

**TURFGRASS RESTRICTIONS DRIVEN BY
REGULATORY SCIENCE: A FOCUS ON THE
CHESAPEAKE BAY AND BEYOND**

before the
Lawn Care Summit
NPMA and PLANET

by
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OUTLINE

- I. What is the Chesapeake Bay and Why is it Important?
- II. The Health of the Chesapeake Bay
- III. Pollutant Limit Goals -- TMDLs
- IV. Prediction of Water Quality Impacts with Modelling
- V. Why Should You Care?
- VI. Conclusions & Recommendations

I. What is the Chesapeake Bay, and Why is it Important?

- It is the largest estuary in the U.S.
- The Chesapeake Bay watershed covers 64,000 mi², parts of 6 states + Washington DC, and more than 100,000 tributaries (EPA Chesapeake Bay Program website, 2010).
- 11,684 miles of shoreline.
- More than 16.6 million people live in the Chesapeake Bay watershed.



<http://www.fws.gov/chesapeakebay/newsletter/Fall04/Wildside.htm>

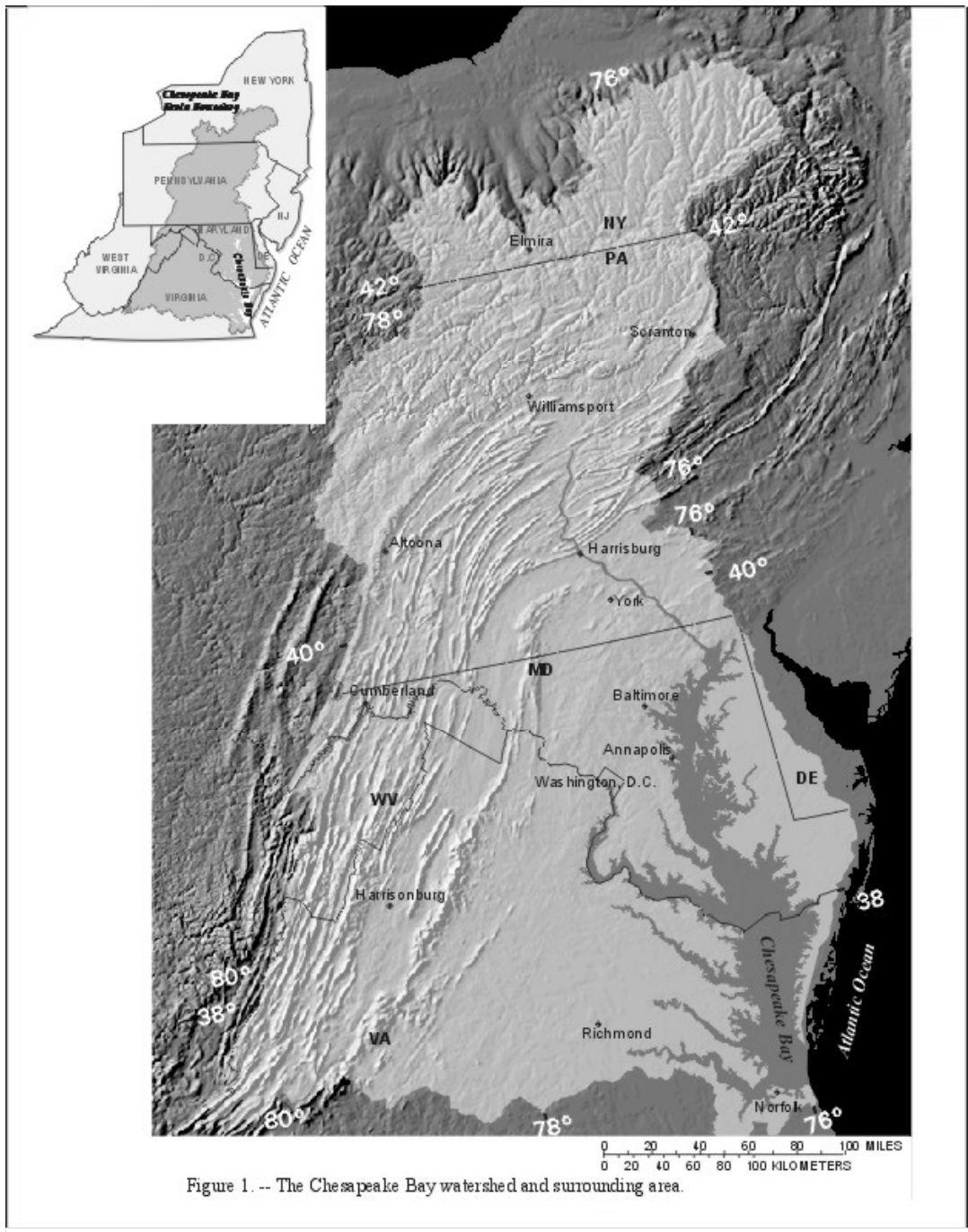


Figure 1. -- The Chesapeake Bay watershed and surrounding area.

The Importance of the Chesapeake Bay

- It produces approximately 500 million lb/yr of seafood, despite dramatic declines since the 1960s.
- 348 species of finfish, 173 species of shellfish, and winter home to 1 million waterfowl.
- Hunting and fishing.
- 3.8 million acres of turf in the watershed – ***the number 1 crop!*** (9.5% of total area; EPA, Section 5.1 of 5/12/10 federal land mgmt guidance).



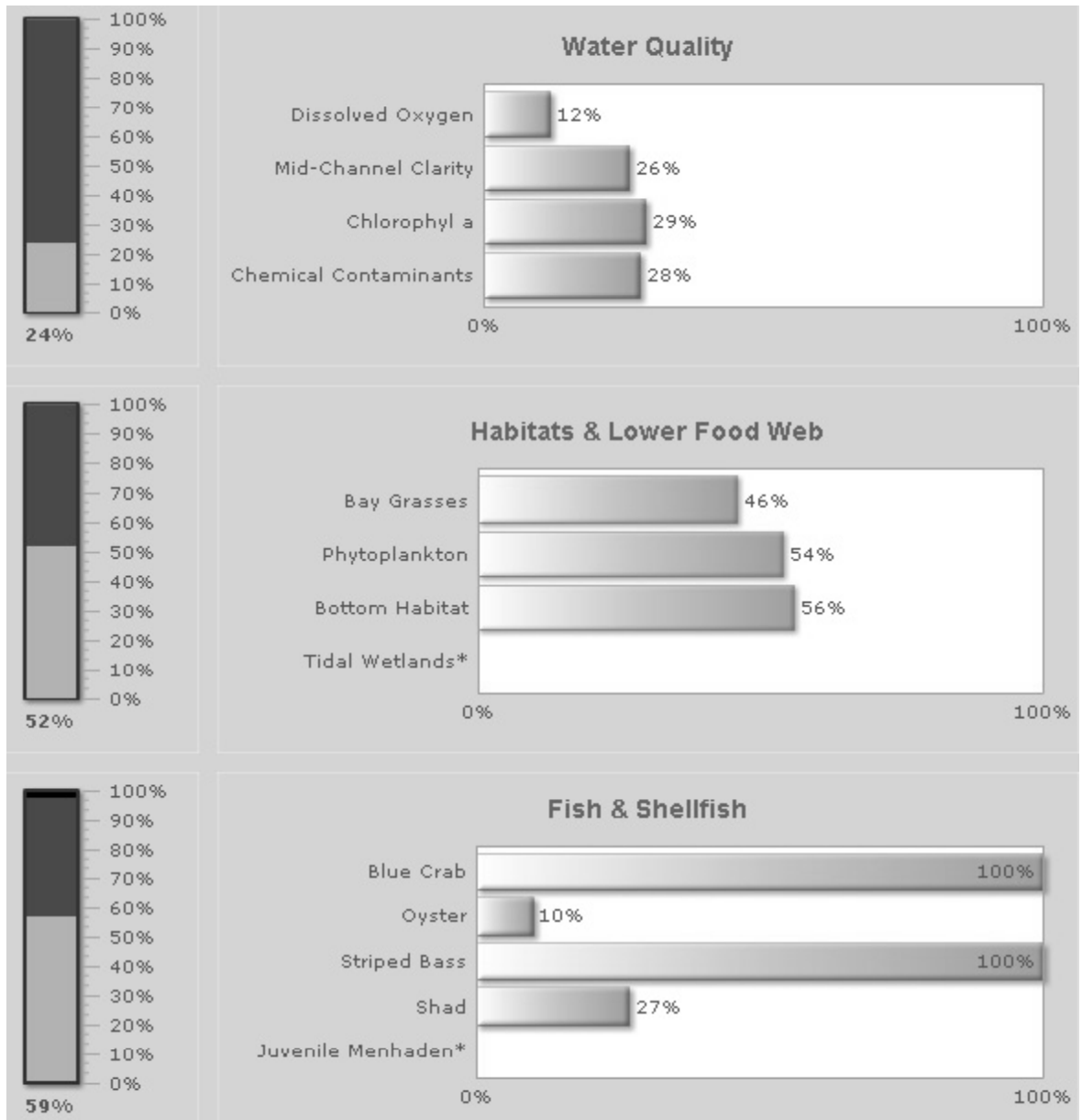
<http://blogs.smithsonianmag.com/science/2009/03/25/environmental-film-festival-review-who-killed-crassostrea-virginica/>



