approach, such that a lower, but non-zero credit would be provided to communities that undertake a basic education/outreach campaign (# of times, various types of media). A higher credit would be assigned to localities that adopt and implement a more sophisticated outreach program that focused on a direct "retail" approach to homeowners (i.e., master gardeners, soil testing, spreader buybacks etc.)

The panel generally concurred with the approach and felt a conservative approach should be used that still provides some incentives to MS4 communities to improve their existing stormwater outreach programs with a more direct focus on reduced N fertilization.

ACTION: Mark Aveni to work up some minimum elements for each outreach tier, and work with **Tom** on a rationale for devising rates

April 23, 2012
Meeting Minutes
Urban Fertilizer Management Expert Panel

EXPERT BMP REVIEW PANEL Urban Fertilizer Management		
Panelist	***Affiliation***	**Present?**
Jonathan Champion	DDOE	Yes
Karl Berger	MWCOG	Yes
Dr. Stu Schwartz	UMBC	No
William Keeling	Virginia DCR	Yes
Dr. Gary Felton	U of MD	Yes
Dr. Neely Law	CWP	Yes
Marc Aveni	Prince William County DPW	Yes
Dr. Mike Goatley	Virginia Tech	Yes
Gary Shenk	US EPA CBPO	No
Tom Schueler, Cecilia Lane	CSN (facilitator)	Yes
Molly Harrington	CBPO	Yes
Non - Panelists: Mark Sievers- Tetra Tech,		

ACTION ITEMS

General: Schedule next call for end of May/early June

ALL to send comments on your matrix/definitions.

Norm to continue to look into NoVa research on homeowner lawn behavior and share it with the panel if it is useful

Neely will do some additional (limited) research to see whether phosphorus bans in upper Midwest and Austin, TX compare favorably to the 15% effect predicted by CBWM and whether the water quality benefits actually persists over time.

Gary Felton to do P calculations for MD, similar to N calculations

Gary Felton to get turf acres for VA, PA, DE, WV, and DC from Tom Schueler and do watershed wide P reductions between 2006 and 2010.

Gary Felton to write comments for Mark's straw man (particularly with respect to greater involvement by State extensions)

Gary Felton to check Mark Sievers write-up on public lands and see if consistent

Gary Felton to check Home Depot 10-10-10 for warning about use on turf and collect digital photo

Mark Aveni to work with Tom to remove Fed/State lands from local outreach activity to avoid double counting

Bill Keeling to check state write-ups by Tetratech for consistency; will eventually become an Appendix

Mike Goately to check state write-ups by Tetratech for consistency; will eventually become an Appendix

Gary Shenk to run CBWM with Keeling's comments to get N reductions associated with proposed approach

Tom to check with West Virginia re: Karl Berger's concerns

Tom to write-up draft document of different tiers for state P-bans with actual numbers assigned to them as well as something on RTV to be reviewed by panel and discussed at next call.

Tom to simplify matrix on urban nitrogen credits and send out to panel prior to next call.

CSN to resend public lands research document to panelists.

Tom to follow-up with Stu Shwartz to obtain an electronic copy of his presentation and email to the group

Tom to work with **Marc Aveni** on removing Fed/State lands from local outreach activity to avoid double counting

Tom to create an outline of recommendations for the next panel call

MEETING MINUTES

Panel Consensus on Technical Assumptions for P Ban Credit Model Runs: The Panel reviewed their homework from the last meeting to refine the technical assumptions for Watershed Model Runs that evaluate the effect of state-wide fertilizer P-bans.

- Bill Keeling reported that he and Gary Shenk are in agreement on how to model the effect of the state-wide fertilizer P-bans, found a less than 1% difference between the 2 model runs. **Bill Keeling** asked what the discount factor should be since even with a state-wide P-ban, won't get 100% implementation. Keeling also noted that the CBWM data seems consistent across the Bay states with the exception of DC and WV. Keeling noted that this is because in DC it's based in impervious land whereas in WV there is not a lot of urban land and the pervious land isn't necessarily pervious.

  Karl Berger expressed concern over whether West Virginia should be consulted about this.

ACTION: CSN to follow-up with WV re: Berger's comment.

