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CHESAPEAKE BAY PROGRAM

LAND USE WORKGROUP (LUWG) MEETING

Meeting Minutes
September 17, 2025
1:00 PM – 3:00 PM

Summary of Actions and Decisions

Decision: The LUWG approved the June 2025 minutes

Decision: The LUWG approves the back-cast methods described in the workplan for representing historical land use conditions from 1985-2012 in the Phase 7 suite of models.

Action: LUWG leadership will work with Peter Claggett, USGS, and others to formally document a response to the back-cast related concerns regarding the TMDL and critical period.

Action: The LUWG leadership will be working with groups under the proposed Healthy Lands goal to host a joint meeting in December. Caroline Kleis, LUWG Staffer, will follow-up with additional information as it is available and update the calendar invitation accordingly.

Action: If you have any feedback or questions regarding the future of the Land Use Workgroup, please contact Jackie Pickford, USGS (jpickford@chesapeakebay.net) and Caroline Kleis, LUWG Staffer (Kleis.Caroline@epa.gov).

Decision: The LUWG approved an update to the June 2025 LUWG decisional item to read "the group approved moving **all bare shore (tidal and non-tidal) that is not classified as construction** to the Phase 7 water class". The June 2025 minutes will be updated to reflect this change.

Decision: The LUWG approved the aggregation of the High-Resolution LULC data to 16 Phase 7 mapped land use classes.

Action: LUWG members are asked to provide any comments on the time series review process and web viewer. Feedback should be provided to Sarah McDonald (smcdonald@chesapeakebay.net) and Caroline Kleis (kleis.caroline@epa.gov) by Tuesday, September 30th.

Action: Sarah McDonald and Andy Fitch, USGS, will draft a mock up of the changes they intend to make to the time series web viewer. This will be circulated to LUWG members in the next month.

Action: Sarah McDonald, USGS, will update the web viewer to fix the integration of the back-cast with the high-resolution period from 2014-2022.

Action: LUWG members will be asked to provide any concerns for their jurisdictions that they would like to see addressed prior to the final back-cast data being delivered to the modelers. Remaining feedback should be provided to Sarah McDonald (smcdonald@chesapeakebay.net) and Caroline Kleis (kleis.caroline@epa.gov) by Tuesday, September 30th.

Meeting Minutes

1:00 **Introductions and Announcements** – Arianna Johns, VA DEQ (LUWG Chair) (15 min.)

- **Decision:** The LUWG approved the June 2025 minutes
- Confirmation of email decision to approve back-cast methods
    - Sarah McDonald, USGS, asked the group for any final feedback on the back-cast methods decision. No additional comments were provided, and the LUWG confirmed the following:
        - **Decision:** The LUWG approves the back-cast methods described in the workplan for representing historical land use conditions from 1985-2012 in the Phase 7 suite of models.
    - Follow-up on back-cast comments

      Discussion:

      Sarah McDonald: I think the primary two comments we received were about running replacing the Back-cast numbers back through time through the lawyers to ensure that that doesn't affect the TMDL or anything like that. Peter, do you mind speaking to that conversation you had with the EPA lawyers?

      Peter Claggett: It was clarified from Kelly Gable who's the lead Regional Council for the TMDL at EPA, Philadelphia, that anything we do with the back-cast is not going to affect the TMDL in any way. We are recalibrating the Phase 7 model, and none of that is going to affect the TMDL either. I can go into more details if needed, but that's what she said.

      KC Filippino (in chat): If there's any details you can put in writing to explain it a bit more that would be helpful. I just want to understand it better that's all. Sounds great, thanks.

      Peter Claggett (in chat): From my notes with the legal team, the TMDL is a planning tool that establishes numeric criteria for delisting the Bay and it's tidal tributaries and is designed to help establish effluent limits in permits that are enforceable. Modifications to the TMDL requires a legal process which is not triggered by changes to data and models. The CBP Partners implement the TMDL via our data and models and these can change as new data and information become available and those changes do not impact the legal process.

      Sarah McDonald: Cassie was asking about how updating the back-cast could affect the critical period. Peter, do you have a response to that?

      Peter Claggett: The critical period is going to be the same as it was for Phase 6. The calibrations over the 1990's and the critical period, I think it's like '93-'95, somewhere around there. It's a three-year period within the mid-90s. Even just to kind of reinforce what I was saying earlier, we can even change that critical period, we could change the calibration period, and none of that would affect the TMDL as well. But, we're not changing the critical period in the back-cast. It will change the conditions over the critical period, the land cover land use conditions, but it won't

change the slice of time that is carved out to represent the critical period because that's weather based.

Action: LUWG leadership will work with Peter Claggett, USGS, and others to formally document a response to the back-cast related concerns regarding the TMDL and critical period.