<http://www.nwf.org/Wildlife/Wild-Places/Chesapeake-Bay.aspx>

II. How Healthy is the Chesapeake Bay?

Not very healthy.



<http://www.chesapeakebay.net/images/BayHealthAnnual2009.jpg>

Chesapeake Bay Restoration Goals for 13 Indicators

- Dissolved oxygen
- Water clarity
- Chlorophyll a
- Chemical contaminants
- Underwater Bay grasses (“submerged aquatic vegetation [SAV])
- Bottom habitat (for aquatic invertebrates like stone flies and may flies [fish food])
- Phytoplankton
- Tidal wetlands abundance
- Blue crab abundance (success! sustainable?)
- Striped bass (rockfish) (success! sustainable?)
- Native oyster abundance
- Shad abundance
- Menhaden abundance

III. The EPA's Goal is to Protect the Bay via the Use of TMDLs

Total Maximum Daily Loads for N, P, and sediments (TSS).

TMDLs are used to cap contaminant discharges to impaired surface water bodies; i.e., discharges must be below the TMDL: "... a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards." (EPA TMDL webpage)

TMDLs are often also expressed as an amount of contaminant per season or year.

That's all very nice. But why should we care, here, today?

Federal and state regulators around the country who are responsible for implementing TMDLs are watching this.

For those in the Bay watershed: the other shoe is about to drop.

TMDL-driven restrictions on N and P will very likely affect turf managers – discussed below.

TMDLs - - General

- TMDLs are developed pursuant to §303(d) of the Clean Water Act.
- Most TMDLs are based on pathogens, metals, nutrients, and sediment; there are also 24 other pollutant parameters (e.g., pesticides).
- There are 40,199 “impaired waters” surface water bodies with TMDLs in the US (11/22/10).
- States with the most approved TMDLs are PA > NH > KS > WV > ID > GA > MS > OH.

