STAC WORKSHOP PROPOSAL
5/29/2013 (Revised)

The Peculiarities of Perviousness:
a workshop to define, measure and model the nutrient dynamics
from the mosaic of land cover known as pervious land

1. Format: A two day research synthesis workshop

2. Requesting Bodies and Sponsors:

- Urban Stormwater Workgroup
- Land Use Work Group
- Forestry Work Group
- Urban Nutrient Management Expert Panel
- Stream Restoration Expert Panel
- Erosion and Sediment Control Expert Panel
- Stormwater Retrofit Expert Panel

3. Proposed Roster for Workshop Steering Committee:

Name	Affiliation	E-mail Address
David Sample	Virginia Tech (STAC)	dsample@vt.edu
Peter Claggett	USGS	pclaggett@chesapeakebay.net
Karl Berger	Chair, LUWG	kberger@mwcog.org
Norm Goulet	Chair, USWG	ngoulet@novaregion.org
Tom Schueler	CBP Stormwater Coordinator	watershedguy@hotmail.com
Sally Claggett	CBP Forestry Coordinator	sclaggett@fs.fed.us
Bill Stack	CBP Stream Restoration Coordinator	bps@cwp.org

4. Audience: (60 to 75)

- Urban stormwater managers
- GIS, mapping and land use experts
- Urban hydrologists and water quality analysts
- Local and state watershed planners
- Urban foresters, soil and turf scientists
- CBPO modeling and Scenario builders

5. Workshop Objectives:

The current version of the Chesapeake Bay Watershed Model (CBWM) includes more than 3.5 million acres of pervious land, or just under 9% of the total watershed area. In the context of the model, pervious land is used to describe urban and suburban land that is not impervious. Consequently, this single land use category includes diverse land cover such as residential lawns, landscaping areas, gardens, parks, golf courses, road right of way, vacant lots and open areas. Pervious land also includes a limited amount of

forest canopy. Pervious lands are subject to different management regimes including just periodic mowing all the way up to the intensive maintenance of a golf course. In the context of the CBWM, fertilizer inputs to pervious areas are currently represented by a single weighted average for both fertilized and un-fertilized pervious areas (CBP, 2013).

The objective of this workshop is to characterize the key source areas and pervious cover types that generate nutrients and or reduce runoff in the urban landscape and determine whether it is feasible to utilize them in Phase 6 of the CBWM, by answering the following questions:

1. Does the source or cover type depart in a meaningful way from the average nutrient loading for generic pervious land?

2. If so, are their existing or future mapping tools that can accurately measure the source or cover type at the scale of a county and the entire Bay watershed?

3. If so, can the pollutant dynamics of the source or cover type be accurately simulated in the context of existing or future versions of the CBWM?

4. If so, would the source or cover type respond in a unique manner to the application of a new or existing urban BMP type?

Based on the answers to the preceding questions, the outcome of the workshop would be to analyze current research and recommend the best process to create a scientifically sound pervious land sub-classification system for the purposes of simulating and managing nutrient loads in the Bay watershed.

6. Proposed Workshop Sessions:

Note: The final agenda and speakers will be determined by the workshop steering committee who may drop or combine sessions in order to fully meet the workshop objectives.

1. The CBWM and Pervious Land (Speaker: Gary Shenk) How does the current CBWM simulate pervious land? What are the current categories and how do we differentiate the loading?

2. CBP Land Use Modeling (Speaker: Peter Claggett). What pervious land uses can we likely differentiate spatially? What is the partnership process for creating the land use data set?