- Announcement: Update on the CBLCM historic trend scenario for forecasted data- Sarah McDonald, LUWG Coordinator
    - Sarah McDonald: Labeeb Ahmed has been presenting on, and we've been discussing the Chesapeake Bay Land Change Model or CBLCM that we use to forecast land use into the future. There's been discussions about having a small group interested in these forecasts to better understand what the model is doing, documenting what the model is doing, and how it works. The update I have from Labeeb is that our team who works on this project has been doing a lot of other Phase 7 tasks that have a sooner deadline than that. There has been progress made on this, including incorporating new data products such as parcel scale, residential, commercial masks for the entire Mid-Atlantic states. That has been produced by Michelle Katoski on our team. Additionally, there's sewer service area footprints that Jackie Pickford has been leading on our team, as well as some other updates on the back end in the model to carry through some of the updates that remain to our Delaware project that Peter had presented on at the June meeting. Right now, our game plan is that early next year, we will have preliminary data for one scenario, as well as some documentation to go along with that, to start having those more detailed conversations that have been requested at our last meeting. So, we expect to spin that up early next year.

1:15 **Beyond 2025 Public Comment Period Follow-Up and Next Steps-** Jackie Pickford, USGS (10 min.)

Jackie Pickford, USGS, provided an overview of the comments received on the draft revised Chesapeake Bay Watershed Agreement Land Use Decision Support Outcome. Time was made for discussion regarding the transition of the LUWG and next steps.

Discussion:

KC Filippino: Thank you, Jackie. It is so good to have you back and doing all these cool things. I appreciate it. This is something that I had hoped we'd get to several years ago. So, I'm really glad to see it on a PowerPoint. I definitely want to think more about this. One thing that came to mind, but I don't know how you would do it, in the membership bucket is figuring out ways to get the development community in line or engaged. A lot of the issues that happen with land use planning and development are because developers are pushing something or because there's a housing crisis. There's a lot of narratives that they are presenting right now that are prohibiting smart growth and smart development in the localities. We've even kicked off a brand

new group in our region that is getting together the development staff, so people doing site plan review and land use planning below the planning director level at the locality, because they are all hearing different things from development communities. If there's a way we can get that community engaged in a way to help us help them, so we are all making smart decisions for economic development and the environment, that would be really helpful. Maybe it's not having them on the Workgroup. Maybe it's one of these targeted meetings where we focus a little bit on something specific and invite them to it. So, those are just some thoughts I have on the top of my head.
Jackie Pickford: Thanks, KC. That's really helpful to know. I would definitely be interested in looking more into that and how we can reach that group of people. So, thank you.
Jackie Pickford (in chat): My email is jpickford@chesapeakebay.net for anyone with feedback or questions about the future of the LUWG.

Action: The LUWG leadership will be working with groups under the proposed Healthy Lands goal to host a joint meeting in December. Caroline Kleis, LUWG Staffer, will follow-up with additional information as it is available and update the calendar invitation accordingly.

Action: If you have any feedback or questions regarding the future of the Land Use Workgroup, please contact Jackie Pickford, USGS (jpickford@chesapeakebay.net) and Caroline Kleis, LUWG Staffer (Kleis.Caroline@epa.gov).

1:25 **Approval of the Phase 7 Aggregation**- Sarah McDonald, USGS (LUWG Coordinator) (15 min.)

The 2021/22 LULC data will be aggregated, or rolled-up, from its native 56 classes to 16 classes as input to CAST (excluding Tidal). These 16 classes are an intermediate land use product between the LULC and CAST land uses, referred to as the Phase 7 aggregation. Sarah McDonald, LUWG Coordinator, walked the group through the final Phase 7 aggregation, incorporating remaining workgroup decisions, and requesting a vote on the proposed Phase 7 aggregation. Additionally, Sarah explained the classification of tidal bare shore and asked the group to amend the June decision to include all bare shore.

Discussion:
Bare Shore
Sarah McDonald: We recommend aggregating bare shore along the Bay shoreline to water as well, unless it is construction. If we do not approve this, these lands would be treated as compacted pervious in Phase 7, because they were previously treated as mixed open in Phase 6. So, unless there are questions, I'll pause here if there are questions or clarifications about anything I said, before we pull up the vote tracker on this.
Caroline Kleis: Since we have our cameras off and mics muted, if you could just drop your vote in the chat, I will try to keep up with that and record it in this tracker. If there's any comment you want to register, feel free to also type that out or just raise your hand, and I can unmute you. So, you can go ahead and put those votes in the chat.

KC Filippino (in chat): 5
Arianna Johns (in chat): 5
Tom Butler (in chat): EPA- 3
Norm Goulet (in chat): 5
Scott Heidel (in chat): PA DEP 3
Lori Brown (in chat): Lori Brown- 5
Deb Sward (in chat): Deb Sward 5
Samuel Canfield (in chat): WV-5
Marel King (in chat): CBC- 5
Caroline Kleis: Looks like we are missing Cassie, George, and Marel. Cassie, George, and Marel, if you are on the call, if you could just put that vote in the chat there, I'll make sure these get into the tracker. Otherwise, looks like it is tentatively approved, Sarah.
Sarah McDonald: Great. I see Marel just put her vote in. We can follow-up with Cassie and George on this. Thank you, everyone, for dropping your votes in so quickly.