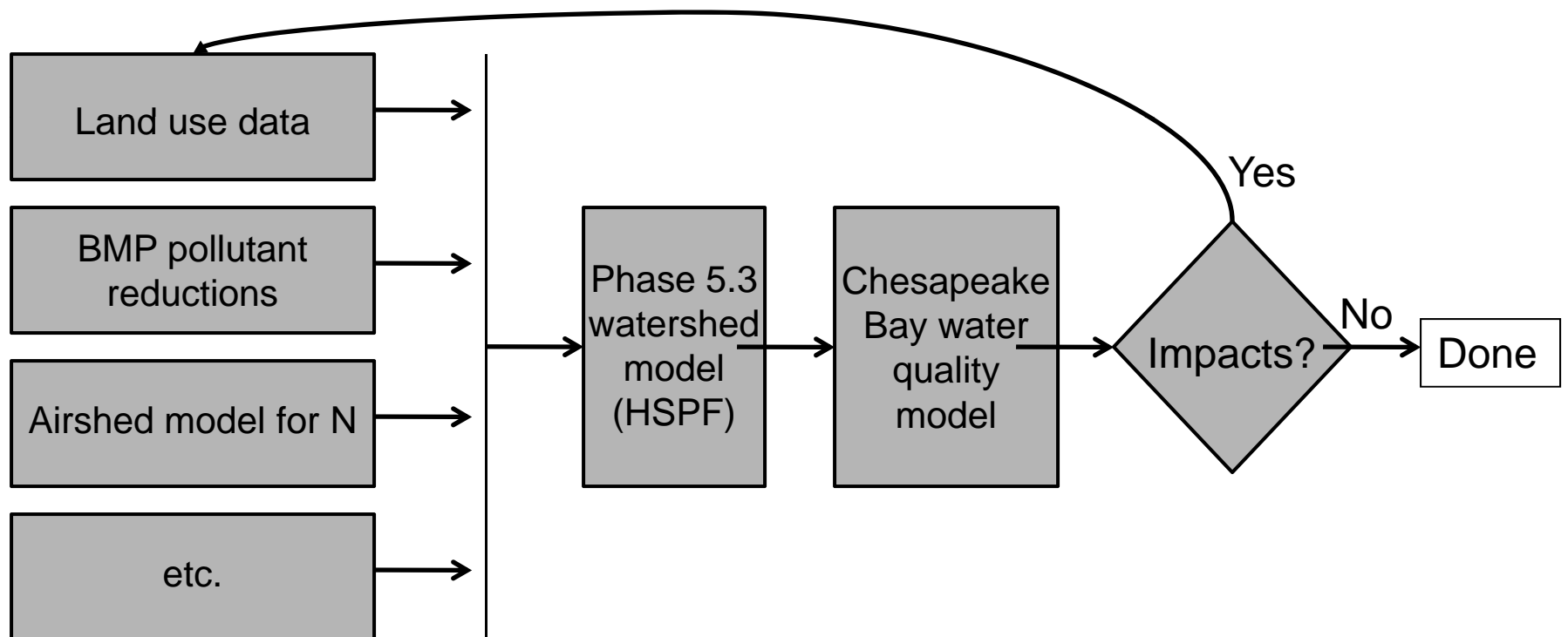
Why Should We Care (cont'd)

- They place limits on N, P, sediment and other contaminants of surface water.
- TMDLs can be used to impose restrictions on:
 - turf management (N & P)
 - turf areas (reductions).

Why Should We Care? (cont'd)

- The EPA's Chesapeake Bay TMDL is scheduled for completion December 31, 2010.
- By 2011, the EPA expects the States/D.C. to allocate their TMDLs down to the local level.
- What will the States/D.C. do? – Watershed Implementation Plans (WIPs).