*3. Runoff Concentrations from the Storm Drain Pipe***.** What have we learned about pollutant concentrations from mixed urban land over the past three decades, and how does that knowledge inform how we manage pervious and impervious land? (Tom Grizzard, VA Tech and other runoff monitoring experts)

4. Sediment and Vegetation as a Source. Can different levels of nutrient enrichment in sediments and detritus in the urban landscape be used to define or predict nutrient loading? (Speakers: Pouyat, Law)

5. Terrain, Topography and Bay Proximity. How does runoff generation and nutrient loading for pervious land differ across the watershed solely due geographic factors such as karst, coastal plain, mountains, reservoirs or proximity to the bay? (Speakers: TBD)

6. The stream corridor as a land cover type. How do stream bank erosion, illicit discharges, and sewage transmission losses influence nutrient and sediment loading and processing within the stream corridor? How does the stream corridor itself act to process nutrients and sediments delivered from upland and adjacent urban land? (Speakers: Bill Stack, CWP, and members of stream restoration expert panels)

7. How many types of turf cover should be simulated? Should turf cover be sub-divided into different types based on nutrient risk, fertilizer application rate or other factors? If so, can these factors be measured at the local or Bay watershed scale? (Speakers: from urban nutrient management panel)

8. Pervious interconnections with impervious areas. Are their differences in runoff or loads from impervious area that are connected to pervious areas as compared to impervious cover that is directly connected to the storm drain system? If so, can we accurately map connected and disconnected impervious land in the watershed? (Speakers: TBD)

*9. Construction sites as a urban source area***.** What do we really know about runoff and pollutant generation from the many different stages associated with construction from land clearing to final stabilization ? How are sediment and nutrient loads influenced by the use of traditional or enhanced erosion and sediment control practices? (Speakers: members of the ESC expert panel)

10. Does ownership matter? Is it possible to accurately define who owns the urban land in the watershed model (e.g., federal, commercial, industrial, MS4-regulated or institutional, etc.)? If so, would it make any meaningful difference in how these lands are managed or regulated? (Speakers: LUWG)

11. Trees and Pervious land: A different type of pervious land? Some pervious land has tree canopy (urban forest) that may function differently than normal forest or turf cover. What forms of nutrient exchange occurs between trees, urban soil and adjacent impervious cover? Are any of these exchanges amenable to new urban management practices? (Speakers: TBD)

12. Urban Ditches: Prospects for Low Cost Retrofits ? Development in exurban and rural pervious land is often served by ditches rather than storm drains, particularly in the coastal plain and along highways. Do ditches have different nutrient processing mechanisms than storm drain pipes? Are the amount of nutrients processed or

transported via highway ditches related to traffic volumes? If so, can these functions be enhanced by retrofits? (Speakers: Bill Wolinski, Talbot County, MD SHA)

13. Next Steps in the Process for Defining Pervious Land in the CBWM. The final interactive session would feature a facilitated discussion to identify critical research needs and define a draft charge for a future expert panel.

7. Proposed Timeframe: The following schedule is recommended to integrate the STAC workshop findings with a future expert panel and the ongoing efforts to improve the CBWM.

Steering Committee Refines Agenda:	August to October, 2013
Two Day STAC Workshop:	November 2013
LUWG/FWG/USWG Define Expert Panel Charge	January, 2014
STAC Workshop Report:	February, 2014
Urban Land Use Loadings Expert Panel Launched	March, 2014
Expert Panel Recommendations	September, 2014
Get Feedback from CBP Work Groups	November, 2014
Commence Refinements to CBWM	mid -2015
Mid Point Assessment/Phase 6 of Model	2016-2017

8. Resources Needed: About 10K for meeting costs and out of Bay speaker travel.

9. Previous Experience: CSN has extensive experience in arranging workshops and meetings, such as the July 2012 workshop on Floating Treatment Wetland/Algal Turf Scrubbers Research Workshop that directly led to two CBP expert panels. The workshop also builds on the 2012 STAC workshop 'The Role of Natural Landscape Features in the Fate and Transport of Nutrients and Sediment'

10. Workshop Product: Summary of current research on pervious area mapping and loading rates and recommendations for a charge for a future CBP expert panel on urban land use loading rates which will be used by CBPO and partners to make key decisions in Phase 6 of the CBWM. CBPO funding is expected in 2014 to support the expert panel.

