00:27 I'm Ellen Bryson. I work with Region 3 EPA. I've been involved with the WRR project for a little while now, and we're very happy that you're here. This has been the brainchild of the Pennsylvania Team - the technical advisory committee team which has representatives from EPA Region 3, all three districts of the Army Corp of Engineers and then lots of state agencies. We've got DEP, we've got invitees of DCNR – they don't always attend the meetings - but we've also got of course Penn DOT. This overview, demonstration of the project is something we've wanted to do for a while, and I thank Drew for helping us get this off the ground. Drew, would you like to say a couple of words?

01:15 Yes, thank you Ellen. So, I'm Drew Ames, from PennDOT Central Office - Environmental. And the impetus behind this particular session was the fact that Ellen and company had done a demo of the Pennsylvania Water Resources Registry a couple of months ago at this point. It was a really good overview. It went over a lot of the different functions within it, but I was hoping we could have another session just focused primarily on the suitability analyses that are built into the Water Resources Registry and that's primarily for wetland restoration, wetland preservation, and the same thing for streams. So, the general thrust of this is to talk a bit about that analysis and how it's done and how we could use it. But then we have folks from the Corps here. I believe we have some DEP people were invited and I hope they joined us. And we should have some time after the demo for some discussion, which will not be recorded by the way. Just the demo will be recorded. But for some discussion to talk about how the suitability analysis might be useful when looking for mitigation sites, like PRM sites on site mitigation or wetland banks. So, I'll turn it back over to Ellen, but that's the general concept behind this session and I'm hoping we can start a good discussion on how to use this tool or whether or not this tool would be useful as we get into looking at mitigation opportunities.

03:23 Thanks Drew. That is what we are going to cover. I also wanted to reiterate to consider this the first of other, future opportunities. If you all tell us, '*I think this was really great, I'd like to learn more about this. I could use some hands-on. Could you walk me through this?*' We are happy to do that, and we have some great resources to help with that, one of whom is with us today. Emily Gentry joined EPA as an ORISE student I think about a year and a half ago now and she is just awesome in terms of teaching materials and training materials and giving demos, so she's going to cover quite a bit for us today too.

04:00 So, I'm going to start. I'm going to pull up a PowerPoint and turn off my video camera. And as Drew said, we will have time for discussion today. We will turn off the recording so it can be comfortable. We're going to ask you to please hold your comments until then. So, I'm going to turn off my camera and pull up my presentation and share my screen. I guess I need to do that first. Just a second here. Whoops. Don't want to start at the end. Let's start at the beginning. Ok, great.

04:41 As Drew said this is something we've been wanting to offer for a good while and we're looking forward to doing this for you. You know our whole aim is to be helpful and make the WRR useful to you all. If there are things you would like us to provide as follow up trainings, follow up demos, follow-up walkthroughs, reach out to your agency representative. All of you that are here today have an agency representative on the Technical Advisory Committee. I'm going to show you how to find their names during this presentation, so again just we're really open to making this work for you all.

05:18 So, we're going to provide a little bit of background on the project. I'm going to dig into the spatial analyses, because when you go to the WRR later, and Emily's going to show us, there are going to be a lot of different data layers. And it's helpful to see some of those findings on the spatial analyses before

you dig into the interactive map so you know what you're looking for, how they were created, and what they mean for you all. Emily's going to do the demo and then as promised we'll have lots of time for question and discussion.

05:49 So, a quick background on the Pennsylvania project. What is a WRR? What is a Water Resources Registry? We call it the WRR a lot. First thing about WRRs is that they are state-centric. So, there is a Maryland WRR. There's a Pennsylvania WRR, Virginia, etc. And, there are WRRs being developed beyond Region 3, which we're all very excited about.