Aggregation
Sarah McDonald: I am calling to ask the group to approve the aggregation of the high-resolution land use land cover data to the 16 Phase 7 land use classes. I will pause before I pass it to Caroline for the vote tracker. Are there any clarifying questions or concerns that folks wanted to bring up now?
KC Filippino: I don't think I have a problem with how this is laid out. I think this came out via email. How do these roll up into the bigger picture items is another question. What falls under developed? What falls under ag? Therefore, what BMPs then are appropriate for each of these? That's a question that seems to be hanging after we make this decision. I don't think it impacts it, but I just want to draw attention to it, because then it gets real fuzzy once we keep rolling things up.
Sarah McDonald: That's a great point. I think at the next Water Quality GIT meeting, I'll be giving this same presentation, followed by Helen Smith, who works for Devereux Consulting. She works with the CAST team who will then be doing that second piece of translating this information to the CAST load sources. I think my understanding is BMP questions related to some of these changes would be coming up at the appropriate sector workgroups and then would need to go through the Watershed Technical Workgroup. I think the step after this, the full picture, will be presented at the WQGIT on Monday, the 22nd.
Caroline Kleis (in chat): Monday's WQGIT Materials: https://www.chesapeakebay.net/what/event/water-quality-goal-implementation-team-git-3-meeting-septe…
Helen Smith (in chat): The Phase 6 and Phase 7 Land Use Crosswalk is linked on this page: https://cast.chesapeakebay.net/Documentation/ModelDocumentation
Sarah McDonald: Thank you, Helen. She just dropped a link of a table crosswalking this with the CAST load sources. If there are no more questions, I will stop sharing and pass this to Caroline for the vote.
Cassie Davis (in chat): 5

Tom Butler (in chat): EPA-3
Norm Goulet (in chat): 5
Lori Brown (in chat): 5
Arianna Johns (in chat): 5
Deb Sward (in chat): Deb Sward 5
Samuel Canfield (in chat): WV-4
Scott Heidel (in chat): PA DEP 3
Marel King (in chat): CBC- 5
KC Filippino (in chat): KC-5
Caroline Kleis: It is looking like we are just missing a vote from George, DOEE, and I can follow up offline. Otherwise, no ones or twos, so looks like this is tentatively approved.

Decision: The LUWG approved an update to the June 2025 LUWG decisional item to read "the group approved moving **all bare shore (tidal and non-tidal) that is not classified as construction** to the Phase 7 water class". The June 2025 minutes will be updated to reflect this change.

Decision: The LUWG approved the aggregation of the High-Resolution LULC data to 16 Phase 7 mapped land use classes.

1:40 **Discussion of Review Process of Land Use Time Series** - Sarah McDonald, USGS (LUWG Coordinator) and Andy Fitch, USGS (25 min).

Sarah McDonald, USGS, discussed the review process for land use data entering the Phase 7 Model prior to the year of review and Andy Fitch, USGS, showed the LUWG how to view and download the data using a web app. The group was asked to provide any feedback on the web app for the upcoming review of finer scale (LRSEG) data. The web viewer is accessible via the following link: https://gis.chesapeakebay.net/lulctrends/.

Discussion:
Caroline Kleis (in chat): Web App Link: https://gis.chesapeakebay.net/lulctrends/
KC Filippino (in chat): That was my first question Andy, can you somehow make a note of that in the viewer itself or when you download the data note that it's within the watershed only.
Norm Goulet (in chat): Would be nice that when you selected a specific year the actual LU would show up in the map.
Cassie Davis: This might be a question more for Sarah than Andy, but there's a jump from 2013 to 2014 throughout a lot of the data. Is that just because we had a land use update then?
Sarah McDonald: Yeah, that's something I will cover in the following presentation focused more on the data. But, yes. I had the back-cast focused on '85-'13. So, there's a jump because I didn't have time to properly integrate the high res period with the back-cast period. So, that's something that will be reconciled in the final version. I'm hoping to actually tweak that this week and send Andy data to update to reflect that. Yes, that is a known thing that will be tweaked, so that is an artifact. So, please don't be alarmed by that yet.

