Webinar: Tree Canopy Loading Rate Partnership Review

February 11, 2016
1:00 PM – 3:00 PM

To access a recording of this webinar, please visit the following link:
http://www.chesapeakebay.net/calendar/event/23466/

About the Webinar: This webinar was focused on the Tree Canopy Land Use Loading Rates for the Phase 6 of the Chesapeake Bay Watershed Model. Participants had the opportunity to get an in-depth presentation on the proposed methodology for the Tree Canopy loading rates, ask questions, and give input. The Forestry Workgroup's "Tree Canopy Land Use Response and Coordination Plan" provides detailed information on the background, progress to date, and next steps for partnership review/approval of the Tree Canopy land uses and loading rates.

Presenters: Neely Law (Center for Watershed Protection), Justin Hynicka (Maryland DNR Forest Service) and Marion Divers (University of Pittsburgh).

Timeline:

- February 22: deadline for feedback on loading rates and methods. Refer to the draft report on Tree Canopy Loading Rate Methodology and submit input to Julie Mawhorter, Chesapeake Bay Tree Canopy Coordinator (jmawhorter@fs.fed.us).
- Brief workgroups on methodology and seek their approval where needed:
  - March 2: Forestry Workgroup
  - March 2: Land Use Workgroup
  - March 3: Watershed Technical Workgroup
  - March TBD: Modeling Workgroup
  - March 14: Water Quality Goal Implementation Team
  - March 15: Urban Stormwater Workgroup

Participants on Adobe Connect:
Angela Johnson, Anne Hairston-Strang, Ashley Hall, Alana Hartman (WVDEP), Barbara White, Ben Sears (NYSDEC), Bryan Seipp, Delaware, Dinorah Dalmasy (MDE), Douglas, Eric Kuehler, Edward Heide, Jeff (MDE), Frank Rodgers (Cacapon Institute), James Davis-Martin, Jenny Tribo (HRPDC), Jessica Baylor, Matt Keefer, Nancy Sonti, Olivia Devereux, Erin Rountree, Dave Montali, Gary Shenk, Jaime (VADEQ), Judy Okay, Jessica Baylor, Julie, Justin Hynicka, Justin Shafer, K Brooks (VA DEQ), Kathleen Bertoldi (NTM Engineering), KC , Laura Miller, Kristy Woodall (DEQ VA), Marion, Neely Law (CWP), Nicholai Francis-Lau, Norm Goulet (NVRC), Renee Rever, Sarah Diebel (DoD CBP), Tanner Haid (Cacapon Institute), Tony Allred, Rob Feldt, Shannon McKenrick (MDE), Mark Symborski, Marty Hurd (DOEE), Karl Berger, George Onyllo (DOEE), Kate Bennett, Marcia Fox, Marian Honeczy, Barbara Brumbaugh, Stephanie Martins, Sue Kriebel

Questions

Q: Should you assume that all turf is fertilized?
A: That is an assumption made in an urban context as decided by the Urban Stormwater Workgroup and Modeling Workgroup. Fertilizer inputs are determined by other groups for the modeling tools, and for the purposes of this loading rate analysis we are emulating those assumptions to evaluate the relative effectiveness of tree canopy over turf compared to turf.
Post-meeting clarification: The fertilizer application rate applied in the modeling tools accounts for the fact that some lawns are fertilized and others are not. While there is a fertilizer input to acres of turf, it is not entirely accurate to say that "all turf is fertilized in the model." The global application rate for fertilizer on turf is developed based on assumptions that not all turf is fertilized.

Q: Is "impervious" defined in the context of the Phase 6 Model land uses as "roads" or "buildings and other"? Alternatively, is canopy over impervious intended to be a reduction from an area-weighted average of both of those land uses, as was discussed in September?
A: This analysis pertains mostly to roads. The percentage reduction would also be true for other impervious services, it just depends how those buildings are connected to the storm sewer, so that might change how we handle it. But it could probably be applied to all impervious surfaces.

