Urban Stormwater Workgroup Meeting
Meeting Minutes
Tuesday, October 15th, 2024
10:00 AM - 11:45 AM
Meeting Materials

Summary of Actions and Decisions

Action: If USWG Members are interested in being proposal reviewers they should email David Wood, CSN (wood.csn@outlook.com).

10:00 Welcome and Review of May Meeting Minutes.
Norm Goulet, Chair.

10:05 Announcements and Updates

- Update on GIT Funding Proposal
  - The deadline for applications on the proposal is October 21st.

Action: If USWG Members are interested in being proposal reviewers they should email David Wood, CSN (wood.csn@outlook.com).

- UNM Panel Update
  - Kickoff for the panel was on September 24th, the next meeting is on November 6th. Will cover sales data, trends, and more.

10:15 Biochar STAC Workshop Summary
Chuck Hegberg, RES

Chuck provided an overview of the recommendations from the May 2023 STAC Workshop: Using Carbon to Achieve Chesapeake Bay (and Watershed) Water Quality Goals and Climate Resiliency. Among the recommendations is engaging with the USWG on potential nutrient reduction credits for biochar retrofits. Chuck covered the STAC workshop's objectives, a timeline of biochar and related research in CBW, recommendations and takeaways from the workshop, and the potential use of biochar in stormwater and toxics remediation.

Discussion:

Olivia Devereux (in chat): I have heard PA say they are using a lot of biochar on abandoned minelands. Is that not part of what was assessed?
Chuck Hegberg: That was assessed in the Emerging Contaminants section. PA is using wood chars in abandoned mines, and I think it's in part a partnership with WVU and a mass bio grant they got from DOE. The other aspect is using poultry litter and other manure chars in mine reclamation because of their ability to bind up metals. That is the next step that's going to be happening, the issue is that no one was producing enough manure char to use in mine reclamation, but that is changing.

Norm Goulet: My understanding is that there's not a lot of availability right now and that availability is very expensive.
Charles Hegberg: The availability is growing and prices are coming down. The reasons for prices coming down are multiple. One is that producers are scaling up. One of the producers I know is doubling their capacity in the next year. The other aspect is the carbon sequestration or voluntary carbon credit market because biochar on a per ton basis is carbon negative. You can get two to two and a half times CO2 on the carbon market which is allowing producers to lower their price points on actual material. It's better for them to get more volume in the ground than hold the price high and not get carbon credits. So there's a number of market elements driving it now, but prices are coming down.
Norm Goulet: That's good but it's bad at the same time. It sounds like a lot of players are getting into the market, and quality will become an issue.
Chuck Hegberg: Right, and that's why I emphasize right source, right place, right rate. Those three elements are very important. There are many types of chars we've been evaluating, and they're all different. But yes, its waste and we need to recognize quality will be a challenge, and educating people on what kind to use where since it can be quite complex.
Norm Goulet: That's what leads into the next set of complexity. Because there are many types with different performances, coming up with an efficiency is going to be difficult. Because of that complexity and the different availabilities, making sure the right people are using the right type for the right application.
Chuck Hegberg: Which is where the NRCS folks are being educated now when it comes to agricultural land. It also depends on how you're tackling the situation as it relates to infiltration. At that point you've got targeted aspects of particle size distribution, porosity, and other things coming into play, versus with emerging contaminants it's the bonding, absorption, and other things, which is why we tackled them separately. I have to admit, I got a little concerned we bit too much of, but it worked out in that we are tackling agriculture, urban, and emerging contaminants as completely separate targets.
Norm Goulet: Do the manufacturers certify the biochar as to what it is and what's in it?
Chuck Hegberg: Yes, there are a number of standards including the International Biochar Standard of 2015. There's also the work going on to create a North American biochar standard. There's a very restrictive and comprehensive testing in the European biochar initiative. What I see happening is there's sort of three or four different certifications are starting to merge together. While it might be the US Biochar Initiative certification, it will probably emulate the others closely. It will be done with EPA protocols rather than German protocols.