- **Gary Felton** reported on whether the Watershed Model unit P and N fertilizer application rates of 1.3 and 43 lbs/pervious acre/year matches up to sales data for

non-agricultural fertilizer sales for 2008/2009 baseline. The loading rate was determined by taking the amount of fertilizer sold and dividing by the number of turf acres.

- Significant P reductions in the past 4-5 years shown; however, may not be reflected in long-term simulation.
- Concerns regarding acreage differences between 5.20 and 5.32 models.
- The model uses 2006 application rates. He has seen decrease in sales/usage between 2006 and 2010.

DECISION: Rates appear accurate, but further evaluation of the data is needed.

State	TURF (acres)
Delaware	36,481
District of Columbia	17,206
Maryland	990,291
New York	170,716
Pennsylvania	1,052,558
Virginia	1,195,567
West Virginia	88,218

- **Neely Law** has been trying to contact someone in Midwest and Austin, TX to see if the ~15% effect of the model compare favorably to real world experience in other parts of the Midwest and actually persists over time.

- **State Bans: Tom** presented his research on what it means when a state says they are doing a 'ban' or taking advantage of a ban, and what years will they actually take effect. Reported the following:
  - A community that has implemented a ban is getting an 80-90% reduction; 70% without a ban

- **Karl and Norm** discussed what discounts, if any, should be made for use of starter fertilizer, hoarding, cross-border "firework sales", use of 10-10-10 fertilizer, etc.
  - Model run: P-ban = 20%
  - Survey data: not good indicating behavioral change
  - MN (Barton and Johnson) looked at paired watershed study (w/wo ban)
  - Actually monitored and saw a 12-15% TP reduction
- **Tom** proposed 2-tiered approach:
  - States without a P-ban: 75-77%
  - States with a P-ban: 90%
- People agreed with concept, just not some of the numbers.
- **Tom** proposed 3-tired approach:
  - No P-ban: 70%
  - P-ban: 80% (supported by Felton's research)
  - P-ban Plus: 90% ("plus" defined as education/outreach, RTV, demonstrations of reductions through monitoring)

ACTION: **Felton** to check Home Depot 10-10-10 for warning about use on turf and get a digital photo

ACTION: Tom to write-up draft document of different tiers with actual numbers assigned to them as well as something on RTV to be reviewed by panel and discussed at next call.

Research Update: Fertilizer Use on Public Land and Update on State/Local Fertilizer Regs: Mark Sievers briefly summarized the highlights of the two literature searches. Panelists were asked to verify that reg description for their state is accurate, and discuss what crediting and verification options are needed to address reduce or eliminated fertilizer use on various classes of urban land. Mark reported that the lit review demonstrated that largest amount of public lands are in ROW. There are some opportunities to improve fertilizer management on public lands but the overall acreage is relatively small and many communities had already reduced fertilizer applications.

There was a question of when the fertilizer applications had been stopped and whether it would be considered a new or old reduction in the model. The answer was 2005 thus it's a new reduction.

ACTION: Keeling, Goatley and Felton to check state write-ups by Tetratech for consistency; will eventually become an Appendix

Revised Definitions and Framework for Urban Nitrogen Credits. Tom presented some revised definitions of urban lawn nitrogen management and how they might be tied together in a comprehensive framework. Tom stressed that the numbers associated with the framework are illustrative only.

Marc Aveni commented that local governments would have a difficulty implementing and keeping track of such a framework.

Neely Law commented that framework would provide good defense of eventual recommendations.

Tom pointed out that with the exception of the "New Construction/Starter Lawns" category all other categories are simulated the same way and could be collapsed into one general approach.

Question from the panel – approximately how many acres are realistically in the "Hi Risk" category?

ACTION: Tom to simplify matrix and send out to panel prior to next call.

ACTION: Ask Gary Shenk to run CBWM with Keeling's comments to get N reductions associated with proposed approach

Credits to Local Outreach Activity: Mark Aveni discussed his proposal on how to link tiered minimum local outreach efforts to verifiable difference in nitrogen loss in the targeted areas.

- Possible 2 or 3-tiered approach:
    - Minimum level: webpage, information in circular etc.
    - Nutrient Management Plan – enforceable = highest credit
    - Nutrient Management Plan – not enforceable = lower credit

ACTION: Tom to work with **Marc Aveni** on removing Fed/State lands from local outreach activity to avoid double counting

ACTION: Felton to write comments for Marc's straw man (particularly with respect to greater involvement by State extensions

Discussion on Sediment: The Panel briefly discussed whether or not sediment should be addressed by the panel. Karl Berger noted that good UNM plans will lead to a reduction in sediment from turf. Bill Keeling noted that UNM plans can lead to an increase in sediment loads from turf. Gary Felton agreed that with the previous panel decision that sediment will not be covered by the panel.

