An Update (from the May 5, 2010 JCAR Hearing) on Imperviousness and Population Increases in the Chesapeake Bay Watershed

January 11, 2011

Presented by Michael S. Rolband
P.E., P.W.S., P.W.D., LEED® AP

Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive · Suite 100
Gainesville · Virginia 20155
www.wetlandstudies.com

Update:

Growth Ratio

In May, the primary issue was the 5:1 growth ratio claim.

EPA has since removed that claim from their website.

Source	Time Period	Impervious Surface Growth	Population Growth[1]	Ratio of Impervious Surface Growth to Population Growth
EPA Sound Bite	1990-2000	41.0%	8.0%	5.1 : 1
Phase 5.3 Model (used for TMDL)	1985-2007	19.2%	26.5%	0.7 : 1
Phase 5.3mod Model (expected)	**1984-2006**	**30.1%[2]**	**26.2%**	**1.1 : 1**

1. Based on US Census estimates.
2. Estimated from spreadsheet "Phase5.3mod_LandUse_Statistics_excl_wooded.xls," received 6/3/2010 via email from Peter Claggett (USGS) to Mike Rolband (WSSI).

Impervious and Pervious Urban Areas

EPA's response to the ratio question uncovered another problem: developed areas.

Current Surface Area Estimate:

Model Version	Analysis Year	Impervious Surface (ac)	Pervious Surface (ac)
Phase 5.3 Model (used for TMDL)	2002	675,917	1,885,935
Phase 5.3mod [1] Model (expected) (excluding suburb and rural wooded areas)	2001	1,569,377	3,442,346
Percent Increase from Phase 5.3	**--**	**132%**	**83%**

Note 1. Surface area acreages were received in a 6/2/2010 e-mail from Peter Claggett (USGS) to Mike Rolband (WSSI).

EPA will formally update the surface areas for the creation of the Phase II WIPs. The data was expected to be available **to a limited audience** last week (per a phone discussion between Peter Claggett (USGS) and Bethany Bezak (WSSI) on 1/3/2011), but further information was not available to WSSI at the time this presentation was prepared.

Potential Effect:

How Does This Update Affect the TMDL?

We expect that the:

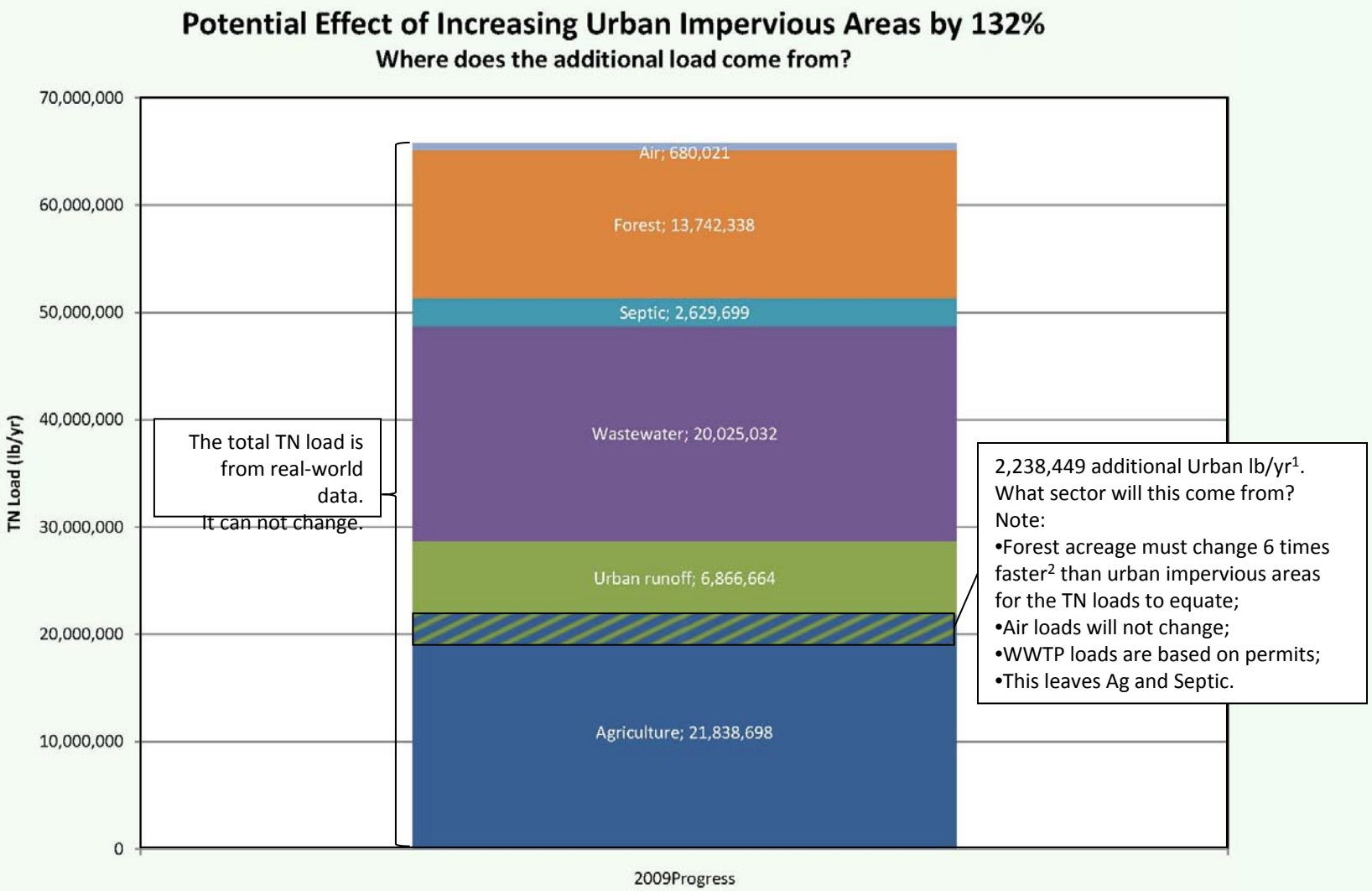
•**Impervious pollutant loads will more than double** because it is equal to the area times the loading rate
(EPA has indicated that the loading rates will not change);

•**Pervious pollutant loads will stay the same** (or close) because it is based on fertilizer sales; and

•**Pollutant load reduction requirements will increase** because the WIP requires the urban sector to reduce a percentage of the urban load.
(Note that the original WIP required the urban sector to retrofit a *percentage of the impervious area;* the final WIP requires a load reduction instead. This is an improvement!)

