Urban Stormwater Workgroup Meeting
Meeting Minutes
Tuesday, April 16th, 2024
10:00 AM - 11:30 AM
Meeting Materials

Summary of Actions and Decisions

Action: If members have nominations for the Urban Nutrient Management panel, please email David Wood, CSN (wood.csn@outlook.com) by **COB Friday, April 19th**.

Action: David will take a look at the Chesapeake Conservancy details on LiDAR res from the Swale Expert Panel.

Action: Members with questions on the Stormwater Storage Dataset Presentation should reach out to Krissy Hopkins, USGS (khopkins@usgs.gov).

10:00 Welcome and Review of March Meeting Minutes.
Norm Goulet, Chair. Attach A.

10:05 Announcements and Updates

- Update on GIT Funding Proposal
  - A list of prioritized projects can be found here.
- Recap of April Joint Workgroup Meeting
- Next Steps for UNM Panel

Discussion:

Jeremy Hanson: [Referring to GIT Funding] The ranking exercise results are hot off the presses and were sent to CBPO branch chiefs yesterday highlighting the top-ranking priorities for the WQGIT. Like you said, we don't know really know what happens next in terms of the process other than just some discussions and we'll keep the workgroups and goal teams informed as we learn more.

Norm Goulet: [Referring to April Joint Workgroup Meeting] We're going to have Michelle and company come over to a workgroup meeting in a month or two to go over the project. One of the things they'll be looking at is some modeling using a SWIM model for the urban side and a yet to be determined model for the ag side. If you're aware of highly detailed SWIM models for watersheds, let me know if its possible they will be used as part of this work. They're looking at doing two or three urban watersheds. As you know, SWIM models can get pretty detailed, and the more detailed the model is the better it is. We've got one in NVRC for Four Mile Run which has all the invert data and everything else so we might be looking at trying to use that. If we could get our hands on another model or two it would be helpful and an off the shelf model would save a significant portion of time.

Action: If members have nominations for the Urban Nutrient Management panel, please email David Wood, CSN (wood.csn@outlook.com) by **COB Friday, April 19th**.

10:15 Developing a harmonized surface stormwater storage dataset
Krissy Hopkins, USGS

Over the past 8 years, Krissy, and her team at USGS have looked at the impacts of environmental site design on streams in Clarksburg, MD. Krissy gave a brief overview of approaches the team is testing to remotely map surface stormwater storage features using high resolution datasets. Krissy discussed the types of features her team could detect and the type of information they could attach to those features (type, size, volume, etc.). She then led a group discussion on if and how such a dataset would be useful.

Discussion:

Marina Metes (in chat): My other project in Clarksburg using landscape openness was just published last week.
Cassandra Davis (in chat): I could see this being valuable for MS4s that are just starting to map stormwater features.
Norm Goulet: There's a comment in the chat from Cassie [see above]. I agree completely with that, Cassie. It would probably be pretty good. I'm wondering for a jurisdiction that might be a little more advanced, this would probably be a little more difficult to integrate.
Krissy Hopkins: Yeah, hearing both perspectives there, from someone who has their stormwater features highly mapped already and maybe with the volumes associated. For us, that would be really helpful information in terms of developing the training dataset for modeling to help inform the areas where we don't have a lot of information already.
Norm Goulet: I find the effective impervious comment interesting. One of the things we really struggle with is determining what the effective imperviousness is, especially when we get a lot of green projects in and we're looking at what have done to the impervious number. Have you thought about utilizing this information along those lines?
Krissy Hopkins: Not specifically going that far with it. We've done a lot of work in Clarksburg mapping each individual BMP and what drains to each line and how the stormwater network connects all of them together. To do it well that's the kind of information you need, the pipes, the hydrography, where the BMPs drain to. In those watersheds, it's complicated because depending on the size of the event you have the effectiveness of the BMPs can vary. If you have a couple tenths of an inch of rain the BMPs are going to be fairly effective at capturing the water, but they won't be as effective in an inch of rain and more water will bypass the treatment.
Ho-Ching Fong (in chat): Could be used to identify non-stormwater ponds (i.e. farm ponds) to connect with existing stormwater systems for the purposes of flooding.
Krissy Hopkins: Yes, and I think a lot of those farm ponds might be included in the high res land cover data already, if they have water in them and depending on how large they

are. [Referring to the second slide in the presentation] The ponds in the high res data here, these have water, and these other ones don't have water. There's a couple over here that are sand filters for dry ponds and they don't show up in the high res because they have grass or sand.