DECISION: Sediment should at least be noted in the final document.

June 15, 2012
Meeting Minutes
Urban Fertilizer Management Expert Panel
½-Day Workshop

EXPERT BMP REVIEW PANEL Urban Fertilizer Management		
Panelist	***Affiliation***	**Present?**
Jonathan Champion	DDOE	Yes
Karl Berger	MWCOG	Yes
Dr. Stu Schwartz	UMBC	Yes
William Keeling	Virginia DCR	Yes
Dr. Gary Felton	UMD	Yes
Dr. Neely Law	CWP	Yes
Marc Aveni	Prince William County DPW	Yes
Dr. Mike Goatley	Virginia Tech	Yes
Gary Shenk	US EPA CBPO	No
Tom Schueler	CSN (facilitator)	Yes
Panel Support and Observers: Mark Sievers- Tetra Tech, Norm Goulet – Chair USWG, Lucinda Power – EPA, CBPO, Molly Harrington, CRC, Cecilia Lane, CSN		

ACTION ITEMS

Tom to send fall fertilization references submitted by Mike G to full panel

Tom to send out Marc Aveni's examples of urban nutrient management plans and summary documentation to the Panel.

ALL: Panelists to comment on the rough draft that CSN will send out in the next 4 weeks. Use track changes to record your comments/edits and return to CSN.

ALL: Panelists to send comments/ideas (few bullets) on Research and Management Recommendations, Accountability Mechanisms and Priority CBWM model refinements to Tom by **July 15, 2012**.

Stu and Gary to write-up an introductory section on nutrient dynamics using a basic soil science model as the framework.

Stu, Gary and Mike to look at the hi-risk factor list and edit as needed.

CSN to work on another draft and send out to the Panel for comments in 4 weeks.

MEETING MINUTES

Review of Actions Items and Consensus: Tom Schueler (CSN) began the meeting and thanked all of the Panelists for completing their work assignments. **Tom** also noted that several of the Panelists are concerned about how the nutrients are being modeled and acknowledges that due to the lack of available data, the numbers the Panel recommends will have to be "best professional judgment". Will offer conservative interim recommendations and clearly note where the scientific gaps are and propose research initiatives.

Action: The Panel agreed that given the gaps in science and modeling, it would be appropriate to only recommend an interim rate (whatever that may ultimately be) and outline the recommended research, surveys and model improvements which would provide greater confidence in our estimates.

Review of Proposed Outline for Final Technical Memo: The Panel reviewed the outline to ensure that it covers the key points.. **Tom** proposed that The Panel focus on Nitrogen in the "review of available science section" (Section 3). **Bill Keeling** (VA DCR) noted that The Panel will need to define the "pre-BMP condition".

Action: The Panel accepted the proposed outline for the technical memo.

Final Panel Consensus on Technical Assumptions for P Ban Credit Model Runs: The Panel reviewed their homework from the last meeting to refine the technical assumptions for Watershed Model Runs that evaluate the effect of state-wide fertilizer P-bans. It was noted that industry reported change is only DIY (do-it-yourself) numbers and does not reflect commercial lawn care companies. **Bill Keeling** noted that in regards to Table 3 in the powerpoint, that VA does <u>not</u> have a P-ban. The Panel questioned which category to place VA in. The Panel then discussed whether the credit should be given up-front with required verification to continue the credit or the credit should be offered only once the states prove a demonstrable reduction in nutrients as a result of the UNMP. The Panel noted that a non P-ban state may have sufficient reductions to achieve the P-ban credit.

Consensus: The Panel agreed that a locality can get the credit when it can be reported and verified.

Gary Felton (UMD) noted that if the state's issue a P-ban, the state soil chemists will be required to monitor so why should a locality take on additional monitoring. **Tom** suggest that the final document acknowledge that not all P-bans are created equal and let VA DCR decide

where it wants to be a P Ban or non-P ban State. **Bill Keeling** commented that VA has a UNM program with specific requirements for qualifying for that will supersede a P-ban.