Dave Montali: I picked up on that, too. I said, for Phase 7, we shouldn't have that jump. It should be smooth. So, glad to hear that will be resolved. The other thing is, I haven't had a chance to really look at real good, but I did look at a couple of West Virginia counties, and it seems like there's this consistent phenomenon of forest going down and natural going up in each of the counties over the whole period. I was just scratching my head thinking what's that telling me?
Cassie Davis (in chat): I noticed that too Dave.
Sarah McDonald: I think we need more time to dig into some of this. As you guys can tell, it's a lot of data. So, I am relying on you here and your colleagues that you share it with to give feedback like this, so we can help make sure that this is actually reflective of your jurisdictions. So, we can dig into that more. My hunch is that that would be related to harvesting or forest clearing of some sort. It could be an aggregation difference between the two datasets that can be tweaked. So, there's a few things that I initially would start with to try to understand that, Dave, on my end. But, this is exactly the type of feedback I am hoping to get throughout this process. So, thank you.
Dave Montali: Great. I was just trying to say, ok, ag is going down and developed is going up in certain counties. I just wanted to see what this is saying big picture, how much increased development is coming from ag versus forest. Then when I couldn't get the numbers to match and then I clicked on natural, it was a weird phenomenon of forest was going down, natural was going up. So, glad to contribute, and interested in the answer.
KC Filippino: Is this discussion just to discuss the process, or this viewer? It says by modeling segment. So, I'm just confused by the agenda items. Do you want to talk about the data itself or just the viewer?
Sarah McDonald: Right now, I want to talk about the review period, not the review of the data itself. Does that make sense?
KC Filippino: It says by modeling segment, but these are all counties. So, that's the other thing I don't understand. Is there something else we're supposed to be looking at?
Sarah McDonald: No. That must have been an oversight on our part in the agenda. That will be our fatal flaw review later on which I will show in a second, where it will be at the modeling segment, since that's what will actually go into the models. I imagine that's what folks want to see. That will be part of our discussion on this.
KC Filippino: I put in the chat, Andy, if you could just note somewhere for anybody else trying to pick this data up because you do have the watershed delineated, that this is only for the acres in the watershed. Especially if you download the data, it's just a spreadsheet, and oftentimes the data either says in the watershed or out of the watershed. Just something so we know it's not the whole county, because that can affect a lot of the acres. This delineation of forest and natural I am not sure I am following, because we don't normally talk about it that way. Forest is always rolled up into natural. So, what encompasses forest? I don't know if harvested is in that. What is all of forest, and then what is natural?
Sarah McDonald: Great question. So, forest is just that. It represents true forest in CAST world. Natural is harvest and wetlands. I believe those are the only natural.
KC Filippino: Where would tree canopy fall? Like urban tree canopy, tree canopy over turf?
Sarah McDonald: That would be developed. I can clarify some of that.

KC Filippino: So, natural equals harvested and wetlands, ok.
Sarah McDonald: If it makes sense for this review to replicate the higher-level sectors and have natural, ag, development and aggregate it that way, I can do that as well.
KC Filippino: I'll leave that up to others. This is just different than what we're used to. So, I just want to be clear on what it all is, even if there's some text that says what they are, that could help too.
Sarah McDonald: Good point. I can share that info with Andy to maybe add in a pop up, thanks.
Norm Goulet: I don't know how much work it would be, but it sure would be nice if we selected a specific year and the land use imagery would pop up in the map, as opposed to just having this blank grayscale that we see now. I was flipping through a couple of jurisdictions, and there's one that had some really weird information, and it would be nice to see what the imagery looks like. I just don't know how much work it is.
Andy Fitch: That could be doable, Sarah. If you have layers for each year or a subset of years, the actual raster layers could be loaded in here.
Sarah McDonald: That's something I think you and I can work on for the fatal flaw review in a couple of months. So far, some great feedback on how we deliver this information to you guys. So, thank you so much for that.
KC Filippino (in chat): Can we have a viewer or tool that compares 2013 P6 acres vs proposed 2013 P7 acres? Ideally I'd like to see the delta back through time if it's feasible.

Fatal Flaw Review

Sarah McDonald: For the fatal flaw review, here are a couple of things that I would like feedback on. What scale of data do you want reviewed in that app? I am assuming it's the land river segments, the modeling segments that the Water Quality GIT has approved. So, I would like feedback on that spatial scale, feedback on this timeframe here that I had listed at the top from December 1 to January 23rd, and any other questions or concerns related to this fatal flaws review. I will open the floor on that.
Cassie Davis: For the land river segments, will it be the HUC 12's and counties for Phase 7?
Scott Heidel (in chat): HUC12
Sarah McDonald: Yes, it will be the Phase 7 segments made from counties, HUC 12, and orographic regions. I think Alex Gunnerson has been presenting this at the GIT. Scott, I see your vote is that you would like to be able to review it at HUC 12. Thank you. For folks that will be reviewing this data, do you want to see how it is now/here is what we are proposing we give to Phase 7? Or, is your review going to be more based on how does this compare to Phase 6?
KC Filippino: I kind of feel like both. I don't even know where to begin for fatal flaws. I need the Phase 6 data to be available to compare it to see if it's vastly different or not. I don't even have a clue. I know we have that now, so we could compare with this tool and then download the Phase 6 data, I guess, ourselves. To me, that's going to be the biggest challenge. That's going to be the biggest message of we thought we were doing this, and now we are doing that. If it's not vastly different, that's great. But, if it is, that's going to be a messaging problem.
Arianna Johns (in chat): I think we need both. Comparing P6 to P7 data will be a major portion of my analyses.