David Wood: I know that there's probably some interest in the capabilities for roadside ditch mapping. We had an effort in 2016 or 2017 or so to look at the feasibility of using high resolution LiDAR data to try to map some of the roadside ditch network, with the goal of understanding the implications and opportunities for BMP implementation in the ditch network. We didn't have a lot of success back then, I don't know what the improvements have been in the seven years since then, but when we asked folks about their BMP interests a month or two ago roadside ditches are still up there. It might be something where we can get more information and that would be really helpful and interesting to a lot of folks.

Krissy Hopkins: All of the high res hydrography will include a category for ditches, and that's something we want to look at. Based on the ditches we've mapped so far, we can pick them out pretty well in Clarksburg, and as long as it's a deep depression we can usually pick it up with the LiDAR.

David Wood: Yes, the limits [seven years ago] were on the depth, I'm remembering 20cm accuracy or similar for the vertical depression for some of the ditches. There's also a lot of canopy cover and things like that in our rural and further north watersheds can cause difficulty.

Norm Goulet: That's actually what I was going to ask, what kind of depth are we talking about? 20cm is probably the minimum it can pick up?

Krissy Hopkins: It depends on the quality of the LiDAR; there's various accuracies but that's probably reasonable, something deeper than [20cm].

Peter Claggett (in chat): For these features, is there a big difference in detection success between QL-1 vs QL-2 LiDAR?

David Wood: I know that the Conservancy had the lead for the Swales Expert Panel but I'd have to go back and review the memo for the details.

Krissy Hopkins: In Clarksburg, we have quality level one (QL-1) which is really good quality LiDAR. Quality level two (QL-2) is lower resolution and you don't have a sense of points and less accuracy. Maybe they were using older datasets. From our experience in Clarksburg with QL-1 data, we can see roadside ditches pretty clearly.

Marina Metes (in chat): In Clarksburg, we have QL-2 for 2018 LiDAR and QL02 for 2021 LiDAR, so we could definitely make those comparisons.

Matt Meyers: I like the graphics in the examples shown which have a lot of the stream valleys. Some of the BMPs are policy driven, i.e. where floodplains start. Different jurisdictions start in different places, we have minor floodplains at 70 acres. Then overall drainage design, right we have adequate drainage requirements that define where our infrastructure is so that water is safely conveyed and stored in the watershed. Just