Consensus: The Panel agreed to note in the final document that State specific requirements will take precedence over any recommendations made by the Panel.

Gary Felton then went over his homework of comparing the CBWM application rates to state sales data for non-agricultural fertilizer sales for 2008/2009 baseline. He used estimates from Scotts' sales data to figure out how many pounds of P had been applied. The only hard data he had was from MD and he used that as a basis and made assumptions about the other districts. Some caveats are that these numbers are based on soil tests and no new acres of land treated. The Panel noted that the state data from Scotts is state-wide (not just watershed) and may need to be area-weighted for increased accuracy. Tom will supply the area weighted corrections to Gary Felton.

Karl Berger (MWCOG) discussed his comments and an alternative approach to the P-ban issue. In doing his research Karl found that the total input of Phosphorus to urban pervious land is 2.6 lbs/ac/yr with only 50% of that number a result of lawn fertilizer. The remaining 50% is considered inputs from other, natural sources (i.e., mineral rock inputs, atmospheric deposition, animal feces etc.). This information should be noted in the final recommendations to indicate to readers why a P-ban does <u>not</u> result in a 100% credit. Karl recommended that for state's without a ban, non-farm fertilizer sales data would be necessary to justify your reductions. Recommends that the Panel chose a conservative number to reflect cheating with the caveat that the locality can receive a better credit if they can verify that cheating is less.

Neely Law *(*CWP) presented her additional analysis of the effect of P bans in other states, and noted the limited monitoring studies are in general agreement with the CBWM simulation. There are gaps and uncertainties in monitoring studies and this is the best available science, but Panel agreed the research should be provided in the final report. Neely also noted that none of the Midwest localities are conducting long term monitoring of P-ban impact, due to this lack of data, panel should recommend a conservative number.

Stu Schwartz commented that it would be beneficial to have a conceptual mass balance approach to demonstrate how both N and P behave on pervious lands, both in the real world and the CBWM. **Stu and Gary** noted that there needs to be an upfront discussion on nutrient dynamics and volunteered to write something up. **Gary Felton** noted that this is essentially a soil science model that already exists and he volunteered to contribute and work with Stu on the write-up.

ACTION: Stu and Gary to write-up an introductory section on nutrient dynamics using a basic soil science model as the framework.

The Panel discussed that an existing modeling issue is that every acre of urban pervious land receives the same amount of fertilization (in the model).

Consensus: The Panel will make recommendations for model changes in 2017.

Revised Definitions and Framework for Urban Nitrogen Credits. **Tom** presented The Panel with the incremental CBWM runs that show the relationship between N fertilizer applications and N loss from pervious lands, using the same modeling scenarios as was agreed

to with P and present his modified framework for N reduction credits. Tom noted the addition of irrigated lawns to the Hi-risk category.

The Panel generally agreed with the proposed definitions for qualifying urban nutrient management, core N fertilization message, passive, active and alternative local outreach, with some significant tweaking, as described below:

<u>For the Core Outreach Message on Urban N Fertilization and Lawn Management:</u>

Agreed with approach where the report would document the scientific support underlying each element of the core message:

Gary Felton took issue with the revised N fertilization rate (i.e., the test approach) and **Mike Goatley** noted that it did not address differences in warm season versus cool season grass management. **Gary Felton** recommended noting that these are maximum recommendations and localities could chose to be less stringent. Tom indicated he would revise accordingly

Neely Law and the rest Panel agreed that the element on promoting healthy and dense vegetative cover should be the first message.

Mike Goatley noted that the spring greenup to Halloween window for fertilization may only make sense for cool season grasses, and that he would send some papers on fall fertilization

Stu Schwartz recommended putting together an appendix on healthy turf and where one can find that information; **Tom** noted that it would be a good idea to have a table where watershed managers could quickly find their respective (and more detailed) state extension resources and recommendations

Several panelists thought the message about not fertilizing w/in 10 feet of impervious surfaces was impractical, and **Karl Berger** suggested the condition "no fertilizer on paved surfaces". **Mike Goatley** recommended sweep off from paved surfaces.