Sarah McDonald: I am not someone who reviews the data through the same lens that you all will. From my perspective, in places that they are different, are we going to focus on this is what we used in Phase 6? Or which one do we think is more right? That's the lens that I think through. But I completely understand that. I think that's an update that Andy and I can make where we potentially gear that app towards you click a place and then you see two plots and you see Phase 6 trends versus Phase 7 trends. I think that's something we can do if that's more useful to you.
KC Filippino: If you had a place where you thought there was far less development than when you originally started or vice versa, that's just opening up a can of worms. Where the rate of change is vastly different between sectors and models, that's going to be an issue. That's why I asked the original question about how this doesn't impact the TMDL. If you're going back and the footprint is different than what we thought it was, I still don't understand that, but I've accepted it. I'm hoping that it's not going to be massively different, I guess.
Peter Claggett: It was said multiple ways by EPA legal team. She was basically saying you've got to understand that the TMDL is just a guide. It's just kind of saying you want to do something like this. How you do it and how you update it and all that, doesn't change the legality and everything else at the TMDL. The only thing that would change the TMDL is if the lawyers got involved and opened up the legal process for the TMDL and said we want to legally change the language and change the planning direction or something. But, that's separate from all the data analysis that goes into implementing and developing allocations and all that. We can change the allocations, and that's not going to change the TMDL either.
KC Filippino: The TMDL is based on set land use, and if we find that set land use to be vastly different than what we thought, I am just trying to wrap my brain around that.
Peter Claggett: I think she was also trying to say it's the permits that are legally enforceable, and the permits are guided by the TMDL, but the TMDL isn't enforceable in the same way. So, it's not something that is this fragile thing that can break it. It can only break if we intentionally go in and say we would please like to break it out. Otherwise, it is what it is.
Norm Goulet: I'm still having a hard time wrapping my brain around that. The TMDL is a series of equations which are based off a series of inputs. If we're changing the inputs, then the TMDL is ultimately changing.
Peter Claggett: I wish I could explain it as well as they did. Maybe there needs to be a separate session where the lawyers are brought in. But, she was pretty emphatic about it.
Tom Butler (in chat): Is this tied more to the accountability framework not the TMDL?
Sarah McDonald: Tom, did you want to elaborate on that, being the EPA rep?
Tom Butler: I was wondering if this was related more to the accountability framework, rather than the TMDL. The TMDL being a legal framework, but the accountability framework that we have being kind of the partnership approach we've taken to implementing all of these tools. I interpreted this to be that this should be part of the accountability framework, which can be changed any time by the discussions we have here. But, I would want to definitely check back with Kelly on that before I made that concrete.
Norm Goulet: No. There are specific equations and the resulting tables in Appendix G of the TMDL.

Tom Butler: Ok. I will just look at those and work with Peter and see what we can do, if there's something that needs to be followed up on.
Norm Goulet: You heard from Peter. You heard from the lawyers. It is what it is. Like I said, I am just having a difficult time wrapping my brain around this, and this has been an outstanding subject for quite a number of years now.
KC Filippino: Norm, it's Appendix Q.
Deb Sward: I would just echo that having a couple of land use data points where you actually see the data on the map might be helpful. I know it's a lot of years to have all the data but having a couple points there could help. If we're reviewing it against the parcel data that the state has, for example, it could help track down a pattern if something seems different from the parcel data. Also, I think with the methodology document that we have reviewed over the last couple of workgroup meetings, there has been some discussion about general validation against parcel data and observing trends of what happens when you go from 30 meter to this 1 meter resolution data. So, any independent observations that the Bay Program has or the Modeling Team has for Land Use Workgroup about any specific patterns or things like that, might be helpful for us to know as well. I know Phase 6 versus Phase 7 is a key question here. It's also helpful to know what some of the limitations of the current approach might be, too, for future considerations.
Peter Claggett (in chat): For the comparison, it will be more helpful to focus on a single year- 2013- comparing 1-m rasters P6 LULC and P7 LULC with CAST. For the backcast- comparing temporal trends, and not amounts, will be most helpful.
Sarah McDonald: Thank you for bringing that up. So, that's something I intend to have. All of that validation will be automated, so that's all information I intend to have documented at the start of our fatal flaw review. My intention is to have all that documented, all of those nice graphics and everything, and kind of write up summaries related to that. A little wrench in this is that our December meeting will be a joint meeting with multiple other workgroups. So, we will not be discussing this. So, maybe we can try and spin up another office hours during that fatal flaw review, if that's helpful to folks to go through some of that and make sure we are on the same page. If that's something people are interested in when we get closer to that timeframe, we can float that around and see how folks feel.
Deb Sward: Thank you, Sarah. I think that would be really helpful and also having that validation at the start of the fatal flaw analysis.
Peter Claggett: When it comes to Phase 6 versus Phase 7 comparison, 2013 is the key year. 2013 is the only year that we had wall to wall 1M land use data, with the 16 classes informing the land use, and that's the baseline for the back-cast for Phase 6. So, we can compare our raster data, our mapped data for 2013 that was used for Phase 6, with our now twice revised 2013 data with 56 classes. We can compare those head-to-head and see what some of the differences are and, for example, there's at least 1,000,000 acres more turf grass in 2013 mapped data that was used for Phase 6 than in the 2013 mapped data that's going to be used for Phase 7. So turfgrass, how we mapped it, the rules and everything, that's a huge difference in terms of the developed acres and why you see the gap between the developed trends in Phase 6 where you have more

