Urban Fertilizer Application Rates Phase 6 Modeling

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Urban Stormwater Workgroup Meeting
February 20, 2018
11:30 Urban Nutrient Management Update
(Jeff Sweeney, EPA)

• Jeff will discuss how the new urban nutrient application method in Phase 6 impacts the Urban Nutrient Management BMP.

• The USWG will then discuss a proposed approach to help states plan for nutrient reductions from new fertilizer legislation.
# Turfgrass Application Rates

## Phase 6 Model

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<tr>
<th>Nutrient</th>
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<td>Phosphorus</td>
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*Must be an actual plan or homeowner pledge*
Ten core lawn care practices that minimize the risk of N and P export (States may modify individual practices to meet unique terrain and conditions as long as they document the nutrient reduction benefit):

1) Maintenance of dense cover of grass or conservation landscaping to reduce runoff, prevent erosion, and retain nutrients;
2) Reduction or elimination of fertilizer through choosing not to fertilize OR reducing application in areas of low need OR applying less than one pound of total nitrogen per 1,000 square feet;
3) Prohibition of application before spring “green up” and after the grass becomes dormant;
4) Use of slow release nitrogen fertilizers;
5) Sweeping of fertilizer off of impervious surfaces;
6) Prohibition of fertilizer application within 15 to 20 feet of any water feature, and management of the prohibited zone as a grass, meadow or forest buffer;
7) Recycling of clippings and mulched leaves on the lawn to keep them out of streets and storm drains;
8) Minimum mowing height of 3 inches;
9) Use of other practices to increase the porosity and infiltration capability of your lawn to treat stormwater; and
10) Consultation with local extension service office or lawn care company to receive advice, including, but not limited to, soil test analyses.
Changes in application rates over time (as an impact of nutrient management) would be captured by sales data.

## Summary of Urban Fertilizer Management Credits for Phosphorus and Nitrogen

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USGS uses AAPFCO data but comes up with methods to fill in holes in the data, such as when a county didn’t report, or the sales data were not split between Farm and Non-Farm.

- Urban method has mass of fertilizer nutrients for each state distributed to one “crop” type = turfgrass
- Additional credit for practices that make up nutrient management – depending on high-risk, low-risk, blended
- USGS-processed data is not expected anytime soon to extrapolating from what we have.
Turfgrass Application Rates
Phase 6 Model

• Method captures variability among states for rural versus suburban.
• Using data that has other utilities nation-wide
• June 21, 2016 USWG decision:
  o The USWG approved the proposed method to vary nutrient application on urban lands in the Chesapeake Bay Watershed Model by jurisdiction and through time.
Turfgrass Application Rates
Phase 6 Model

• Jurisdiction’s concerns:
  o A lot of unexplained variation in the data
  o Regression lines are an oversimplification of what is occurring and does not capture the short-term variations
    ▪ USGS “use” data is better; USGS methods for National Water-Quality Assessment program for period 1987-2006
Nitrogen Urban Fertilizer
Turfgrass Application Rates
Phase 6

• Two components:
  o Fertilizer mass data
  o Pervious urban area data = turfgrass acres
    ▪ High-resolution land cover w/ USGS’s Landsat processing center’s back-casting methodology for land cover change 1984-2013 annual

• Non-farm fertilizer mass ÷ turfgrass acres = turfgrass application rate
Nitrogen Application Rates through 2006
lbs/acre by State

NY, PA, MD, VA, WV, DE, DC
Nitrogen Application Rates through 2012
lbs/acre with [DES] Projection
Nitrogen Fertilizer Use through 2006
kg Annually by State

NY
PA
MD
VA
WV
DE

million kg

Nitrogen Fertilizer Use through 2012
kg Annually by State

NY PA MD VA WV DE

million kg

Phosphorus Urban Fertilizer
Phosphorus Fertilizer Use through 2006
kg Annually by State

- NY
- PA
- MD
- VA
- WV
- DE

Million kg

Phosphorus Application Rates through 2006
lbs/acre by State

NY  PA  MD  VA  WV  DE  DC

lbs/acre

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Planning for Reduced Application Rates
WIPs and Milestones

- Request for mechanism to allow for benefits of planned reductions in turfgrass applications
- Only applied to plans (WIPs, Milestones)
Planning for Reduced Application Rates
WIPs and Milestones

Method

● Efficiency BMP based on Phase 6 model investigation
● Model study where fertilizer application rates on turfgrass were reduced 10%, 30%, 50%, 70%, and 90% - by jurisdiction
● What’s the associated response in loads?
Response is largely dependent on sensitivities = Change in edge-of-stream load is \( f(\text{change in inputs}) \); Varies by nutrient species, LU type and land-river segment.
## Change in Load with Change in Applications
### Nitrogen

<table>
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<tr>
<th>Load Source</th>
<th>Nutrient Species</th>
<th>P6 Sensitivity</th>
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<tr>
<td>Turf Grass (Non-Regulated + MS4)</td>
<td>NH₃</td>
<td>0.005</td>
</tr>
<tr>
<td>Turf Grass (Non-Regulated + MS4)</td>
<td>OrgN</td>
<td>0.009</td>
</tr>
<tr>
<td>Turf Grass (Non-Regulated + MS4)</td>
<td>NO₃</td>
<td>0.033</td>
</tr>
<tr>
<td>Tree Canopy over Turfgrass (Non-Regulated + MS4)</td>
<td>NH₃</td>
<td>0.004</td>
</tr>
<tr>
<td>Tree Canopy over Turfgrass (Non-Regulated + MS4)</td>
<td>OrgN</td>
<td>0.007</td>
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<td>NO₃</td>
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Change in Load with Change in Applications
Phosphorus
Proposal

- Add 10 new efficiency BMPs – UrbanFert10N, UrbanFert10P, UrbanFert30N, etc.
- Jurisdictions report planned affected acres for N and P separately depending on planned policies
- Not applicable to progress scenarios