06:13 Pennsylvania's WRR got started back in about 2015. I was at the Baltimore district Army Corps of Engineers and they had a Maryland WRR and wanted to start one in Pennsylvania, so I started working with all of you. Then when I started working at EPA in 2016, it was just kind of a natural continuation. We developed the GIS analyses that I'm going to show you in just a minute in about 2017, I think. We went live with the interactive mapping in about 2018. I'm just guessing, but just to give you a sense of how long it's been. The analyses are sort of fixed. So, they haven't been reworked, but the interactive tool has been improved upon all the time. We're always finding new data layers, training, etc. And the TAC team, we have been meeting regularly as well - almost monthly. That's a little bit about the history.

07:13 It is, absolutely at its heart, a collaborative effort. It's federal, state, and other partners. In terms of federal partners, we've got EPA Region 3 and the Army Corps of Engineers. In some states, not necessarily this state, but in some states, we've got Fish and Wildlife. We did invite Fish and Wildlife and they're still part of the TAC. They get all the mailings, but they have not been attending meetings regularly. But we consider them partners. At the state level, we have PA DEP, Penn DOT, obviously. You've been very engaged from the beginning. I think I met Drew a while back – a regular, wonderful supporter. DCNR was also involved, especially in the beginning when we were talking about data layers. They're still on the team. They get invitations to everything. I might call them a silent partner, but we consider them important because there's so many good layers that really aren't directly related to what we all do with water, but they do affect what we do, and we put in a lot of their data layers.

08:20 So, one of the main things that the WRR does is that it maps and scores *'eco-opportunities'*. And by that, I mean, if you go out there, you'll see areas where it was a wetland in the past and if somebody was out to do a good thing, they could restore that to a functional, healthy wetland. That's an *'eco-opportunity'*. It could be other kinds of things. It could be protecting a forest that's doing really important groundwater recharge work. That would be an *'eco-opportunity'*. As Drew said, we're going to focus today on those that this group is most interested in. The wetland restoration and the riparian restoration. We'll touch a little bit on preservation for those two topics, but pretty much those are the ones we're going to focus on, just because of our audience.

09:16 And then the last aspect of a WRR is that it is shared through an interactive, easy to use, map that's online that is pretty much available to all of you and it has amazing numbers of resources and tools and data layers and you'll see that in just a little bit.

09:38 Ok, I always bring up this slide. Maybe I should redo it. I don't know. But to me it always captures the three essential pieces. Collaboration is absolutely where it's at. The tool was designed collaboratively, created collaboratively, and it's intended to be used collaboratively. We score those *'eco-opportunities'* and we do the map.

10:00 I did want to show this slide even those it's a little bit wordy. One of things, as again, we're going to talk a lot about mitigation today, but if I don't remember anything from my days at the Corps, job #1 is to avoid and minimize impacts – that very first item. That's the most important thing. If you can avoid an impact entirely, you don't even need a permit, which is a win/win for everybody. But if you have to have impacts, you want to try first to minimize it. It's only when you can't avoid and minimize that we start look at mitigation for it. But avoiding and minimizing is really critical. That is one of the times when the preservation analyses are really critical. If you have, for example, a road-widening. Or, let me say better an alignment. If you have to do a realignment of a road, if one of your options impacts a five-star wetland – we score them with stars – and the other just impacts a one-star wetland, that should serve as a red flag. If you have choices in your project, and sometimes you don't, but if you have choices, try to avoid and minimize first.

11:10 The second one, the one where we find mitigation sites for impacts, that's where the WRR really shines. It will help you find areas where mitigation would make a lot of sense. It could be one of the ones for you to look at. It won't necessarily say, '*Yes go there, that's going to be guaranteed.*' Or you know, you can't use it and say, '*Well, I picked this so EPA ought to approve this permit.*' It's not going to be a guarantee, but you will find sites that the team has agreed, you know, by the standards that they used to create the GIS, that these should be good areas. So right off the bat you're ahead of everything. And so, when you have a mitigation site and you say, you know we're thinking about mitigating for this or that, you can know that supposedly the agencies that you're working with have agreed. *'Yeah, that site should be good.'*

12:03 And then the last one at the very bottom. We're always struck by this. A lot of folks, even folks with a lot of GIS expertise are using the WRR as their out-of-the-box GIS. You just go there, turn on maps, turn on data layers, turn on aerials, turn on roadmaps, turn on wetlands, whatever. It's just a really great, easy to use GIS.