IV. MODELLING: The Use of Computerized Calculations to Predict Water Quality Impacts



EPA-Modeled Contributions of Urban/Suburban Land Use to the Bay

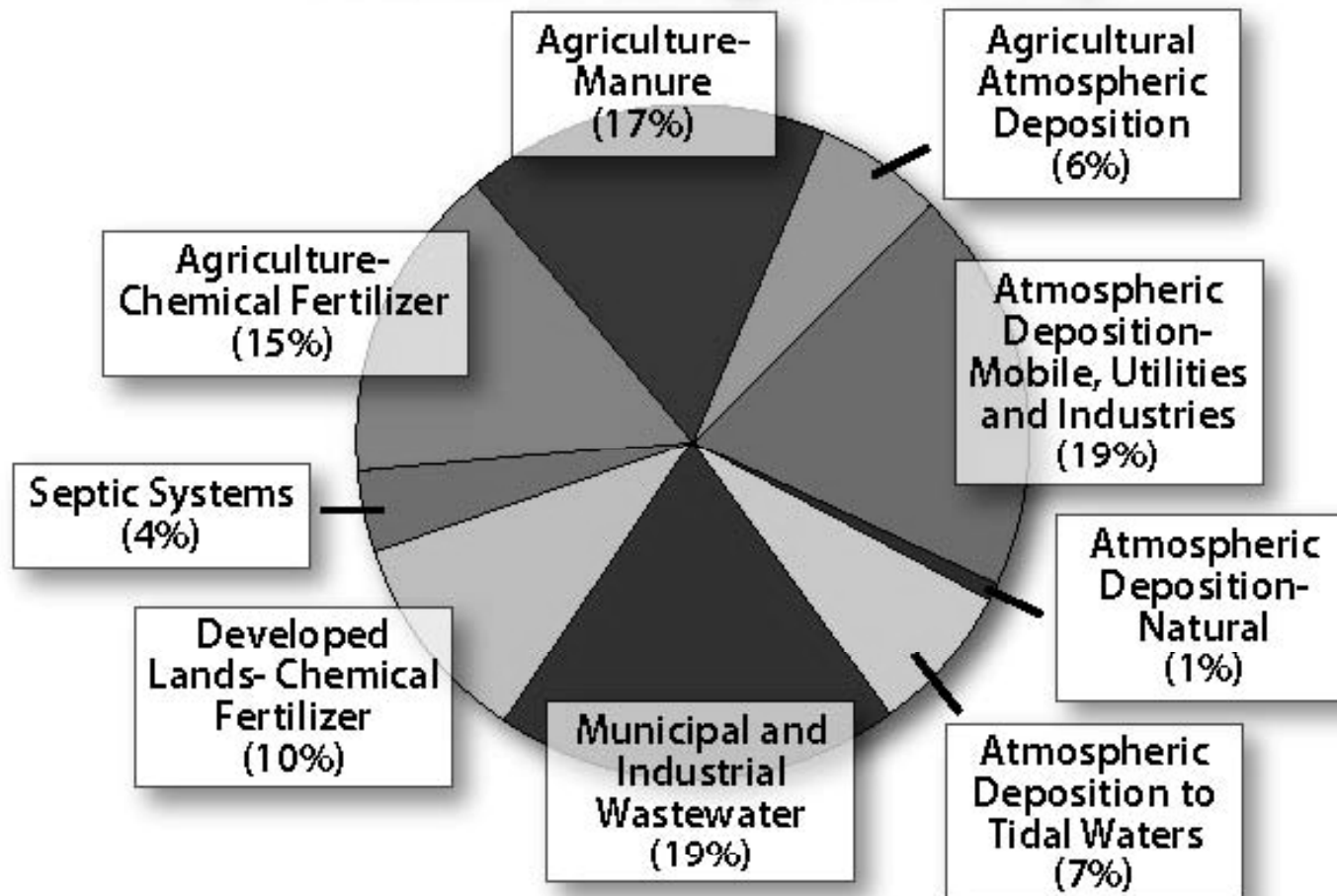
(estimates for 2009, published 9/24/10 [TMDL])

- 8% of the N.
- 15% of the P.
- 16% of the sediment.

(pp. 4-24, 4-41)

What is the Modeled Contribution of N to the Chesapeake Bay? (2008 data)

