Chesapeake Bay Program
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Dr. Kirk Havens, Chair
CBP Scientific and Technical Advisory Committee
645 Contees Wharf Road
P.O. Box 28
Edgewater, Maryland 21037

Dear Dr. Havens:

Thank you for the opportunity to respond to the Scientific and Technical Advisory Committee's (STAC) report entitled "The Peculiarities of Pervious Cover: A Research Synthesis on Allocating Pollutant Loads to Urban Land Uses in the Chesapeake Bay". The Chesapeake Bay Program (CBP) partnership is appreciative that the subject and timing of this report supports our collective efforts to create the Phase 6 version of the Chesapeake Bay Program Watershed Model (CBWM) to be used to support collaborative decisions by the partners starting in 2017.

The CBP workgroups charged with making decisions on the Phase 6 CBWM have already built in many of the results of the workshop based on members' participation. We are addressing the specific recommendations as follows.

No further subdivision of impervious cover is warranted on the basis of general land use, given that the loads are not different at the watershed scale (with the exception of the proposed transport land use sub-category).

The CBP's Land Use Workgroup (LUWG) and Urban Stormwater Workgroup (USWG) concur with STAC's findings. Based on the loading rate literature, impervious surfaces will be represented in the Phase 6 model by two classes: Impervious Surface-Roads (i.e., paved and unpaved roads and bridges) and Impervious Surface-Non Roads (i.e., buildings, driveways, sidewalks, parking lots, runways and some private roads). There is a third potential class of impervious surface, Farmstead Impervious Surface, which is under consideration due to the unique BMPs applied to control loads from impervious surfaces surrounding animal operations.

It is not advisable at this time to differentiate connected/disconnected impervious cover in the CBWM. This is due to the lack of generalized spatial information on impervious cover type, necessitating on the ground surveys to make this distinction.

The CBP's LUWG and USWG concur with STAC's findings that regional impervious cover data are insufficient to characterize the hydrologic connectivity of impervious surfaces throughout the Bay watershed. As noted in the report, soil infiltration rates, slopes, path lengths, and vegetative cover also

vary spatially and impact measures of hydrologic connectivity. Moreover, the literature shows that connectivity is affected by storm intensity, duration, and pattern and measures of connectivity may vary for nutrient vs sediment processes. We have insufficient understanding of these processes and data to model them for the Phase 6 watershed model.

A small group should be formed to develop operational methods to allocate sediment and nutrient loads to the urban stream corridor, and make corresponding reductions to target loads for impervious and pervious cover. It is also recommended that the methods should be piloted in the limited "data-rich" urban watersheds in the Bay watershed, such as Difficult Run in Virginia and/or Baltimore City/County streams.

The CBP's LUWG and USWG are exploring the possibility of improving our representation of urban and rural sediment processes through support from the U.S. Geological Survey (USGS), Center for Watershed Protection (CWP), and West Virginia University (WVU). The CWP has developed estimates of stream sediment ratios (ratio of sediment originating from the stream corridor vs upland erosion) for the sub-watersheds in the Baltimore area by comparing storm sewer outfall sediment concentrations with instream measures. The USGS and WVU have developed automated algorithms to extract fluvial geomorphic features (e.g., channel width, depth, bank angle, floodplain width) from LiDAR data and compared the results (favorably) with field measurements of the same metrics. USGS is currently developing statistical relationships between these automated measures and field assessments of bank erosion and floodplain deposition in the Piedmont and Ridge and Valley provinces which will be used to improve the Phase 6 representation of sediment processes. Considering that the condition of the stream is dependent on the upstream watershed and that these conditions vary across the watershed, the CBP will carefully evaluate any proposed methods to reflect this understanding such that the modeled load changes due to upland and in-stream management practices are accurately represented. We note that some have expressed a concern that, should stream corridors be accounted separately, effective implementation issues could arise with respect to a dissociation of streams from their upland land uses.

Several critical research projects are needed to improve our understanding of urban nutrient inputs that should be completed during the Midpoint Assessment to better simulate them in the Phase 6 model.

Under the direction of the USWG, efforts are underway to encourage the states to gather the more detailed non-farm fertilizer sales data that will be needed to more precisely quantify this key input into the model. There also is ongoing discussion about launching a monitoring study to better characterize the discharge of nutrients from construction sites and to research the water quality impacts of leaf detritus and other organic matter deposited on impervious surfaces and delivered to urban streams through storm drain systems.

While new pervious land sub-categories made sense in theory, it would be impractical to implement in Phase 6 due to a lack of source information and mapping capability.

The CBP's LUWG and USWG agree with STAC's recommendation. No distinction will be made between fertilized and unfertilized turf grass or among the various factors associated with nutrient export risk due to the lack of data to spatially discern such differences. However, "Open space - herbaceous" will be added which will include such categories as non-fertilized herbaceous and barren cover that is justifiably not turf or extractive. Beaches, vacant lots, abandoned/fallow agricultural fields, transmission line right-of-ways, junkyards, fairgrounds, some gravel roads, and railroads will fall under this class.

Urban tree canopy should be considered as either (a) a unique category of pervious land, (b) a pervious land use layer, or (c) treated as an urban BMP, depending on the science available. More work is needed from the FWG (Forestry Work Group) and LUWG in the coming months to recommend the best approach and develop guidelines for its implementation.

The CBP's LUWG and FWG have determined that tree canopy throughout the watershed can be mapped and does affect nutrient loads from both impervious and pervious surfaces. The LUWG has focused its attention on mapping "Tree Canopy" as defined generally as all small fragments of trees and/or shrubs less than 1-acre with an assumed managed herbaceous understory. Such fragments are not exclusive to "urban" areas but are found across the development spectrum from rural to densely urbanized areas. As of this writing, the U.S. Forest Service and a CBP Urban Tree Canopy Expert Panel are investigating ways to quantify the loading differences between tree canopy and other land uses.

On behalf of the Management Board, I want to thank you for your timely and well-supported recommendations. Please extend our gratitude to the workgroup for the time and effort involved in the production of this report. We greatly appreciate the ongoing role of STAC in serving as an independent review body directly towards continually improving our overall management of the Chesapeake Bay and watershed restoration efforts.

Sincerely,

Nicholas A. DiPasquale, Chair
Management Board

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