12:26 Ok, I'm going to take a breather here. So, what I'm going to do now is talk about how the spatial analyses were created. Again, just so you get an understanding of what that means. *Where are these opportunities and how were they created? What should I know about those polygons for example?* So, when I'm doing GIS, I always turn it into a question. And so, for us, the question was, '*Where are opportunities for restoration and preservation?*' and specifically in those resource areas – wetlands, riparian areas, hydrology systems. *'Where are those opportunities? Where could I do that? And then if there are multiple opportunities, how can I choose between them?'* So, the analysis that we did scored areas relative to other areas in the state. It's not a raw value. It's not like this got a 6.2. They're not compared to some idealistic standard. They're compared to each other. So, they're all relative comparisons.

13:33 I use this slide all the time, but I think it really works, because I think a lot of us have been through that process where you have to buy a new house and this process works whether it's just you and you only have to pick what's important to you. And it also works really well if you have partners or stakeholders that you need to decide together on what areas we should look at first. And a lot of times it's a time-saver that will save you time as you're looking. But it's also, again, if all of us decide together, these are the things we're looking for, and then the map shows those areas, then we can be comfortable well that's something I would probably like because I agreed to these factors. So, on the left, we have the absolutes. We don't even want to look at the house unless it meets that criteria. And

then on the right we have desirables. So, any one of those could be missing, two of those could be missing, multiple could be missing. But the more of those desirable factors that are found, the better it should be and the higher the score it should receive.

14:37 So, we did a GIS-based analysis that was just like that, and here's the exact words from the PA Wetland Restoration opportunity. The **'Must Haves'**: It cannot currently be a wetland. If it's currently a wetland, there's no restoration possible. So that wipes all the areas that are mapped by NWI. It can't be open water. And it has to show some evidence of having been a wetland previously. And what we used for that was poorly and somewhat poorly drained soils. Then on the right we see the **'Relatives'**. And you can just read them. I'm not going to read them all to you. Just to say again, these factors were decided on by a collaborative team that said, you know what, these are the things we really value, and you'd be surprised at how much agreement there really was. We ran into very little disagreements in any of the states I worked in, where we just could not come to an agreement on what these were. So, that is Pennsylvania's restoration.

15:35 And I want to show you a good resource. I guess I have to get out of this mode. So, you may be wondering, what about wetland preservation or what about riparian? So, I'm going to bring you into the screen. Are you all seeing my web browser?

15:56 Yes

15:57 Great. So watershedresourcesregistry.org is the homepage for this project. There you are. And if you go to the '***State Registries'*** and click that drop-down and go to Pennsylvania, this is a neat little homepage. Just some background on the project. You'll also remember earlier I was talking about, all of you have a representative in your agency that serves on this Technical Advisory Committee. So, if you have some training you want or you found a data layer that's really useful, you can come here and find somebody in your agency and just send them an email.

16:33 Also, on the homepage, in the upper right corner - so Emily's going to show you the map in just a minute - what I wanted to show you here was the spatial analysis. If you click that and then click ***'View Here'***, you will get a pdf document that fully describes all of the factors that each went into each of the six analyses. So, we have stormwater. I'm going to skim over that because that's not necessarily the focus of today. Here are the factors that went into the Riparian Zone Preservation Analysis. So again, absolutes and relatives. The more of these the better. For Preservation, you'll notice that a lot of the factors are really desirable things, things worthy of protection: endangered species areas, EV and HQ watersheds etc.

17:27 We can scroll down to the Restoration for the Riparian Zone. A little bit of a detour here. The analysis in our first WRR round was really all about the riparian zone, and so we did not do an in-stream analysis. This is really about protecting that area just adjacent to the streams. We are working on a stream stability model right now and once that is complete, we intend to create stream preservation and stream restoration and that's where you can find areas to actually do in-stream work.