development overall through time compared to Phase 7. It's because of how we map turfgrass in Phase 6.
Sarah McDonald: They haven't seen that yet, Peter. That's next.
Peter Claggett: Well, now we know. The other thing is with 2013, once we provided the raster land use data to CAST, it was combined and, in a sense, averaged with the Ag Census. So, what you see in CAST for Phase 6 is never going to be exactly representative of what we mapped. So, there's like three data points for 2013- how we're representing it now, how we represented it then on the map, and then how it's represented in CAST. Ultimately, how it's represented in CAST is what sets the magnitude that is going to be tracked all the way through time for the Phase 6 back-cast. What we map now is going to set the magnitude for the back-cast. So, I would emphasize focusing a lot of attention on that year and then when you're looking at the back-cast, it's just relative differences and how do the relative differences compare.
Sarah McDonald: Thank you, Peter. These are all great suggestions. Andy and I will kind of work together to figure out what's feasible. Maybe what we will do is Andy and I, over the next month or so, will mock up some of the changes of here's what we intend to tweak and ask you all does this meet the needs? Maybe we'll just circulate that via email noting the changes we are going to make. What do folks think? Andy, is that reasonable for you?
Andy Fitch: Yes.

Action: LUWG members are asked to provide any comments on the time series review process and web viewer. Feedback should be provided to Sarah McDonald (smcdonald@chesapeakebay.net) and Caroline Kleis (kleis.caroline@epa.gov) by Tuesday, September 30th.

Action: Sarah McDonald and Andy Fitch, USGS, will draft a mock up of the changes they intend to make to the time series web viewer. This will be circulated to LUWG members in the next month.

2:05 **Review of Draft Version of Land Use Time Series from 1985-2022**- Sarah McDonald, USGS (LUWG Coordinator) (15 min presentation, 35 min discussion).

Sarah McDonald, LUWG Coordinator, facilitated an overview of the draft time series from 1985-2022. The group saw recent trends based on the high-resolution data and draft back-cast results at the county scale, including a comparison of trends with Phase 6 back-cast trends.

Discussion:
Norm Goulet (in chat): A slide with the methodology would be helpful.
Sarah McDonald: Thanks, Norm. I will update that, and we can update the posted version of these slides.
KC Filippino (in chat): Check out Portsmouth too for weird trends.
KC Filippino: This was cool. It's a good way to think about it. Preliminarily, I'm just so curious why some states, like in this example here, why West Virginia has such a gap between the two

models and others are so much more closely aligned. I feel like teasing out the why is going to be trickier. As Peter mentioned, we've made rule changes, so some of it is just a difference in how we classify things over time versus better mapping accuracy. Can you speculate why states would have such differences or why the models would be so far apart in some states?
Sarah McDonald: That's a great question. I completely agree. Putting the why in the story to each of these is going to be a challenge. I think what's largely coming from this is if you look at any of these charts for any of the states or the watershed, and you look at the 2013 years, how different they are starting is the base point. So, that's what we mapped for the 2013 ag acres in West Virginia for Phase 6, the first time they mapped high res, and this is what we're mapping now. So, our baselines are so different. But, if these two points were to overlap and we were starting at the same place, the trends themselves might not be that different. Where these two would really start to differ is where these lines go up, because in the previous model what would happen is you would have said, ok, the population shrunk by this much. I know population shrunk, which means I am going to assume there's less development based on that population change. Based on how much development is going out, I can now say how many acres need to be not developed. Where do those ares go? Are they ag or are they forest? Based on that, they would use a ratio to say there's more ag here, so we are going to assume that it was more ag than forest, which is why you kind of see these straight lines. It's kind of an assumption on what was there on those tails and then interpolating them. As Peter was saying earlier, what this is really going to boil down to is how different is our starting point, which are those 2013 maps. So, it sounds like that's something that my team should prioritize doing is trying to understand how different our two 2013 maps used in these two different models are. In places those are very different, the trends might be similar. A lot of these lines are following the same trend, but they're starting at a different spot. So, it sounds like that's something that we should prioritize to try and have documented when we release this info.
Deb Sward (in chat): For the planned updates this week, it's just smoothing the line at the 2013 time point, correct? The other data won't be affected?
Sarah McDonald (in chat): Deb, yes this week I will only update 2014-2022
Peter Claggett: So, you've got the five-year ag census in Phase 6. To get to the point of why the temporal trend of ag in Phase 6 would be so different across states relative to what we're doing, it has to do with the type of agriculture that's practiced in that state and how that may or may not be represented in the remotely sensed data. So, we know that in West Virginia we are challenged to agree on how much ag there is because some of it could be out of production, but from the remote sensing perspective, it looks like it is in production. There's a lot of haylage, which is really confusing to map sometimes and to separate it from other things. So, it just may be that difference between the remote sensing versus a five-year survey and the characteristics of agriculture in a state that led to state by state variability.
Sarah McDonald: Thanks, Peter, for that clarification. I didn't mention the Ag Census at all being incorporated for the ag plots. Are there other questions or feedback on these initial comparisons? KC, I heard you mention we're mapping less development and that could be an issue, which had me nervous considering we are mapping less development.