10:45 BMP Proposal: Biochar as an Amendment to Existing Runoff Reduction Practices
Carol Wong, Alexandria Wilkins, Lisa Fraley-McNeal, Paul Imhoff, all CWP

Carol, Alexandria, Lisa, and Paul presented a white paper outlining a potential path forward for crediting biochar as soil media amendment in existing runoff reduction practices. They covered the rationale for enhancing existing BMPs with biochar, data and comparisons with other approaches, suggestions for crediting, and an overview of relevant literature. The USWG heard the proposal and was given the opportunity to ask questions. At the November USWG meeting, the workgroup will be asked to decide whether, and how, to move forward with this proposal.

Discussion:

Carol Wong (in chat): www.scalingupbiochar.com
Norm Goulet: Regarding the literature review, of those 67 papers, were they all on bioretention, or a variety of applications?
Alexandria Wilkins: Most of them were lab studies on bioretention, but they were not necessarily field studies.
Cecilia Lane: I had a question about how the biochar amendment increases the impervious cover capture. Is it by increasing the rate of infiltration so it delays the ponding or filling up of the BMP so you're able to capture more stormwater from the contributing drainage area?
Carol Wong: Its increasing the storage volume because there's more volume in the filter media. If this moves forward there's some modeling we can do with continuous monitoring to increase that percentage. It's a lot of work on our end so if you all don't want to move forward with this we weren't going to go that route yet. There's likely a higher percentage increase but we just didn't do that modeling yet.
Olivia Devereux: I really appreciate that you all developed cost data associated with this practice, it's super helpful. I just wanted to know; did you all check the cost against other BMPs to make sure it makes sense relative to them?
Chuck Hegberg: In one of the first studies on the highway, we did a cost comparison using a CWP report from 2014 that listed all the BMPs including erosion and sediment control and adjusted for inflation and applied it to the soil amendment work along the highways. So, it has been compared against the other BMPs and I believe erosion and sediment control was first and then biochar amended soils and then grass buffers.
Olivia Devereux: I just want to make sure it makes logical sense to those who are experts, which I am not. The other question I have is that you said it can be used as an enhancement. I'm not sure how that works with the curves if it were used as an enhancement. Would they be reporting two curves?
Carol Wong: To go back to the cost data, we're just proposing this for bioretention, so we only compared it with that. The thing that we think is the cleanest is to simply increase the runoff stored value. You're not changing the curve, just increasing the amount of storage so you move to the right when you're plotting pollutant removal.

Olivia Devereux: Ok, so you aren't reporting two BMPs, just reporting one and moving to the right. There is a whole thermochemical process used in the agricultural sector called manure treatment and you can report that for agriculture. There are three different kinds, and you can also report it for direct monitoring where you input the pounds of N or P reduced and if it were directly monitored. Those are already in CAST and different, but one of the things that came up with that manure technology treatment, which is what they're calling it although its thermochemically processing carbon material, is where does it come from and where does it go, not how much it changed during the process. I want to make sure that you all are addressing that when you add it to a site, then there could be some nutrient addition and I want to make sure the whole system is accounted for.
Carol Wong: That is something we can look into. Typically, wood char has low nutrients. We've looked into the manure char calculations, typically because the wood char is low in nutrients, we don't consider that, but we can look into it to make sure that when you're removing bioretention media to put in biochar that difference is not significant.
Chuck Hegberg: If it's certified by IBI then its sustainably sourced material, it can't qualify for carbon credits or anything from harvested material. In most cases this is sustainably sourced wood waste used to produce biochar, and that's tracked.
Greg Hoffman: There have been several comments about making sure the specifications for the material itself are right. What are the consequences of using a material that doesn't meet spec, and what would cause a biochar to not meet spec?
Carol Wong: We are very particular about what kind of biochar, and we only listed a few of the specs. We are particular because the research is based off of this size and wood based biochar, not manure based biochar. We're not going to put manure based biochar in bioretention since it has higher N and P. It's like adding compost, and its not the same. It being wood is really important because manure char has higher N and P. The particle size distribution is really important because the total ash percentage, no more than 15% less than 1mm. All the benefits we've talked about involve matching the size of the biochar to what you're mixing it into with the biochar size. With bioretention media its typically very sandy and you want to match the size, i.e. if it's too fine you'll clog the pore space. With the scaling up project, we have our biochar spec but there are other things like how you mix the biochar, store it, how you transport it are important to. The more logistical side is what we've worked on in terms of specifications. The biochar specifications are more from what Dr. Emhoff and folks doing stormwater have looked into so it's kind of pairing those two things together as to the actual biochar spec. The other thing is making sure the fixed carbon is really important too. That's saying the carbon is less likely to break down or will break down slower. Keeping it fluffy is what the infiltration is doing.
Andrea Krug: My question is if you are considering expanding what other practices should be credited? Some that come to mind are green roofs, tree plantings, and conservation landscaping.