Foundations Document

A. Background Information

In October 2012, the CBP Water Quality Goal Implementation Team (WQGIT) held a two day retreat to identify critical priorities for the mid-point assessment for the Bay TMDL. One of the high priority issues that was identified was to improve the resolution of urban land uses in the CBWM to produce more accurate loading rates for the urban sector. Currently, the CBWM uses only two urban land uses (pervious and impervious cover). The WQGIT directed that the recently formed Land Use Work Group (LUWG) develop a technical work plan to resolve the issue, with support from the Urban Stormwater Work Group (USWG).

In response, the LUWG developed a list of about 25 different possible urban land use classifications or sub-categories, but recognized major technical questions/gaps outlined in Section 5 of this workshop proposal. Both the USWG and LUWG concluded that an expert panel was warranted to provide solid scientific support on how to classify urban land use, in the context of their differential capability to export nutrients and sediments to the Bay. Given the highly interdisciplinary nature of the urban land use issue, both work groups agreed that a short term priority would be to conduct a research synthesis workshop to review available research, mapping and land use data, identify critical management and modeling issues to resolve any urban land use classification system and create a detailed charge for the panel to consider during its deliberation.

B. Relevance to Management Needs

As noted above, the urban land use classification system ranks as a high priority, critical path issue for CBP management since these decisions need to be made in the next year in order to meet the time-line for CBWM enhancements for the mid-point assessment in 2016 and 2017 (i.e., several additional years will be needed to acquire land use data and perform tasks related to model development, calibration and validation, etc.).

C. Current Issues Related to Workshop Topics

Both the USWG and LUWG have expressed concerns about the regional variability in nutrient and sediment loadings from pervious and impervious land in Version 5.3.2 of CBWM. This view has been reinforced by research recommendations contained in four approved expert panel BMP reports (CBP, 2012a, CBP, 2012b, CBP, 2013a and CBP 2013b). The stormwater retrofit panel and the state stormwater performance standard panel recommended a protocol to define removal rates for individual projects, but felt these more accurate rates were applied to variable urban loading rates that they could not fully understand or explain.

The urban nutrient management panel concluded that the fertilization status of pervious land should be considered in the next phase of CBWM, along with high risk factors for nutrient export. The stream restoration panel developed protocols that indicated that the headwater stream system was a significant source of both sediment and nutrients in

urban watersheds, and that the export and delivery of these pollutants was poorly represented in the current version of CBWM.

Two other ongoing panels (illicit discharge elimination and erosion and sediment control) will be making research and modeling recommendations later this year in regard to how the CBWM could be improved to better represent these urban pollutant sources.

D. Expertise Needed:

A wide range of interdisciplinary expertise is needed for the workshop, beginning with urban hydrologists and surface runoff monitoring experts that have been measuring the pollutant concentrations and runoff volumes produced from different urban land covers. Further insight is needed from scientists that have been measuring internal nutrient dynamics in the urban landscape at the micro scale (streets, roofs, soils, lawns, groundwater floodplains, streams, construction sites, forest fragments etc.) as well as those that measure aggregate pollutant concentrations and loads at the watershed scale.

The perspective of geographers and mapping experts is needed to define what kind of land uses/covers can be measured accurately at the scale of the Bay watershed, and within the river-basin segments of the CBWM. Further input is also needed from the CBPO modeling team to ensure that the lumping or splitting of any urban land use classification scheme will ultimately be compatible with the next generation of CBWM and Scenario Builder and can be adequately calibrated and validated. Lastly, the input of the TMDL user community -- local land use planners, municipal stormwater agencies, watershed planners -- will be essential to make sure the loadings from the land use are integrated with the urban best management practices use to reduce them.

E. Questions to be Addressed at Workshop:
See Sections 5 and 6 of preceding workshop proposal

F. Workshop Products/Expectations
See Section 10 of preceding proposal

G. Why a Workshop is Needed to Resolve the Issue
See Part A, B, C and D Above

H. Timeline
See Section 7 of preceding proposal

I. References Cited

Chesapeake Bay Program (CBP). 2012a. Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects. CBP--Approved Final Report. October 16, 2012. Prepared by T. Schueler and C. Lane. Chesapeake Stormwater Network. Ellicott City, MD.

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