ACTION: Tom to expand and revise the core message per the above comments and include it for Panel review in the next draft

<u>Qualifying Urban Nutrient Management Plan</u>.
Karl Berger noted that the reporting term "acreage of turf" doesn't always comply with the model (pervious lands), and how to address gardens and landscaping areas that are not technically turf . **Tom** noted that the goal is to get people to report the physical area of their property where urban nutrient mgmt practices are applied (i.e.,non- pavement areas). Marc Aveni has submitted several examples of urban nutrient management plans and tracking

ACTION: Tom will send out Marc Aveni's examples to the Panel, and will include some as an appendix to the report (with names redacted)

<u>Passive Local Outreach.</u>
Bill Keeling was skeptical that the research on the effect of passive outreach on homeowner behavior justified a number greater than zero. Other panelists indicated that it may be appropriate to give a small credit as incentives for localities to shift to the core messages recommended by the panel. **Stu Schwartz** asked if there will be a verification component for passive outreach (answer: yes, evidence of dedicated resources by a municipality to a program

that meets minimum qualifying conditions that would be reported annually through MS4 program permit reports. **Karl Berger** questioned whether the surveys show actual behavior change or rather a change in awareness. **Neely Law** noted that there is a time delay

ACTION: No final decision on whether any credit should be offered for passive outreach, will revisit topic at next meeting

Active Local Outreach.

Neely Law questions whether the term "enforceable" in the definition was too 'big government" and **Marc Aveni** suggested an alternative term be employed.

ACTION: The Panel concurred with the general approach, and directed CSN to expand on it in the next draft for further panel review

Alternative Outreach Approach.

The Panel generally liked the idea of allowing localities to experiment with innovative outreach options, but stressed that measurable verification were essential. **Tom** recommended adding the language that an individual state does not have to automatically accept the credit if they are not satisfied with the local verification component. **Marc Aveni** noted that the localities do not feel they are getting the resources they need from the states but that we shouldn't throw out alternative approaches. **Neely Law** noted that with the education/outreach, localities end up having a stake in what they are doing. **Stu Schwartz** noted that it would be useful to try this out and see what type of innovative approaches to verification the localities come up with.

ACTION: CSN to take a another crack at it with a stronger emphasis on the verification issue for the next draft.

Hi-Risk Category.

Bill Keeling recommended adding "or as specified by the State". **Karl Berger** noted that the current CBWM doesn't have abilities to model such factors. **Bill Keeling** noted that these are just elements of NMP and that's what gets credited.

ACTION: Stu, Gary and Mike to look at the hi-risk factor list and edit as needed.

Simplified Framework for N reduction credits.
While the Panel was OK with the general framework, they did not have time to provide their feedback on what the actual rates should be.. **Bill Keeling** commented that he doesn't know if he can support a hard number especially for passive outreach. **Tom** reiterated to the Panel that this is where the science ends and the professional judgment begins. **Stu Schwartz** suggested adding a footnote to the table that says "with verification".

ACTION: CSN to draft it up, but reserve discussion on the basis for the N numbers at the next meeting.

ACTION: CSN to put together Rough draft of recc memo in the next 4 weeks. In lieu of another meeting CSN will send the draft to the entire panel for review. The Panel will use track changes to make their comments. The Panel will reconvene in August for a teleconference with the goal of coming to consensus. If no consensus is reached in August then the Panel will continue.

September 25, 2012
Meeting Minutes
Urban Fertilizer Management Expert Panel

EXPERT BMP REVIEW PANEL Urban Fertilizer Management		
Panelist	***Affiliation***	**Present?**
Jonathan Champion	DDOE	No
Karl Berger	MWCOG	Yes
Dr. Stu Schwartz	UMBC	Yes
William Keeling	Virginia DCR	Yes
Dr. Gary Felton	UMD	Yes
Dr. Neely Law	CWP	Yes
Marc Aveni	Prince William County DPW	Yes
Dr. Mike Goatley	Virginia Tech	Yes
Jeff Sweeney Matt Johnston	US EPA CBPO	Yes
Tom Schueler	CSN (facilitator)	Yes
Panel Support and Observers: Mark Sievers- Tetra Tech, Norm Goulet – Chair USWG, Jeremy Hanson, CRC, Cecilia Lane, CSN		

Key Action Items

Panel directed CSN to prepare a second draft that incorporates their written comments, as well as verbal feedback at the meeting, for final consideration in October or November

Tom and Stu: to meet to develop a CBWM mass balance approach to check to see if the UNM rates we developed based on best professional judgment can be supported in time for next panel meeting

Neely: Agreed to put summary credit table, verification timeline, and alternative outreach performance requirements**.**

Felton/Goatley: Agreed references that provide operational definitions for vegetative cover to define the exposed soil risk factors.