18:04 Ok, so that's my little detour. If you click on the map and you see, '*Oh my gosh, this one got a four for wetland restoration,'* you can come back to this pdf document and you won't know literally how much of that area was within a 303 impaired stream or how much of that area was potential wetland or farmed, etc. You'll just know that 15 or 14 factors that went into that. So, if this one got five stars that

was probably 11, 12, 13, or 14 of those factors were met. So that's a good tool when you're trying to figure out, *'What does a five star for wetland restoration mean?'* I just wanted to show you that.

18:50 Alright, now let me go back to my PowerPoint. I think I'm good on that, so we'll keep going. So that's Wetland Restoration and how we got that. I'm going to give you one quick demo on how the GIS did it inside the nuts and bolts of the system. This is a simple example of a spatial analysis. We have four factors. Let's pretend for a minute that we just have four and they are habitat value, is it near water, is it wooded and is it in a floodplain? So, we gather the data and we put it into GIS. Mostly that's in polygons. That's fine.

19:25 Then what we do is overlay it with a grid because it's a little bit easier to work with; a little bit faster to process. And each of those grids gets assigned a value of *'it is'* or *'it is not'*. So, the pink ones are definitely the habitat value is there and the white or the transparent indicate no habitat value is there. So, you do that with all four of your factors.

19:52 And that what you can do, once you get it into that format, you can overlay them and simply sum up the desirable factors. So, you can clearly see on this snapshot, this area in the middle central, there were some deep, deep pink areas and so all four of the factors were found there. The areas that were white, none of the factors were found there and you can see in between the ones and the twos. I didn't fill in all of the numbers but you kind of get the idea.

20:20 So you now know which areas have the most of those desirable factors and then the computer does this for us, where it finds areas where the scores were really similar and it makes them into polygons. So, then we have what we wanted to be able to put on our interactive map. We've got polygons that represent opportunities for whatever. We know the size of the polygon because it's GIS and we know the number of stars.

20:51 I skipped over how we convert from the total number of factors to the stars. It's a little bit too much in the weeds, but basically it is just putting them into buckets. If there are 20 factors, then maybe the ones that had 16 – 20 got to be five stars or maybe the ones that only got up to five factors, those were the one stars.

21:17 And that was all done by comparison. Let me detour for just a little bit. So, if you remember what I said earlier, these were all compared relative to other areas. So, we're scoring areas relative to other areas. In Pennsylvania, as you guys all know, if you have an impact in a service area, you're strongly encouraged to mitigate for that impact within that service area or possibly within an adjacent one. This is in Pennsylvania only – this is kind of one of the ways that Pennsylvania was tailored to meet the needs of Pennsylvania – all areas were compared to other areas inside a service area. So, within every single service area in Pennsylvania, you're going to see all of those stars, one through five. Which is a good point. It means that you're going to be able to find the very best opportunities within a service area.

22:13 And the last thing o mention here of course is, you guys know how computers work. Now that I've got this as polygons with the size and the number of stars, we can support a search. So, you can go to - and Emily's going to show this I think - you can go to service area number 7 and you can start typing in I want to find all of the restoration opportunities in service area 7 that are at least 10 acres in size and got three stars or better. So that's kind of at the heart of what the WRR is.

22:44 And I wanted to show you this. This is the last thing I think before I turn it over to Emily. I showed you simple example with the pink stars and everything. This is an actual, took it off the Pennsylvania WRR this morning. This is Wetland Restoration and its colored orange. The lighter colors are the lower number of stars. The deepest orange is the highest number of stars. So that's five stars. Those deep orange areas kind of in the middle, lower middle of that little snippet, those are going to be the five stars. If you can see the image and you don't see anything in terms of wetland restoration, that means [cut out] that's what it will look like. Again, Emily will show you later.