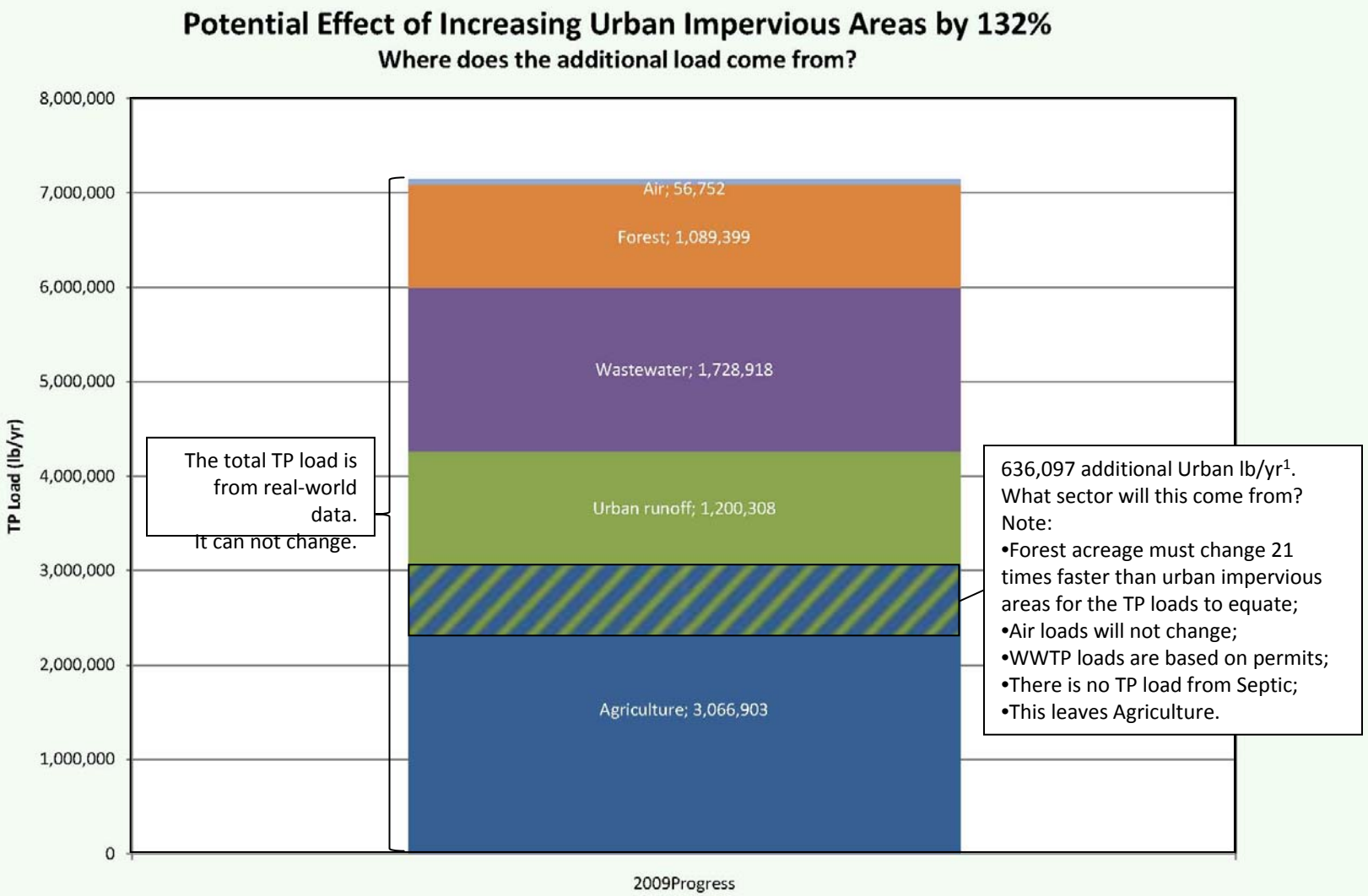
This will affect all sectors because the sum of pollutants in the Bay must remain constant.

Potential Effect on TN Loads:



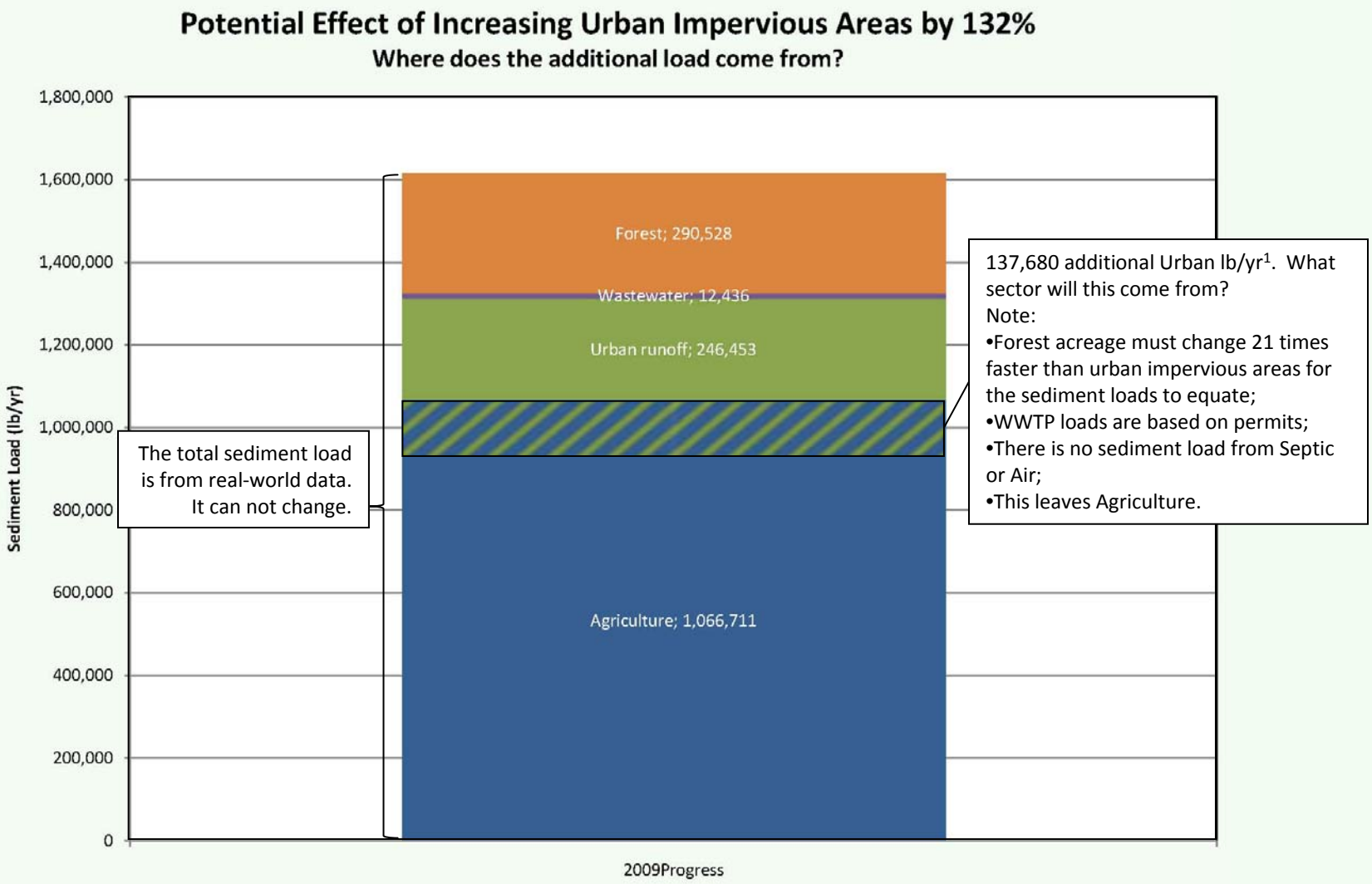
1. The additional urban load equates to the 2009Progress TN load from impervious urban surfaces (1,695,795 lb/ac/yr) times 132%. WSSI assumed no change in the TN load from pervious surfaces.
2. Urban impervious TN loading rate = 11.8 lb/ac/yr
   Forested TN loading rate = 2.0 lb/ac/yr
   Ratio = 12:1

Potential Effect on TP Loads:



1. The additional urban load equates to the 2009Progress TP load from impervious urban surfaces (481,891 lb/ac/yr) times 132%. WSSI assumed no change in the TP load from pervious surfaces.
2. Urban impervious TP loading rate = 2.1 lb/ac/yr
   Forested TN loading rate = 0.1 lb/ac/yr
   Ratio = 21:1

Potential Effect on Sediment Loads:



1. The additional urban load equates to the 2009Progress sediment load from impervious urban surfaces (104,303 lb/ac/yr) times 132%. WSSI assumed no change in the sediment load from pervious surfaces.
2. WSSI assumes sediment to be proportional to TP.