wondering if those are going to be considered too, having good land development practices that complement traditional stormwater BMPs and provide an overall benefit.
Krissy Hopkins: That's a great point. I'm not talking at all about floodplains; you can see in this image here [slide 5 of presentation] the stream channel pops up pretty clearly in these dark areas. This graphic is showing you the landscape openness variable that Marina Metes has worked on a lot, looking at can you use this to map things like stream channel incision or the state of channels. You can see differences between the different tributaries, where you have fewer dark areas in this upper tributary, so you don't have as deep of a channel and a more connected floodplain. Downstream of the road, the stream gets much deeper. We are thinking mostly of the uplands but yeah that's something else to think about. Peter and I worked on a project looking at floodplain ecosystem surfaces and tried to develop tools to map the floodplain (i.e. FACET). We're in the process of updating that tool which would provide a rough area across the Chesapeake. We created an older version that was published a couple years ago with 3 meter data and we will be updating it to 1 meter data this summer which will capture some of those floodplain areas as well.
Fernando Pasquel (in chat): Does the tool automatically categorize the surface storage components?
KC Filippino: How well will this work in relatively flat areas like the coastal plain where you may have influence from tidal flooding, how you can distinguish features in an area that doesn't have a lot of elevation.
Krissy Hopkins: For the floodplain work that we've done the coastal plain was very difficult. For this aspect though, it wouldn't be as challenging because we're humans, we're modifying the landscape, we're creating these depressions to store water. What we want to estimate is how much water could potentially be stored in that feature, and if there's not a deep depression there, it's not going to store much water. I'm sure the soils may have been amended to infiltrate water, but what we were trying to think of is can we use these datasets to try to get a rough proxy, for like storage across a region. In the coastal plain, even still, you have so much land grading that happens within these developments that I think you'd still be able to detect them. I've never tried it in the coastal plain but that's something we could definitely look at.
KC Filippino: When you have the high ground water table that definitely leads to doing less storage.
Krissy Hopkins: If there's water in the pond, we don't know how deep the water is. The LiDAR hits the surface and that's the base, which is another limitation. Someone asked about automatically categorizing the surface storage components. We are developing a tool to model and automatically categorize into these specific categories. Is it a roadside depression, what kind of circular or triangular depression is it, etc. Based on the topography trying to estimate the maximum storage volume.

Action: David will take a look at the Chesapeake Conservancy details on LiDAR res from the Swale Expert Panel.

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10:40 Phase 7 Land Use Process
Peter Claggett, USGS

Peter Claggett provided an introduction to the Phase 7 Land Use development process and timeline, focusing on how the USWG can provide data and feedback. He focused on the following:

- Improving MS4 Boundary Data
- Process for Phase 7 Land Use Development
- Improving How CBPO Produces/Manages Septic System Data

Discussion:

KC Filippino (in chat): Don't forget the federal facilities and their MS4s, I don't think those are reported by jurisdiction.
Cassie Davis (in chat): In NY, our tax parcel data attributes include if the parcel has septic, public, or none.
Natahnee Miller (in chat): I will need to take these questions back; not prepared to answer these today as they were not on the agenda. In regards to the MS4, PA doesn't expect their MS4 footprint to significantly change from what was in Phase 6, and Jamie Eberl from PA's NPDES MS4 section emailed Peter after the last USWG Meeting with a preliminary explanation of changes to the MS4 footprint. Peter should follow up with Jamie.
Norm Goulet: [Referring to 'Discussion Questions' slide on Peter's presentation] Thanks Peter. Let's start with the bottom of the list and work our way up. Let's start with the MS4 areas. We already did a quick survey of the jurisdictions, and everyone's in a slightly different state, in terms of where they're at. My suggestion for this would be for each state to submit digitally to Peter, the MS4 areas as they become available in shapefiles. I know in Virginia we will be developing the Phase 1 MS4 information over the next twelve months, so it won't be available until this time next year for all of Virginia MS4s. The Phase 2's are already in the process of being worked on. Cassie, you've probably got the least amount of MS4.
Cassie Davis: Yes, and we know where it is.
Norm Goulet: So you can easily provide Peter a shapefile with that?
Cassie Davis: Yes
Norm Goulet: Good, DE?
Elaine Webb: I don't manage the MS4 program, but I can confirm that we have those available/can make them available.