Q: Slide 44 - is the 'Result' statement that reduction of nutrient loads from trees over turfgrass are likely directly proportional to reduction in water yield...is this based on data (i.e. computer program analysis showing direct relationship)?
A: There is no computing outlet from our model. We are pulling from the literature information on tree function at an ecosystem level. We did look at some of soil leachate work, for the most part there is not a huge difference in leachates turf grass versus beneath trees. The big question is whether it is fertilized. When dealing with fertilizer, there is a question about spatial variability. In this model, because we are doing relative loading rate, we are covering both ends of the spectrum. The relative difference would be similar whether fertilized or not.

Q: The Bay Model assumes that all turf is fertilized, including turf under trees. Were these loading rates estimated assuming that the turf was fertilized? And if not, how could the loading rates be changed to reflect that?
A: We assumed that all inputs of nitrogen, phosphorus and sediment were the same. The only thing we did was see how water yield changes across land uses, and applied the same amount of N, P, and sediment to that. One clear case we can point to is conifers – people don't want to go into them to fertilize. The assumption of fertilizer being used may not be true across all land uses but we are making assumption that all inputs are the same.

Q: Can you repeat where the interception rate of 0.05 in/storm and ET rate of 0.08 in/day for TC over turf come from?
A: This is pulled from several literature documents, to save time I would point you to our technical document.

Q: The reduction rates proposed here are a direct result of the modeling. I would like to hear some more discussion of the assumptions in that model...CN, hydrolog, etc
A: For the most part the assumptions of CN we basically used the recommendations from the USDA technical report. Hydrology is a different question, might need more clarification on that, so maybe another point to follow up on.

Q: Why did you look at just one year of data?
A: Because the Chesapeake Bay Watershed Model also looks at it year by year. We could expand it to look at previous rainfall in previous years.

Q: Slide 47 - why would the assumption be that trees intercept precipitation on leaves and branches and reduce intensity, volume, and velocity only over impervious and not over turfgrass?
A: Great question. We are not assuming that when you have tree over turf grass the tree isn't doing the same thing. It is just that there are factors in underlying land use that determine runoff. The amount generated from turf is a lot less than on impervious. So the energy of water running off will be reduced overall.

Q: Will the reduction rates here be applied to the Tree Planting BMP to ensure there is consistency between lands currently classified as tree canopy and those created in the future?
A: These proposed loading rates would only apply in Phase 6. The current Tree Planting BMP used for Phase 5.3.2 will remain unchanged. For phase 6, the recommendation from the BMP Expert Panel are coming in April or this Spring. The Panel is waiting for the results from this analysis, and will be making a recommendation afterwards.

Q: I might have missed this in the beginning of the presentation, but could you clarify what pollution sources you are assuming in this model?
A: For turf grass, inputs are fertilizer, nitrogen, phosphorus, and particles, both wet and dry deposition. This applies when are talking about direct benefits. For indirect benefits, we looked at nitrogen, phosphorus and sediment which become mobilized when you have erosion.

Q: Based on your last slides, it looks like the indirect effects of decreased flow and bank erosion from TC over impervious are not reflected in the proposed loading reduction (7%), is that correct?
A: That is correct. That 7% is just the reduced water volume. We will be working the next two weeks on the temporal effects of interception. So that is why we described the 7% as kind of being the floor, and the number might be raised. If we have data to adjust it upward, it would be described in March updates at all of the workgroup meetings in addition to other comments received. So likely it is 7% plus.

Q: Do the proposed reductions apply to N, P and S? Please describe the evidence supporting this.
A: Yes, we are using these proposed reductions across all three pollutants. I think there could be an opportunity for the indirect benefits to have slightly different rates, and that evidence is supported in the technical document we uploaded. For those indirect benefits, when we look at erosion, soil has three components: sediment mass, nitrogen inorganic matter and phosphorus so we can use those proportions to adjust the relative loading rate.

Q: Is the technical report you are referring to the 'tree canopy loading rate methodology draft'?
A: Yes.

Q: In Pennsylvania, we support the efforts to include tree canopy land uses and loading rates, as it supports several goals and objectives related to our work in the watershed.. However our folks have asked some process and modeling questions that are itemized in the Response and Coordination Plan dated 1/13/16. Will there be an effort to directly address these questions?
A: We did list out a number of modeling and programmatic questions that are beyond the scope of the science review. We will be picking up those issues in workgroup meetings and following up with individuals to discuss concerns. We will also be reporting updates at workgroup meetings.