MEETING MINUTES

Review of Actions Items and Approval of the June Meeting Minutes: Tom Schueler (CSN) began the meeting and thanked all of the Panelists for their comments on the initial draft. Tom asked for the approval of the June meeting minutes.

DECISION: The Panel approved the June meeting minutes.

Rapid Feedback on First Draft of the Final Technical Memo: Tom asked each panelist to provide specific feedback on what they liked (and didn't like) about the first draft. In general, the Panel was quite positive about the memo, but provided a lot of feedback on how it could be further improved. The following summarizes the major points raised.

Marc Aveni

- Mark noted that Lawn Care Practice #4 should be clarified that homeowners should leaves should be mulched or composted, and not left on their lawn
- Page 35: Verification/subsampling. Mark asked for clarification regarding what is being suggested by subsampling. **Tom** clarified that it would be a phone or e-mail survey of the property owners to see if they were still following their UNM practices

Karl Berger

- Karl indicated that his comments focused on the quality of non-farm fertilizer statistics and the need for better verification of future state sales data. Gary strongly agreed with Karl on the proposed re-write
- Karl sought clarification on the baseline issue: what is the baseline that state-wide credits are being compared to? **Tom** clarified that the word baseline will be replaced with an explicit reference to the CBWM fertilizer application rate that was used to calibrate the model, and is not references to the TMDL baseline. **Jeff Sweeney** noted that any N or P reduction after 2006 can be credited in the existing model for fertilizer application rates; He also indicated that EPA is looking to get better non-farm fertilizer sales statistics and might have updated Bay data in 2013

Gary Felton

- Gary reiterated his concern to have a more stringent definition of what constitutes alternative outreach…social marketing alone is not enough. Tom indicated he would include tougher definitions in next draft

Mike Goatley

- Mike noted that report should note that some of the UNM practices are done differently based on the wide range of climatic conditions in the Bay watershed, and depending on whether the turf is cool or warm season grasses

Bill Keeling

- Bill expressed concern that given our lack of faith in fertilizer statistics, that we should be conservative with state-wide credits, and require a shift to verifiable statistics within a few years, rather than an automatic credit. Panel concurred, and changes will be made to next draft.
- Bill recommended that a blended UNM rate be allowed for now based on Phase 5 of the model and then shift to hi risk/lo risk splits in Phase 6 of model. **Sweeney**: It is possible to have different UNM BMP options for the same unit area of pervious land.
- Bill was skeptical about the research literature support for actual nutrient reduction associated with various kinds of outreach
- Bill also noted that more specific UNM definitions were needed in next draft, and eliminate references to P-ban. Panel agreed
- Bill started a long panel discussion on providing more operational definitions for the high factors, and these were developed during the meeting.
- Several panelists indicated that the 10 UNM practices are general recommendations as to what could go into a UNM, not all apply in every situation, purpose is to encourage a more N-based focus

Neely Law

- Neely supported an alternative outreach credit, particularly when programs target hi-risk lawns, and that verifiable tracking is important to show change
- Neely also thought a Summary Table showing the credits upfront in the report would be useful and agreed to put together one.

- Neely also commented on the issue of timelines for UNM verification and that they should align with existing MS4 permits and/or 2-year milestones progress runs **Action:** Neely will put a timeline together for the panel to look at next meeting:
- Neely also noted that the Panel should define a statistical threshold for UNM sub-sampling, and clearly define the number of samples needed to get within a 5% margin of error

Stu Schwartz

- Stu noted that the various adaptive management elements of the panel's approach added to the credibility of the document
- Stu noted that we need to develop a CBWM mass balance approach to check to see if the UNM rates the panel developed based on best professional judgment can be supported

Next Steps in the Panel Review Process

Bill Keeling recommends that the Panel talk to the agricultural sector about how they are handling nutrient management; possibly get Tim Sexton (Ag NM Panel) to speak at the next panel meeting. Tom asked the panel upon completion of the next draft (which would incorporate the edits from today) if they would be comfortable sharing the recommendations with the Ag sector. The Panel agreed.