KC Filippino: I am actually happy that it looks like we're mapping less development. This is not a bad thing. But, again, it goes back to the narrative. If you look at these plots, it's like we are closer to achieving the TMDL. We have more natural, less developed. Were we off? I feel like this data could be potentially overinterpreted or under-interpreted. So, maybe it will change nothing, but I'm always trying to counter that development narrative a little bit because of all the regulations that folks have to do. To say that development is going unchecked kind of says maybe we need to reevaluate that. Not to say there's not a problem with development, but I find this data to be really interesting and how it's interpreted will also be interesting.
Peter Claggett (in chat): Less agricultural acres but the same amount of animals, manure, and fertilizer could lead to higher loads?
Sarah McDonald: Are we the only data that's being updated, though? Is there other information back through time that's being updated in addition to land use that could affect this?
Norm Goulet (in chat): Yes
Tom Butler: For Phase 7, you can speculate on the loads, but it's also important to realize for the land use data you see here, it is not exactly apples to apples for what's in CAST, so I would caution against looking at that. I would also caution against what we'd see for one of the dominant drivers for our loads, our crop yields, and we are redoing the crop yields simply because we recognized the shortcomings with some of the Census of Agriculture data. So, there's a lot going on there. You can speculate but, at this point, I want to highlight it's just speculation, and we don't know the answers to any of those questions because we are revisiting a lot of information and there's more than just the ag sector.
Peter Claggett: In terms of the ag we see here not being the ag that's going to be in Phase 7 CAST, it's my understanding that the mapped and Sarah's back-cast of agriculture will represent the acres of agriculture in aggregate. But, the CAST land use will break that down into 10 or 12 classes. So, the devil is in the details in terms of crop or soy or whatever, but the cap on ag acres will be set by Sarah's data. Is that correct?
Tom Butler: Sarah's data will directly inform what goes into CAST. But, yes, we'll have different land uses within the ag sector then we had for Phase 6. So, we currently have two new land uses in relation to the pasture and hay. So, those are going to have different loading rate ratios which will have an implication for loads potentially based on what states report for those. We're also looking at fertilizer and animal nutrient concentration. So, even though we're looking at potentially different numbers for animal units, we're also going to have different concentrations associated with those. So, the nutrients will change.
KC Filippino: I think, Sarah, this is just so much to wrap our heads around. I appreciate that distinction, Tom, that it's not necessarily a direct correlation to loads. But, the acres are still pretty relevant especially at this level of aggregation. I wish I could have looked at the data a little bit more clearly and been able to say this doesn't make sense. That's my other problem. I don't have a frame of reference, so that's going to be the tricky part of figuring out how to compare back through time and give you meaningful feedback to say this is a fatal flaw. That's the part I'm still struggling with, and I suspect many others will be struggling too. For the most part, it's going to be like yeah, that makes sense to me. Other than the blips in '13 and '14 and