Norm Goulet: That'd be great. PA, you've got the most of them, what's your situation?
Natahnee Miller: I'm filling in for Jamie today, so I'm not really prepared to answer that. I put a note in the chat, so Jamie's going to have to get back to you with that, and probably all of these questions.
Norm Goulet: Right. Did I hear that WV wasn't going to be changing theirs Peter?
Peter Claggett: Yeah, that should be pretty imminent, and they gave me a contact so I can get those.
Norm Goulet: How about DC?
David Wood: DC's off today.
Norm Goulet: Federal Facilities? How do you work with Federal Facilities Peter?
Peter Claggett: That's a really good question. I assume I should solicit that information from the Federal Facilities workgroup. I haven't yet, but that's good, thank you.
Norm Goulet: I suggest that we keep this subject on two agendas. Ours and the Land Use Workgroup, and kind of hit up on it every couple of months to figure out where we're at in the submissions. The other question I need to ask you is what is your timeline?
Peter Claggett: 18 months. We have to have everything done and wrapped with a bow in September/October of 2025.
Norm Goulet: For an overlay that's no big deal, because it's just an overlay.
Peter Claggett: Correct
Norm Goulet: If we're talking about something other than an overlay it becomes more critical in terms of when we actually start getting this data.
Peter Claggett: Right. So, if there's an update planned for December of 2025 or thereafter, we would not be able to use if for at least the initial roll out of Phase 7.
Norm Goulet: Let's talk Sewer Service Areas, or I should say Sewer Area. Have you regularly been getting updates on Sewer Service Areas because that changes fairly frequently?
Peter Claggett: Yeah, we've been soliciting those through our land use mapping process. The last time we did that was perhaps a year or two ago, but then the last 12-18 months prior to now, the Chesapeake Conservancy solicited that information from counties. So, we have some of that. For that reason, and because they do change so much, in some ways I feel like the best approach for Sewer Service Areas is to take what we've got and post it. Depending on people want, provide a 3–4-month review period and have people look at them and download the data and say have we accurately captured your Sewer Service Area and if not, you need to provide a replacement. For some of these, we still don't have any local data. We've modeled them. We've modeled them like a census place with a certain density and amount of impervious cover where we almost know for sure that there's probably sewer, but nobody's ever given us a polygon. So, it would be good to have people look at what we've got.
Christina Lyerly (in chat): I also think that it would be best to provide time for us to review these questions with staff.

Norm Goulet: The problem there, Peter, is that we've put out the data calls for years now, and there's always going to be those jurisdictions that will hop right on and give you the information, and there's going to be jurisdictions that we never hear anything from at all. The question is how do we solve that problem with the jurisdictions we never hear at all. Maryland you've got the Maryland Department of Planning and they've got everything for the state of Maryland for the most part. You get into VA, it's jurisdiction by jurisdiction for the most part. I'm not familiar with the other states so I can't really comment on that.
Peter Claggett: We are thinking of changing this approach. If we change the approach and do it based on parcels, like developed parcels and not based on Sewer Service Areas that would alleviate the burden of reporting the Sewer Service Areas perhaps completely. What we need in order to update that methodology based on tax parcel information is we need like what you guys have in Northern VA, point data or parcel data showing us where we have septic systems. We need that wherever we can get it and that way we can evaluate across different locations and jurisdictions, different states, what kind of methodology works best.
Norm Goulet: That national parcel dataset that you talked about, what attribute data carries through with that?
Peter Claggett: It's not great. It all originates, as you can imagine, from the counties. Private sector vendors have collected that information, they sell it back to the government and sometimes they try to add value added attributes and those have tenuous value at best. We've been exploring this for the past several months.
Camille Liebnitzky (in chat): I had the same issue with missing septic systems for a water quality model down in FL. What I did was take the building layers and remove areas that have sewer lines, then create a point with the rest of parcels that have buildings.
Norm Goulet: Basically, what you need is parcel data from every local jurisdiction in the Bay?
Peter Claggett: We have that, and we know what the size and the shape of the parcels are, so that we're very confident about.
Norm Goulet: I'm talking about the attribute data.
Peter Claggett: The attribute data, obviously if we had it for everywhere we wouldn't need to model it. We just need those point data, that Allie provided us for Northern VA, we need that for more jurisdictions. If there was a county in PA that had that, or NY or WV, it could be polygons of drain fields, permits, we need to figure out which parcels are in septic and sewer and then we can validate our models and come back to you all with what that looks like.
Norm Goulet: So, we need to put the word out to everybody that we need as much detailed data as we can get. I think this is one that we'll have to hit up between the Urban Stormwater Workgroup and the Land Use Workgroup in terms of getting the message out. That basically takes care of 5, 4, and 3. Now we get to the fun ones. The land-to-