Carol Wong: We picked one because of the way that the interpretation memo works. We would love to expand to other ones too, but a lot of them you're making assumptions to transfer the relevant information to another topic. We could look into other crediting, we just kind of started off with bioretention because to justify the other ones you aren't looking at studies. Bioretention, if you think about BMPs that tends to be the one people start off with. There's a lot of potential in the soil amendment side of things but we kind of bit the low hanging fruit and did bioretention first.
Fernando Pasquel (in chat): Where there any studies included in the literature review that described potential negative impacts of biochar on aquatic environments? "Some studies have shown that biochar also poses potential risks to aquatic environments, including the enhancement of eutrophication, acceleration of pollutant migration, and inhibition of aquatic organism growth."
Chuck Hegberg (in chat): I have not seen any of these effects in the literature using wood biochar. There are risks of releasing nutrients from high mineral chars if used in the wrong conditions. There are also issues with wood chars that are not completely reacted such as PAHs which are tested under the international certifications.
Fernando Pasquel (in chat): Great idea to use biochar. You may want to see this study, in case there are any concerns. Thank you, Chuck, for the response. Linked Paper.
Chuck Hegberg (in chat): Thanks for sending. I will take a review and see how this might be a concern in what we are looking to do.
Chuck Hegberg: I did post that response. As it relates to wood char, I have not seen any literature associated with that. There are implications to using a high mineral char such as a manure char or biosolids char. UDel first study looked into using poultry litter char in stormwater, and they got a release of P and N from it. In mine reclamation you want those minerals because you're changing the pH and binding those metals. It goes back to the right place and right use. One area that you could have issues with if it's not certified biochar and it's been done at a low temperature is you could have PAHs and dioxins which is an issue with charcoal and using that in some of those cases. Again, it goes back to the production and making sure you have a clean fixed carbon. Most of the carbons that we're using are 85-90 something percent fixed carbon and very low ash. I've not seen the negative side of the wood but where I have is as Carol brought up some of the issues with particle size distribution, the surface area, and some other things. If you apply a char that's too fine to say a bioretention mix, you're going to slow down retention rates and hold more water. So, the physical characteristics are important when you start getting into the actual media used.
Alexandria Wilkins: We included studies that addressed the leaching of potential contaminants from the use of biochar, but nothing specific to its impact in aquatic environments. If you have those studies and would like to share them, please send them our way.

Carol Wong: To Chuck's point, the type of biochar is really important. I've read through studies that aggregate the negative effects of biochar and I think the nuance of which type of biochar they're looking at is really important to the end product and if you aren't fully getting to the pyrolysis, it's like you're only half activating it and half removing the negative constituents. The chemistry doesn't reach the point where biochar is most efficient, which is why our specifications are so detailed. It might be an unintended side effect, but using biochar that isn't fully pyrolyzed. Manure chars and other biosolids, there's a lot more stuff in them than a wood char, which is waste wood material. You aren't allowed to use treated hardwood or anything like that in the IBI spec. If you were to throw in a treated wood, stuff could come out, but in the spec, it is just wood waste. That helps decrease some of the potential leaching when you mix it into the ground.
Norm Goulet: It sounds like the local government planning approval process will have to be very diligent on the type of biochar utilized for individual projects, which I suspect could be a bit of a hangup.
Cecilia Lane: I just wanted to clarify that the current approach would be just for bioretention BMPs, or beyond as well?
David Wood: I believe what's on the table is just for bioretention.
Heather Gewandter: My question follows Cecilia's, is there a universe for both? I appreciate all the work that's gone on for bioretention, and maybe that's ready to go, but I do think there's value in the idea of looking at soil amendments in general, whether it be biochar or other things. Accreditation for that, especially when we're talking about small scale infill, is there an opportunity for both?
David Wood: Yes, and I should have said that. Choosing the interpretation pathway for just bioretention does not preclude an eventual larger panel that tackles some of these other topics. It might push the timeline a little bit, considering we would aim to wrap up the interpretation by late spring, in theory we could begin work on this longer process next fall.
Norm Goulet: I think if we go the interpretation route, the qualifying conditions will have to be that its bioretention only, and biochar only. It would be fairly narrow in its applicability. If we want to broaden the horizon for use in other BMPs or soil amendments we would then have to do a full panel and need to have a lot more time and resources.
Cecilia Lane (in chat): That makes sense, so we could amend and get credit for bios sooner and then later expand the effort to other BMPs and possibly urban soils.