Tom will have a second draft for the Panels review by the second week of October. Once the panel received the re-write, Tom will share it with the ag workgroup and the panel will decide if the next meeting should be a conference call or a face-to-face meeting. After receiving the second draft, it is recommended that panelists use 'track changes' and the line number option when making further edits.

Tom thanked the Panel for their hard work and constructive comments on today's call.

November 5, 2012
Meeting Minutes
Urban Fertilizer Management Expert Panel

EXPERT BMP REVIEW PANEL Urban Fertilizer Management		
Panelist	***Affiliation***	**Present?**
Jonathan Champion	DDOE	No
Karl Berger	MWCOG	Yes
Dr. Stu Schwartz	UMBC	Yes
William Keeling	Virginia DCR	No
Dr. Gary Felton	UMD	No
Dr. Neely Law	CWP	Yes
Marc Aveni	Prince William County DPW	Yes
Dr. Mike Goatley	Virginia Tech	Yes
Matt Johnston	US EPA CBPO	Yes
Tom Schueler	CSN (facilitator)	Yes
Panel Support and Observers: Mark Sievers – Tetra Tech, Norm Goulet – Chair USWG, Cecilia Lane – CSN		

MEETING MINUTES

Review of Actions Items and Approval of the September Meeting Minutes: Tom Schueler (CSN) began the meeting and thanked all of the Panelists for their comments on the second draft. Tom asked for the approval of the September meeting minutes. He noted that due to their tardiness, panelists have until 11/10/2012 to review and comment on the meeting minutes.

Update on Panel Next Steps: Tom briefed the panel on the next steps to get the recommendations approved through the CBP BMP review protocol process, including coordination with Bay modelers, informal review by other experts, and the agricultural work group, and the proposed approach to get input and approval from Urban Stormwater Workgroup, Watershed Technical Work Group, and the Water Quality GIT.
Tom also described how the various technical appendices will be developed.

Key Changes in Second Draft of Expert Report: The Panel discussed the key changes in the second draft of the report on the following topics:

- More specific UNM definitions
- Re-write of fertilizer data statistics
- Expanded CBWM section
- Expanded Section on high risk factors from Schwartz
- Reduced Sate-wide P Reduction credit, with transition to verifiable statistics
- Blended rate option for UNM Plans
- New Section on Alternative Outreach option
- New verification procedure for state-wide credits
- Revised UNM verification procedures
- New verification procedures for alternative outreach option
- Expanded discussion of future research and management needs

The Panel approved each of the key changes and noted that the following areas need to be further addressed:

- Alternative Outreach Option needs to be better defined
- Active Outreach Credit needs to be better defined
- Add the language: *"UNMP must be prepared by a trained expert as defined by the state."*

Neely Law discussed with the Panel the summary table of Urban Fertilizer Management Credits for Phosphorus and Nitrogen that she put together. **Matt Johnston** noted that this was very helpful to the modelers. The Panel decided the table should go in the beginning of the technical memo where the different crediting options are discussed.

DECISION: The Panel approved the key changes to the second draft with the aforementioned changes.

The Urban Nutrient Management Rate Check: Tom went over the CBWM mass balance comparison against the current N and P removal rates associated with the UNM practices. Overall, the Panel agreed with the method for the deriving the UNM removal rates however **Stu Schwartz** noted that he would like to contribute additional data to the mass

balance calculations. **Karl Berger** noted that the need to confirm that the average pervious loading rate is edge of stream (EOS) data. The **Panel** decided to include the mass balance rate check as an appendix to the final recommendations.

ACTION: Stu Schwartz to revise Table 9 by adding a percent loss column.

ACTION: Stu Schwartz to work with Tom to enhance the mass balance check on the UNM rates.

ACTION: Tom to confirm the average pervious loading rate is EOS.

ACTION: CSN to write-up mass balance approach as an appendix.

DECISION: The panel approved the approach contingent upon the changes that were mentioned.

Panel Feedback on the Final Recommendations: Each panelist was asked to provide final comments on the report and indicate whether they endorse the final recommendations as written, or identify specific changes that are needed to get their support. The Panel requested that CSN compare the recommendations to the original charge of the panel to ensure that the recommendations have met each of the components of the charge.

DECISION: The panelists who were present decided to approve the final report, contingent upon the completion of specific changes requested.

Tom thanked the Panel for their hard work and constructive comments on today's call.