the weird anomalies that are showing jumps in some localities, I really don't know how to know that something is a fatal flaw, unless it somehow jumps out to me.
Sarah McDonald: I don't know if this is appropriate for the joint meeting in December, Peter, or maybe this would be a nice conversation with the Water Quality GIT at the joint meeting in December about the process of reviewing fatal flaws and what that means. Right now, as you are pointing out, the only frame of reference we have is Phase 6. So, where do we diverge? How do we determine which one is more representative without just saying this is the one we are used to or know the effects of?
Peter Claggett: You are talking about validating the back-cast, right? I think we have historical information from localities or, in the case of Maryland, Maryland property data with year built dates. We can compare directly to the Ag Census, which is going to be a different thing than comparing directly to CAST, which was an averaging of the Ag Census with the land use. So, for ag, we can look at the Ag Census trends and USGS has normalized the Census years overtime, which is a different way of interpreting the Census than how the Census was interpreted for Phase 6. So, there's different ways we could do that and as you've mentioned to me, Sarah, with the FIA data, looking at the forest cover trends, maybe the natural resources inventory data could come into play at a state level, but we can throw more at this comparison than just Phase 6. In my mind, the question is is what we are doing now more accurate independent of Phase 6? Is it more accurate the way we are depicting land uses, judged by these other data sets? Then we can say how does it compare to Phase 6 once we've decided it's a more accurate depiction?
Tom Butler (in chat): Agree, the question should be is this an improvement over phase 6
Dave Montali: I agree with that. If it's better, it's better. I agree with Tom. Trying to make load determinations about the differences between Phase 6 and Phase 7 is a fool's game at this point. It's all very complicated. I also think that, in the end, the model will be calibrated to observed loads coming down at the RIM stations, and it's all going to shift around. But, it goes back to if this is a better depiction over time of these groups of land uses, there's no other way but to use it in Phase 7, even if it differs from Phase 6.
Samuel Canfield (in chat): Going back to the LULC trend tool earlier: since forest harvest is being included in Natural, we should see the general current relationship of Forest decreasing and the Natural increasing, correct?
Sarah McDonald: I would say that depends on the rate of harvesting per year. If there was more being harvested more regularly back through time than there is now, that's one aspect of it as well as because these are high level net changes, it's how much of this forest is also going to development. I think that would depend place to place on the rate of change of harvest. If you have years or blocks of years where timber was going for a lot of money and a lot of people started harvesting their land, then maybe you would see less of a spike of more natural to less forest in that year. I think it would be more related to the slope, but I don't think it would be consistent necessarily unless you're expecting that that rate is a consistent trend over time as well.
Samuel Canfield: This is diverging from the current conversation, but I ask in relation to the question that we had earlier of why was forest decreasing and natural increasing? I was just thinking of it in a general sense of if forest harvest was being included in the natural, that would

just be one aspect, but a potentially influential aspect in why you are seeing that negative/positive relationship there. So, just a thought. Thank you, Sarah.
Sarah McDonald: Thank you. As you can tell, this is a lot of data. So, there's kind of higher level analyses that my team can do to wrap our heads around it, but so much is going to vary once we get down to these smaller geographies, even to the county scale. That's a lot of counties for us to try and wrap our heads around and understand what's happening in each jurisdiction. So, that's really where I'm going to rely on this group is to make sure that each jurisdiction is reasonably represented. I think the state and watershed scale is where my team can come in and hopefully answer questions about what you're seeing in your jurisdiction on the data side. In terms of if it necessarily makes sense for a jurisdiction or the why for a jurisdiction, that's where we really need support to give us some of that context that we lack at the top view largest scale.

Action: Sarah McDonald, USGS, will update the web viewer to fix the integration of the back-cast with the high-resolution period from 2014-2022.

Action: LUWG members will be asked to provide any concerns for their jurisdictions that they would like to see addressed prior to the final back-cast data being delivered to the modelers. Remaining feedback should be provided to Sarah McDonald (smcdonald@chesapeakebay.net) and Caroline Kleis (kleis.caroline@epa.gov) by Tuesday, September 30th.

2:55 **Review of Actions/Decisions** – Arianna Johns, VA DEQ/Chair (5 min).

3:00 **Adjourn**

NEXT MEETING: Wednesday, December 17, from 1:00-3:00PM

Participants

Arianna Johns, VA DEQ
Sarah McDonald, USGS
Caroline Kleis, CRC
Labeeb Ahmed, USGS
Jackie Pickford, USGS
Dave Montali, Tetra Tech
Lori Brown, DNREC
Tyler Trostle, PA DEP
Tom Butler, EPA
Kristy Woodall, VA DEQ
Irina Beal, We Conserve PA
Marel King, CBC
Ashley Hullinger, PA DEP
Samuel Canfield, WVDEP
Deborah Sward, MDP
Scott Heidel, PA DEP
KC Filippino, HRPDC
Emily Heller, EPA
Helen Smith, Devereux Consulting
Katheryn Barnhart, EPA
Mark Symborksi, MCPD
Robert Hirsch, Baltimore County
Norm Goulet, NVRC
Katie Brownson, USFS
Allie Wagnet, NVRC
Peter Claggett, USGS

Clinton Gill, DDA
George Doumit, DNREC
Young Tsuei, DOEE
Andy Fitch, USGS
Caitlin Bolton, MWCOG
Cassie Davis, NYSDEC
Jennifer Ciminelli, VA DCR
Michaella Kuykendall, MDA

Acronym List

CBLCM: Chesapeake Bay Land Change Model
LULC: Land Use / Land Cover LUWG:
Land Use Workgroup
USGS: United States Geological Survey
VADEQ: Virginia Department of Environmental Quality