11:15 Proposed Relative Land Use Loading Rates for Solar Development
David Wood, CSN

Earlier this year, the USWG was asked to lead the development of relative land use loading rates for land uses associated with solar farm development. CSN conducted a literature review, as well as a review of the current available guidance from state

regulatory agencies on solar farm development. David reviewed the overall findings from this review and ask for USWG feedback on the proposed recommendations. To give members time to consider these recommendations, no decision was requested at this meeting.

Discussion:

Olivia Devereux (in chat): Will there be a comparison with the work VT did with VRRM to ensure the definitions and delivery factors are similar?
Cecilia Lane (in chat): Sorry if I missed this, please define the difference between solar impervious and solar pervious.
Dave Montali: Looking at this, the easy answer is what you proposed relative to impervious and 'mixed open'. If you don't want to call it 'mixed open', call it 'suspended succession' or whatever, but it's a loading rate that reflects the compaction part of the pervious and vegetative cover and no fertilizer. To me, given the short time left, and no real good science available, the easy answer is to call the impervious part 'buildings or other' and the pervious part 'mixed open' or 'suspended succession.'
Norm Goulet: 'Mixed open' is going away so it would have to either be what David's proposing (turfgrass and roads) or the 'suspended succession' which no one's fully defined. I'm a little weary of going that route right now.
Dave Montali: I don't know if mixed open is absolutely going, but to me it's still the land use that loads P relatively high because of the compaction, loads N higher than forest, not as much of a relative difference. Is your charge here to do a relative loading rate to impervious roads, or can you simply say handle the pervious part like Phase 6 mixed open.
Norm Goulet: It would have to be linked to a Phase 7 Land Use because this is going to be a Phase 7 application. Based on everything I've seen coming out of LUWG, Peter was doing away with mixed open. The relative loading rate is 1 which is forest.
Dave Montali: Mixed open is relative to forest, right?
Norm Goulet: They're all relative to that [forest] one, whether it's a lower or higher number.
Greg Hoffmann: With the potential paths forward, does one give more or less opportunity to differentiate between different solar installations, particularly with how they deal with soil compaction, and to a lesser extent how steep the slopes are? Both of those are really big factors.
David Wood: I don't know that we have the mapping capability to get to that level of detail. I think that you're correct that you could load them differently based on different factors. Based on what we've done in the past with similar land use decisions from a loading rate perspective, I'm thinking about the conversation in Urban Nutrient Management about how different turfgrass areas load. For the relative loading rate conversation, I think it's a level of detail we don't have. That's why in some of the initial