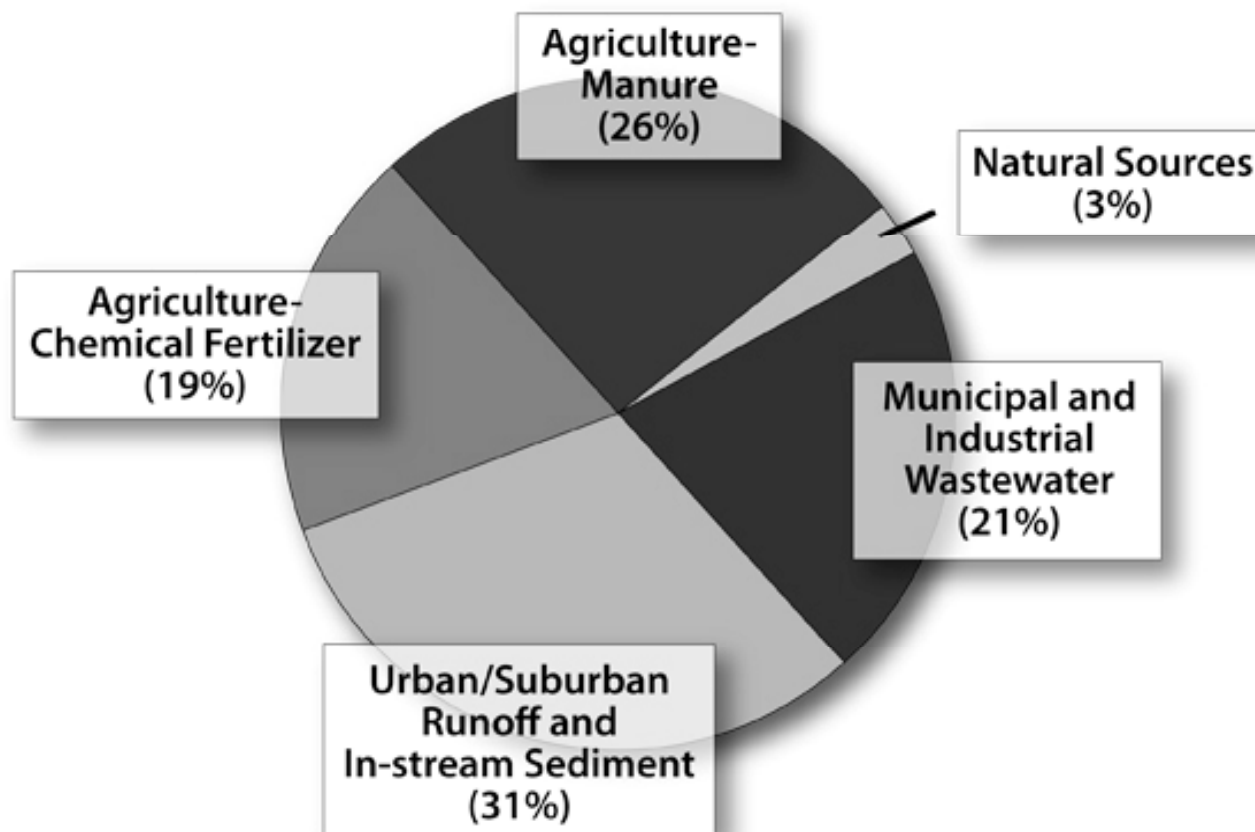
Sources of Nitrogen to the Bay



Note: Does not include loads from the ocean or tidal shoreline erosion. Wastewater loads are based on measured discharges; other loads are based on an average-hydrology year using the Chesapeake Bay Program Watershed Model Phase 4.3 (Chesapeake Bay Program Office, 2009). Values do not add up to 100% due to rounding.

What is the Modeled Contribution of P to the Chesapeake Bay?