Q: Do you have any other data available to you for soil leachate other than an annual amount so that seasonal variation could be applied instead of dividing by 365 to come up with the throughflow rate?
A: That throughflow assumption is really critical for the water balance model, but when applying water balance to nutrient fluxes we are dropping that out.

Q: It seems a stretch that all three pollutants would be directly proportional to runoff reduction, under all precipitation intensities, all tree types, and any time of the year.
A: Noted for future reference. What you could do is that if those pollutants have different rates for tree canopy, you apply the percent reduction to that.

Q: Could you try to tie your recommendations back to the literature?
A: This will be included in the technical document.

Q: Do you envision the reductions being applied to the acres under canopy?
A: Yes as they are mapped.

Q: Any consideration of the impact on efficiencies of other BMPs?
A: That is again another one of those important issues beyond the scope of our work but we want to work on this with the Urban Stormwater Workgroup.

Q: The resolution of canopy assessments could dramatically change the estimates for reductions. Would there be an opportunity to provide higher resolution UTC assessments that what the Chesapeake Bay model may use?
A: The plan is to incorporate the 1-meter land use resolution set when it becomes available in the summer so there will be high resolution tree canopy data for tree canopy and other land uses.

Q: Do you know what that resolution is?
A: It is based on one meter data and it is aggregated to 10 meters for the CB Watershed Model.

Q: Would annual growth of tree canopy be assumed and built into the Land change model or would jurisdictions need to report their annual acres under canopy?
A: For our purposes, the Expert Panel does not determine how those should be changed every year. As far as reporting on the BMPs, we are not talking about reporting total acres just new acres as a bmp. So I think the land use would stay consistent until we got an update.

Q: For urban areas the trees are often smaller and shorter, so 1 meter data provides drastically different canopy estimates than 6 inch. Could you clarify again if a community could supply higher resolution to adjust its loading ratios under the Chesapeake Bay model? Or are you planning to keep this standardized at 1 meter?
A: We have to defer this question to the Land Use Workgroup and others. They are working with locals to get high resolution data where available. So potentially there are opportunities to incorporate 6 inch data in certain places.

Q: I agree if the annual percent reduction in water yield by tree canopy is going to be used, historical rainfall data should be analyzed...not one year.
A: All sites have data that go back 10 years, the model is easy to run for every one of those years just a little bit of processing on backend. If people want to see this I am happy to accommodate that.

Q: How is this model influenced by different tree species, different sizes, different soil types?
A: We tried to use a value that would be representative of your average tree. Your tree species will influence performance at specific site, different soil types will influence that as well. We did our modeling based on one soil type. I don't expect the changes to be huge if we manipulated some things. I don't expect the overall percent to change a lot because leaching is driving a lot of it for pervious land uses.

In addition, the Expert Panel is looking more closely at tree species. We could potentially know which trees are going on the ground. As far as land use we don't have tree species data but we do have acreage data.
We are looking at the area of influence a tree can have with the canopy but we know the roots do stuff as well, so in some ways we underestimating the benefits.

Q: Does your report specify what these assumed averages are?
A: Yes, the values that we used in the model were in the presentation. The final report will provide more evidence for the range you might find across the Chesapeake Bay.

Q: What % of the total rainfall is the 0.05 in interception capacity?
A: Percent of total rainfall will depend on the storm. We are presenting daily rainfall data, the sum of precipitation over the year is what we are using to get the percentage reduction value.

Q: How do the analyses or lit review incorporate USFS i-Tree considerations, as these are commonly accepted?
A: The Expert Panel literature review on our summary of runoff reduction looked at studies that used the i-Tree model program, so the literature review incorporated those where available. The Expert Panel has looked closely at these tools to see how they can be incorporated to characterize this BMP. Many of the models reviewed used loading rates, none of them characterized modeling environment that would be suitable to the land use in question.
The i-Tree hydro model combined tree canopy over pervious and impervious and forest, so we have had to look elsewhere to tease that out, but we are comparing our results to the output of the i-Tree model.