Nutrient loss from turf

CAC – January 14, 2016

STAC workgroup

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CAC resolution – part 1

- The Residential Fertilization Sub-committee of the CAC has recommended to the CAC and the CAC thus recommends to the Board that research on the nitrogen and phosphorus loads flowing into the bays as a result residential fertilization from increased development in the watershed be initiated. This information is necessary to understand the impact of this potentially important source of pollution on the estuary and to determine any actions that could help implement the CCMP in regards. This recommendation is consistent with Actions E., E1, and F of the Nutrient Management Focus Area of the 2012 CCMP Addendum.

Resolution - part 2

This research would include but not be limited to:

- Estimating the current and proposed acreage of lawns in the watershed,
- Researching literature for models to determine loading rates of N and P from lawns into the inland bays
- Determining the effects and impact of laws in adjoining states, which have mandated decreased content of nitrogen and very limited use of phosphorus in lawn fertilizers.
- Approved by CIB Executive Board – Oct 8-15

STAC Response

- Form working group and plan – no budget
- Review Barnegat and Chesapeake resources
- Limited lit and web searches
- Phone conferences
- Contact regional experts

- N and P exports from turf and other
- CBP Model Project drives everything
- Many good resources – e.g., Livable Lawns
- Bigger fish to fry….

Estimating land in turf

- In-state resources not adequate for this task
- Chesapeake Bay Program method will likely be the *de facto* method…… once it is released

Nutrient Loss

Nutrient export coefficients			
Land Cover		N loss (kg/ha-yr)	P loss (kg/ha-yr)
Turf		1 to 4	0.01 to 1
Row crop agriculture - DE		> 20	0.1 to ~ 3
		(lb/ac-yr)	(lb/ac-yr)
Turf		0.89 - 3.56	0.0089 - 0.89
Row crop agriculture - DE		> 17.8	0.089 - 2.67
Nutrient export ratios - Ag : Turf			Land area
N	5 to >20		Ag:urban
P	1 to 3		3.6 : 1

Turf is a minor contributor to N load, somewhat more important contributor to P load

Nutrient loss - 2007 land cover & mid-range export coefficients

Land use	Area (sq km)	annual P loss (kg/yr)	annual N loss (kg/yr)
Ag	272	27247	681167
Developed*	184	4597	36778

*** If all developed land were turf**

DE and other states

- DE Dept of Agriculture - Nutrient Management Program tracks fertilizer use and enforces rules – both ag and turf
- DE turf fertilizer sales a small part of the mid-Atlantic market
- DE Livable Lawns developed from same resources as laws in MD, NJ, and VA
- Education and training available thru UD Cooperative Extension

Bigger fish….. Legacy P

- ~ 60 % of Sussex ag soil samples excessive or greater levels of soil test P, ~20 % are optimum (UD Soil Testing Lab)
- Led to Nutrient Management Law, Regulations, and Programs
- Reservoir of P in soil is parallel to N in groundwater – very long drawdown
- *P mass in stream and bay sediments largely unknown*

Estimate of legacy P magnitude

P mass (kg) for top 15 cm (6 in) of a typical sandy soil		
	STP* (mg/kg)	P (million kg)
Low-medium	<50	0.5
Optimum	51-100	1
Excessive	>101	4.4
Total		5.9

**Melich 3 Soil Test P*

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