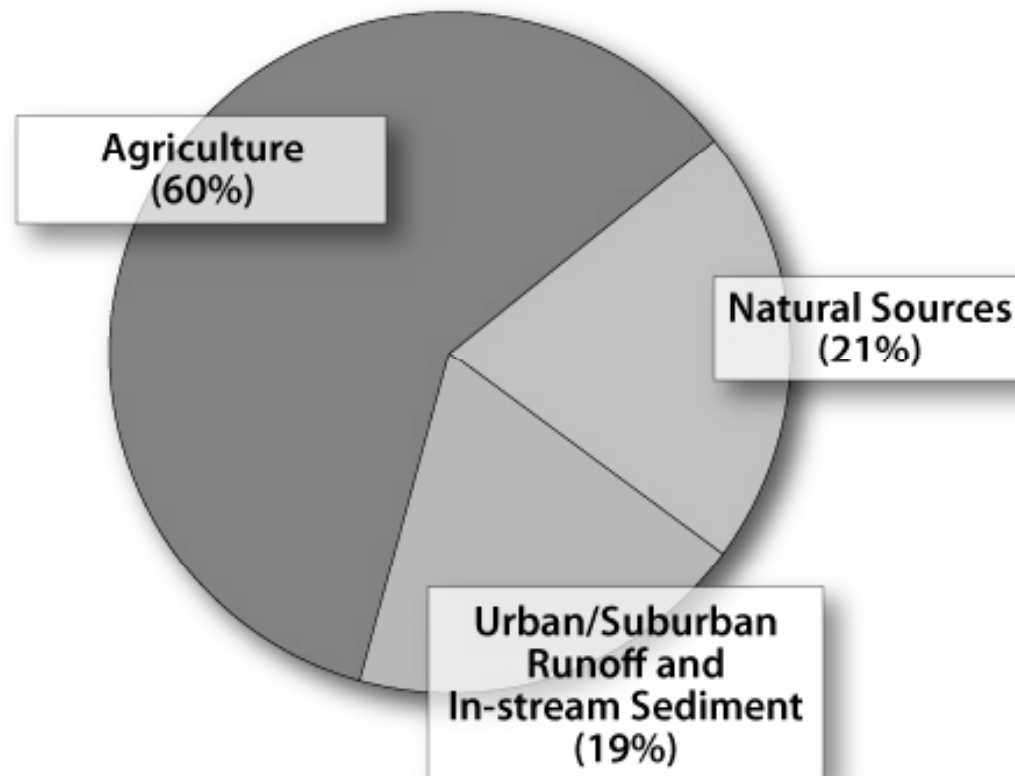
Sources of Phosphorus to the Bay



Note: Does not include loads from the ocean or tidal shoreline erosion. Wastewater loads are based on measured discharges; other loads are based on an average-hydrology year using the Chesapeake Bay Program Watershed Model Phase 4.3 (Chesapeake Bay Program Office, 2009).

What is the Modeled Contribution of Sediment (TSS) to the Chesapeake Bay?

Sources of Sediment to the Bay



Note: Does not include loads from the ocean or tidal shoreline erosion. Loads are based on an average-hydrology year using the Chesapeake Bay Program Watershed Model Phase 4.3 (Chesapeake Bay Program Office, 2009).

Conclusions from the Modeling

- Agriculture is the largest single contributor of N, P, & TSS via fertilizers, tilled cropland, and application of manure. Significant improvements since 1985.
- Urban/suburban fertilization is a relatively small contributor. (But is it 'low hanging fruit'?) Pervious and impervious surfaces, low and high intensity, modern stormwater mgmt, all considered.
- For TP and TSS: VA > PA > MD. For TN: PA > VA > MD (Figs. 4-1 to -3, 9/24/10 TMDL).

Modeling/TMDL Uncertainties

(from 11/8/10 comments by an ag/pesticides consortium)

- The modeling inputs were not made available for review (critical; focus on Scenario Builder).
- Ag BMPs under represented.
- EPA has not stated the degree of uncertainty in the models nor the modeling results; rather, “... the uncertainty *[sic]* of the suite of models is minimized.” (p.5-1, TMDL)
- EPA rushed the states into producing their WIPs.

Modeling/TMDL Uncertainties

(from 11/8/10 comments, cont'd)

- The Revised Universal Soil Loss Equation over predicts sediment loss.
- Over estimates of fertilization, based in part on assumption of low degree of ag fertilizer BMPs.
- [Given this fact, and my concerns, I am skeptical that appropriate fertilizer loads for urban landscapes were used.]
- [My concern re: assumes 2 ppm N loss from all turf.]
- 12/29/09 threat letter.

V. Why Care? Uh Oh.

From a June, 2010 letter sent to the 6 Bay governors and D.C. mayor, endorsed by 58 senior policy leaders and senior scientists. (Weingrad, Hughes et al., 2010):

- They advocate costly retrofitting of existing developed areas to limit stormwater contaminant discharges to pre-development rates.
- “13) Measures to reduce or eliminate fertilizer usage on residential lawns, golf courses, and public lands should be included in your state’s WIP, including measures to prohibit phosphorus in fertilizers sold for maintenance of such properties.”