water factor development, what's the group's feeling on that, what level of involvement do you want to have in that? Or is this something you want to take back and think about?
KC Filippino: What does this entail? How much effort is this?
Peter Claggett: It's a lot of effort on our part, internally, at the Bay Office, but its not a lot of workgroup effort other than taking the time to understand what we're doing any why. Ideally, we'd have some workgroup members that have some interest in this or have some modeling experience themselves that want to weigh in. But we have a lot of that in house and with some of our partner organizations that we can rely on. So, from the workgroup perspective, not a lot of work. Eventually, the WQGIT has to bless what's being done, and that has to come as a recommendation from the workgroup. So, a workgroup, or more than one workgroup has to say yes, we think this should be used in Phase 7 and we like this approach, and then have the WQGIT decide.
Norm Goulet: Have you presented any of this to the Modeling Workgroup?
Peter Claggett: Yeah, I presented to the Modeling Team, the various internal modeling teams, and to the modeling quarterly last week.
Norm Goulet: Well, David, I suggest at the very least what we need to do is get her on the agenda for the next meeting and let's hear a presentation from her and we can decide from there where we want to go with it.
Peter Claggett: Another way to look at this, it may sound to cryptic 'land-to-water factors' but if you think of it in terms of. We're mapping at one meter resolution now, so we see chicken houses, apartment buildings, roads, and Walmart parking lots we see all this pretty clearly. All impervious essentially has the same loading rate except its moderated by atmospheric deposition and some other things. A chicken house, because it's a chicken house and an apartment building and a Walmart, the Phase 6 model is agnostic to those differences. They're not just different in terms of what they are, but they're different in terms of where they sit on the landscape, and how much pervious land is between them and the stream. So rather than having a poultry house land use, an apartment building land use, and a Walmart land use, we can look universally across all development and say based on the location in the landscape, is there a moderation to the loads that we would want to apply, either increase or decrease that base loading factor.
Norm Goulet: So what we're looking at here is using the concept of effective imperviousness to the edge of field as a modifier for the model calibration.
Peter Claggett: Right, to edge of stream.
Norm Goulet: I think the best think here first would be for her to come and give us a presentation and then we can gauge some of the interest in terms of who might want to follow this a little more closely than others.
Peter Claggett: Ok
Norm Goulet: The real fun one is the disaggregation of the mixed open. As Peter alluded too, mixed open has been a bit of a bugaboo for a number of years now. It ended up being this catchall, and as the catchall got a little larger, we've noted some issues with it. One

of the catchalls that you see is in there now is the solar operations. I think the answer to the question is yes, we need to disaggregate is, but the confounding aspect to that is can we develop loading information for those disaggregated land uses? I'm not an expert in solar fields, but my suspicion is that they definitely don't load as low as near forest. How much of an interest is there in the workgroup to try to lead an effort to look at what is some of the loading information that's out there in the literature in terms of solar fields. Do we have a solar expert in the group?

Peter Claggett: If I may say something while everyone's thinking. There has been a STAC workshop on the impact of solar fields, and that workshop report is on the STAC webpage [link]. They concluded that there's a lot of inconsistency in the way solar fields are managed and developed. The level of compaction, re-vegetation, all that kind of stuff. There's just a lot of variety, and there's not a lot of information on what the effects are of stormwater impact. DEQ in VA is leading a six-year study to do just that, look at the hydrologic impact of solar fields in VA, but we won't have that information for another five years. So, I don't think you're going to find really good loading rate information on road right of ways, reclaimed mines, and solar fields. What some group is going to have to do if they want to disaggregate mixed open, is weigh in from a relative perspective. Going back to that scale that I had on an earlier slide ['Average P6 Land Use Nutrient Export Rates' slide], if we're confident that solar fields are not all the way next to forest for N, or halfway between forest and turf for P, if there's enough confidence that it's not that, where do we put them on the scale? Making a reasoned recommendation on where you might put that, based, probably on compaction or assumptions about probably compaction, I think that's what's going to have to be done. I don't think the science is out there to make this an easy case.