23.30 So that's what it will look like on the map for these [audio cut out].

23:39 In summary, the WRR maps areas across the state where wetland and riparian area restoration makes sense. Again, there's some other stuff in there too but we're focusing on restoration today. It does provide a sense of how well those areas compare to each other so you can get a sense of the best of the best. It does not mandate any site selection. It doesn't say, '*Ok here's what you put in, so here's what we spit back out, so you've got to do this.'* It's really just another piece of the picture as you're evaluating either a project if you're with PennDOT or if you're evaluating a permit if you're with the Corps. And again, it doesn't guarantee approval of any mitigation site either.

24:22 You know, I've talked about collaboration. I love collaboration. Collaboration is at the heart of the WRR. But it also provides a framework for collaboration during an entire process. So, it you're at PennDOT and you're thinking about doing this, you can pull up the WRR and you can know that someone at EPA that's thinking and talking about the same project or maybe somebody at the Corps, they're looking at the same thing. They're looking at the same soils' layers. They're looking at the same landcover dataset and they're looking at the same prioritization effort for wetland restoration and preservation. And so, it's really not just a collaborative effort that took place back in the day, but an ongoing tool for collaboration which we're very, very happy with.

25:09 And I think that is it for me. I'm going to stop sharing and invite Emily to take over. Can you get that without my help Emily?

25:27 Yes, I think so.

25:29 Awesome. Thank you.

25:33 Good afternoon everyone. Like Ellen mentioned, my name is Emily Gentry, and I am an ORISE Research Participant with the EPA's Region 3 Wetland Branch. For my portion of the presentation today, I want to give you a live demonstration of how to use the WRR to identify potential wetland restoration sites. My hope is that even if you don't have to do that specific task in your work that this demonstration will introduce to enough features within WRRs that you will take something away anyway.

26.09 I'm going to talk for about 25 minutes and then open it up for questions at the end. The first couple of minutes of this presentation I just want to cover some very basic, introductory things in case there are some people with us today that have never interacted with a WRR, and then we're going to go ahead and dive into the bulk of the demonstration.

26:31 So on your screen right now, this should look familiar from Ellen's presentation, but it is the WRR homepage which can be found at watershedresourcesregistry.org. And this is where you'll go to access a

WRR. When you're here, you'll need to click on the '**State Registries'** drop-down menu and select the state of interest. For us it's Pennsylvania. And this will take us to a state-specific page. You'll see the spatial analyses that Ellen mentioned earlier. We have a listing of ap services and a user guide that are all available. But you want to access the WRR itself, you'll need to click on the gray '**View Map'** button.

27:12 A new tab will open, and this is what you should see. There will be interactive map on the right-hand side of the screen. There's a search bar along with some tools underneath on the map itself. And then to the left we have an expanded tool panel which holds all our pre-loaded data layers along with some other features.

27:34 I'm going to be talking about a lot of different things today. There is no worries. You don't have to remember everything, but if you can remember one thing from this presentation, the thing I want you to remember is the **More icon**. It is the one farthest to the right on the green toolbar. And under the **More icon** there is a **Tutorials** option which will take you to a **Tutorials panel**. Here we have instructional videos and written fact sheets that are both created around different topics and features within in WRRs and designed to either teach you how to use these or kind of guide you through the process as you work in a WRR. So, you don't have to know everything. We have tried really hard to anticipate how you might like to use the WRR, what problems you might run into, and created this set of resources for you. So, if you can only remember one thing, make sure it's the **More icon** and the **Tutorials panel**.

28:35 But now let's dive into the question at hand which is, *'How we could use the WRR to help us identify potential wetland restoration sites?'* When I do desktop analysis, one of the first places I like to start is with the search bar. This search bar will allow you to enter the common name of a place, the street address, or the latitude and longitude coordinates. When you're using coordinates, you'll need to make sure that you enter longitude first and that you're putting a negative sign on that value otherwise it's not going to work. We have added some gray text to hopefully remind you of that. Today, I am just going to type in the name of a place, and the map will go there.