More Uh Oh

- Pressures on builders may force them to reduce the areas of managed turf. (See the next 3 slides.)
- Pressures on builders may force them to establish HOAs that restrict or prohibit fertilizer application. (See the next 3 slides.)
- If this is done, will TSS (total suspended solids [sediments]) increase? Will P increase?



Richard L. LaNore, MRW Lawns, Inc.

Excerpts from a Draft White Paper by a Builder's Association in the Mid-Atlantic Region

- “Trees should be encouraged along with natural vegetation instead of turfgrass. (EPA is seeking to limit turfgrass around the Bay and replace it with natural vegetation.)
- HOA governing documents will control grass cover, plant types, use of fertilizer, septic system maintenance (if septic tanks are installed), and homeowner protection of stormwater controls (and, if required, stormwater maintenance requirements).
- HOA governing documents will provide authority to expand and keep pace with the science of protecting the local water quality without having to get a majority vote of the Member constituency.”

Draft Builder's Proposal (cont'd)

- “Fertilizer Application
 - Limits phosphorus to first year only
 - Fertilizer application should probably be limited to a window period in the fall only
 - Limits use of fertilizer in terms of pounds per 1,000 sf
 - Limits number of applications per annum
 - Required only certain type
 - Fertilizer to be applied to lawn surface only, avoiding application to any paved surfaces

- HOA/Homeowner provided information on proper lawn mowing (height of cut when mowing) and maintaining grass clippings on lawn.”

Guidance to Federal Land Managers

First proposed for comments in March, 2010.

Unrealistic assumptions were made about turfgrass management, then EPA concluded in the proposed draft: *“Using those statistics and the turf estimates noted above, 227.5 million pounds of N are applied to turf areas each year.”*

I commented (4/23/10): ***“If a more reasonable assumption of 58 lb N/A is applied (the midpoint of the 36-80 lb N/A range below) to 45% of the 3.8 million A stated at the beginning of section 5.1, then a more realistic turf N loading number would be 99 million pounds, not the 227.5 million pound figure listed twice in the section.”***

Guidance to Federal Land Managers (cont'd)

So how did EPA consider the comments? The EPA *increased its estimate of N loading to the watershed in the final version (5/12/10)*. “Annual N applied to turf areas in the watershed, estimated using the definitions of high-input and low-input turf presented above, is approximately **389 million pounds of N per year.**¹ Such a magnitude of N use in the watershed underscores the need for management practices that reduce risk, ranging from high-quality nutrient management planning and implementation by institutions to turf reduction actions, to prevent excess N from entering the Bay.”

These assumptions are official and readily available to all regulators throughout the country.

In other words, ***turf now has a bullseye on its back.***

Guidance to Federal Land Managers (cont'd)

EPA ASSUMPTIONS

- Half of the lawn area and 1/3 of public turf are managed as high input: 4 lb N/1000 ft². This ignores the high percentage of lawn area (e.g., back yards) where minimal N is applied.
- The remaining areas are managed as low input turf: 1 lb N/1000 ft².
- There is no specific category for zero N – supposedly included within low input.
- Why not use Scott's data?

VI. Conclusions & Recommendations

Turf is Low Hanging Fruit (sorry, botanists)

- It's not a crop.
- The science is not well understood.
- The turf constituency is not extensive nor well organized.
- Bad science by the EPA guidance document authors indicate one can get 'more bangs for the buck' by hitting turf with a big hammer.

Note: record-keeping requirements may increase.

Conclusions & Recommendations

Do Research

- For those in the Bay watershed: what does your State's WIP state about turf?
- For those not in the Bay watershed: are there TMDLs relevant to your practice areas?

Get Involved

- Consult your local association's leaders and lobbyist, and ask: should our focus be the EPA, the State, or both?
- Find a way to communicate the science: ***turf yields fewer bangs for the buck.***