conversations, trying to stick to impervious and pervious is where we would start. Down the road we could end up opening the door to different BMP types and things like that.
Greg Hoffmann (in chat): I was impressed with the monitoring work that Dr. Mulla from the University of Minnesota did to develop the PV-SMART tool.
Olivia Devereux (in chat): I thought Peter was directly mapping solar? That gives us the acres. When the modeling workgroup gets to land use loading rates, they will need this information.
KC Filippino (in chat): Go to slides 4 and 5 of this presentation to understand the loading rate ranges
Norm Goulet: We need a lot more information regarding the literature to even consider splitting it out. That's why we coalesced to just having solar impervious, which is the panels and hard infrastructure versus solar pervious which is the green area on the site. Peter is directly mapping the panels. He waffled on the remaining infrastructure, but I suspect that the methodology he's going to use will pick up the remainder of the hard infrastructure as impervious.
Greg Hoffmann: One of the big takeaways from the PV-SMART work was that decompaction after construction has a huge impact on runoff, but perhaps that's more of a BMP to treat this land cover than a characteristic of the land cover itself.
Norm Goulet: I agree with you but unfortunately in the real-world applications that we've seen so far, and this is where we sometimes differentiate between the academic research and the real world, is there is no decompaction. That's why so many of the erosion rates we're seeing are higher after construction.
Jeremy Hanson: If we have such a dearth of information, is there a way to go even simpler? Why have solar impervious and solar pervious, should we look at it as just solar, since you aren't going to have solar without the panels that are on site too. What are the main reasons for having it split up into two?
Norm Goulet: Mainly because we know there is a pervious component and an impervious component. Peter is going to be mapping the impervious component i.e. the panels. We do know that based on volumes of observations that have been occuring over the last several years, these sites are problematic. As a result, we do need to be capturing some of this in our modeling.
Samuel Canfield (in chat): These were Sarah McDonald's proposed rollups for the land uses (slide 6 of this presentation).
Jeremy Hanson: For the sake of our model, do we really need it separate because BMPs are going to treat some of the runoff from the panels versus the pervious areas it's all there together anyway. I'm struggling to see why we would have to do this with two rather than one.
Cecilia Lane (in chat): Or could you blend the two rates since they would both be present?

Jeremy Hanson (in chat): That's essentially what I was getting at… and I do see value in seeing the acreage of the solar impervious change over time, so splitting works fine.
KC Filippino: Jeremy, to answer your question more specifically at least from VA's perspective, we have a very specific runoff reduction model that is exclusively calculating the impervious surface of those panels. We're only counting those panels as impervious in terms of implementing BMPs. That's one reason to do it and if Peter is willing to map them, we have to separate them. I can't speak for other jurisdictions but that's at least one reason to split them out. I would direct you all to the slides I shared with the loading rate ratios. The first slide, slide 4 shows where they are now with everything rolled into mixed open. Somewhere in that realm, and that's what David's trying to get at.
Norm Goulet: I will also say that when you look at the watershed in general, the entirety of the watershed, solar is not a huge impact. However, there are some areas, especially in VA where this is a dramatic land use impact. There are many reasons why we're moving in that direction, and in order to support everyone we're doing the best we can.
Olivia Devereux (in chat): Re: pervious/impervious, it makes a huge difference in loading, BMPs, and management in general. There are also legislative directives in some states about controls on that land use. The states are going to ask for a BMP if we don't do it from the outset. It would be a BMP on all of the state's acres if it is in their legislation, which is not really how BMPs are intended to function.
Norm Goulet: I'm not going to worry about legislative directives until anything is approved.
Olivia Devereux: If a state has a statewide control requirement in some legislation or regulation or permitting, then that state is going to ask for a BMP to be applied to all their acres which is a mess in the model. I would rather have different loading rates at the outset if that's the way things are headed.
Dave Montali: Going back to clarify that I didn't mean to confuse things with mixed open. There is a suspended succession land use that currently resides in mixed open. Another easy answer is to say that pervious is suspended succession. What is in that category now are road right of ways, transmission line right of ways, things that have vegetative cover, not trees, not fertilized, compacted because of past activities. That to me is the easy answer. If you want to get more precise than that, I want to throw out the caution that we only have eight months to figure it out.
Norm Goulet: I see major differences between a solar site and a transmission right of way. There is different management of those, that's why I think we've ended up where we're at. I'm open to having my mind changed. We can discuss this further next month.
Dave Montali: The point is, it's not a clean land use. Twice the TN of Forest and 4x the P of Forest. If you want to make it worse than that, that's where you've got to look at the literature. The reason this is easy is that it's an established assessment of the average condition across the watershed for land that is generally so. I agree with you, it might be

different to some degree, but I don't know that the literature will allow you to define how different.

Norm Goulet: Correct. Jeremy, sorry but I tend to be a splitter and not a lumper.

Participants

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Allie Wagner, NVRC
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