29:26 The second thing that I like to do is make sure I'm saving my location on the map. That way if I navigate away, I can easily navigate back to my locations. Or if I'm zooming out and looking at a larger area, I never lose a sense where my saved locations are in relation to everything else. So, there's two basic ways to save your location in a WRR. The first is that if you're using the search bar to find your location, you'll always get this pop-up box, and in the lower right-hand corner of that box, you'll have an option to add a marker. This marker will remain on your screen until you close out or refresh.

30:12 The other way is by using the **Draw tool** which is found under the search bar farthest to the right. This tool will allow you to add points, lines, or polygons so depending on what type of site you're using, different things might be helpful. In this case I just going to use a point. I'm going to choose a style I like and then by default we have all location measurements turned on. But for today I'm not interested in that so I'm going to turn that off and then drop a point right there. This as well will remain on the map unless I click *Undo, Clear* or *Refresh*.

30:59 From here there's a couple of different places we can go. One thing I want to mention is that we have a **Basemap Gallery** where additional information is available. It's pretty self-explanatory so I don't want to spend a lot of time on that, but it's there.

31:13 We also have a **Find Opportunity tool**. This tool will allow you to search for wetland restoration opportunities using a set of constraints. So, if you know that you're looking for a site that's within a certain county or watershed, or you want it to be of a certain quality or size, you can use the **Find Opportunity tool** to really tailor the set of results that you're looking for. Again, I'm not going to spend a lot of time on this. We do have videos and fact sheets on how to use this tool, I just want you to know that it's there.

31:54 Now let's turn our attention to the **WRR Layer List**. Again, this is where all of the pre-loaded data layers live, and they are sorted into expandable and collapsible folders. If you know what folder or data layer you're looking for, you can expand these folders individually or just scroll through looking for them. If you're looking for a very specific data layer, but you don't know what folder it's in, I like to use the *Ctrl + F option*. This will bring up a search bar and then you can type in whatever layer you're looking for. In this case I would like to see the *PA Service Areas layer*, so I type in 'service'. I can see there are two results. One of the is the *RIBITS – Banks & Service Areas* which isn't what I want so I'm going to click 'Enter' and it will take me to *PA Service Areas*. I'm going to turn that on just by checking that box and then I'm going to zoom out so hopefully I can see that data appear on the map.

33:01 There we go. We can see our data appear on the map. And by default, with all our data layers we have automatically enabled pop-ups. Which means that when you click on a feature within a data layer, if there is any corresponding attribute information, it will appear in a little pop-up box like this. Right now, for this data layer, the *PA Service Areas*, we only have numbers attached to these service areas, but we are hoping very shortly to update this to include the names of the Service Areas. If there is additional information that you would like us to include in this update of this data layer, please reach out and let us know. We're happy to add that for you.

33:53 Now, I'm going to turn on the *Wetlands Restoration layer*. And I'm going to zoom in to our saved location on the map. One of the first things you might like to do is start clicking on some of these areas to explore if there is any attribute information in their pop-ups that might be helpful. So, I'm going to click on this polygon right here. And you'll notice that this is one of two pop-ups. So, because I have two data layers turned on. I have this *Wetlands Restoration layer* and the *PA Service Areas layer* turned on; I'm getting pop-ups for both. If that is causing a problem for you, one of the things you can do is next to a data layer there will be an ellipse. You can click on that and disable pop-ups. I'm not really interested in that *PA Service Areas layer* so I'm going to turn that off. Now if I click that area again, I only get one pop-up and it is related to the *Wetland Restoration layer.* This pop-up is going to give me a description of the layer itself, a legend. I get the HUC code, the score, the county, the acres. There's also a pdf link which if you were to click would take you to that pdf of the spatial analyses that Ellen was showing earlier in the presentation.

35:31 As Ellen mentioned, this spatial analysis was created by many different agencies working together. But we understand that there are other groups that do similar analyses and they sometimes come up with different results because they're using different metrics, or they have different goals in mind. One of these layers that we have is in the **Water Resources folder**, just for clarification, is the *Modeled Restorable Wetlands.* This is PA DEP, along with Pennsylvania Western Conservancy, the Virginia Spatial Analysis Lab, and there's one other one that I can't remember who was a part of it but it's a different group of people and so I like to turn these data layers on at the same time. So, you can see where different groups of people are identifying different sites and then also where they are overlapping.