Norm Goulet: So basically, we're going to have to stick a finger up in the air.

KC Filippino: I have a question about these loading rates, you're calling them P and N export rates. This is essentially a function of CAST, right? Loads are coming out of CAST and you just divide them by the acres?

Peter Claggett: Yes, these are the average loads for these land uses watershed wide reported for CAST for Phase 6.

KC Filippino: But as the acres change, the loads change, the rate changes? This is where I get frustrated.

Peter Claggett: We can have an offline discussion, I didn't think that was true, I thought that the export rates were independent of the acres. The loads are dependent on the acres, but the per acre rate is the per acre rate.

KC Filippino: So where do you get those numbers?

Peter Claggett: These are from the CAST documentation.

KC Filippino: Ok, I've been digging to try to find a comparison, and I don't see anything as nice as your scale here laid out clearly. My second question, can you go back to the

'Phase 6 Roll-up of High-Res Land Use Classes' slide to the mixed open breakout? Are we only talking about solar because I thought you had also mentioned others?
Peter Claggett: The big ones that I'm talking about breaking out are suspended succession and solar fields. There are active mines in this class as well, but they don't make up a lot of acres, so they're only very locally important and they probably drain inward rather than outward. Bare developed is construction, that is a no brainer of how we can reconcile that with what's reported. Harvested forest is going to be reconciled by the Forestry Workgroup. That leaves what's in red which is kind of natural and probably does load close to forest, and what's in blue which is what I'm saying may be worse than the way mixed open is characterized currently.
KC Filippino: I'm a little unsure about breaking solar out into those 3 categories. That's a lot of nuances between those 3. In particular, the stages of solar development are going to vary as you build out solar. Are you looking for loading rates for all three of those differently, the same as suspended succession because I don't know that we could ever get to that level.
Peter Claggett: What we map as solar fields are only developed solar fields. When a solar field is in the early stages of development, we would map it as bare developed, we'd map it as construction. That may be another thing the Urban Stormwater Workgroup wants to take on. I'm not sure if what's currently reported as construction in the model includes solar fields. If it doesn't, maybe it should, to capture that initial sediment surge from disturbing all the vegetation.
Norm Goulet: I'm not an expert in terms of how the permit process interfaces with your mapping. I do know that construction permit data is submitted by the states, but there are always various stages of development and that's where the issues come about. That might be something the Land Use Workgroup has to tackle.
Peter Claggett: I want to point out to you guys, the panel arrays right now for Phase 6, they roll-up to impervious. So, we could move the panel arrays to this new class we're talking about (mixed open) along with the pervious portions of solar fields just to keep them all together. That's a possibility too, but none of this is my decision to make. I would think the WQGIT would want to have a Workgroup weigh in on this and not have to make the decision themselves.
Norm Goulet: Obviously we're not going to give you an answer right now Peter. I think what I'll do is get with KC and David and the three of us will talk a little bit about this. I suspect we may try to find an expert or two out there on solar and see if we can pick some brains, maybe do a presentation or something, and try to get you an answer by this summer or so. I've dominated most of the talking here today. I really would like to hear opinions from the other states. That way we don't get too far down a road where you don't want to go. I'd like you to take this information back and ponder it a bit, and we'll go over these same questions at our next meeting and then we can report back to Peter. Does that sound reasonable? Ok.

Participants

Aaron Fisher
Adrienne Kotula, CBC
Alana Hartman, WV DEP
Allie Wagner, NVRC
Andrea Krug, DC DOEE
Bonnie Arvay, DE DNREC
Brenda Morgan
Caitlin Bolton, MWCOG
Camille Liebnitzky, City of Alexandria
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