36:35 When you have data layers that overlap like this, something that can be helpful is when you click on the ellipse next to the data layer and scroll down. There's an option to adjust the transparency. So, I'm going to turn this to 40% because I still want to see it, but I'd like to be able to see through it a little bit more. And now you can see exactly where these overlap and which polygons they intersect with. So, this can be really helpful especially if you are going to create maps or share this information with someone in anyway where they can't just easily turn those data layers on and off. Adjusting the transparency can really help you communicate your results.

37:23 In this same folder, again that's the **Water Resources folder**, from the same people we have the *Modeled Primary Wetlands layer* which is identifying existing wetlands. We also have the *USFWS NWI layer*. So, both of those layers are available to you so you can see where existing wetlands have been mapped and then you can consider how close – if you want to build off existing wetlands or maybe move a little bit farther away from them.

38:04 Another major consideration when looking for potential wetland restoration opportunities are, *'Are there any areas that are under protective management?' 'Are there any conservation easements, any other restrictions, etc., etc.?'* Under the **Protected Lands folder**, we have the *Protected Areas layer* which is from PAD-US. This is a little difficult to see - the colors are really similar. So, this is the *Modeled Restorable Wetlands layer,* and this is the *Protected Areas layer*. If you click on that, again you're get a pop-up. I'm going to drag this more to the middle of the screen and then you can maximize this so it's a little bit easier to read. It's still really tiny text though. So, this is the *Protected Areas layer*. I'm going to close that and turn that off, and then we also have a *Conservation Easement layer*. Again, a very similar thing. You get polygons, you can click on them, and then explore that information.

39:09 The last layer I'd like to highlight for you is our *Hydric Soil layer*. We have a *Hydric soils layer* which can identify hydric soils. Turning that layer on at the same time as the *Modeled Primary Wetlands layer* can be helpful. Because again, you can see where existing wetlands have been mapped and then where there are hydric soils and how all those interact with the different suitability analyses and where they're saying might be good sites to restore.

39:57 Something you may find when you're doing your analysis is that you know of data layers that don't exist in the WRR but might be really necessary as you are doing the work that you need to do. So, there are two solutions to that problem of, *'Hey I really need a data layer and it doesn't exist in the WRR right.'* A longer term to solution is to reach out to us and let us know. We are always happy to add new layers to the WRR, especially if it's going to be helpful to the work that you do. A shorter-term solution is that you can manually add data layers to a session.

40:38 The way to do that is to go to the **'More'** icon. Again, this is where the **Tutorials panel** lives. It's also where the **Add Data panel** lives. This panel has three tabs: *Search, URL,* and *File*. We're just going to be talking about URL today. And earlier today, I know of a *State Games layer* in PASDA, so I went to PASDA and found the rest service, and now I can copy the URL, go back to the WRR, and paste that URL in the text box and click **Add**. When you're adding data layers, if you don't see any data immediately appear on your screen, I like to look first to the lower right-hand corner to see if there is a revolving gray circle. If so, that just means that there's a lot of data and it's taking a little bit of time, so you just need to be a little patient. If that is not occurring and I don't see data, I like to look to the lower left-hand corner of the screen and sometimes there will be gray text that tells you there's been an error, or the data is unsupported.

41:54 For us, neither of those is happening, so I am going to go back to the **WRR Layer List** and click on the **Added Data Layers tab**. And here we can see the data layer we just added. I'm going to click on the downward arrow and here are all of the sub-layers that we now have access to. I'm interested in this *PGC State Gameland 2021*. I'm going to turn that on and then I'm going to zoom out until I see any new information.

42:34 Here we go here are some black polygons that are with that new data layer. If you weren't sure you could go to the **Legend**. That's the icon to the farthest left. And you can see the black polygon is the *State Gameland layer*. So, I am going to zoom in to some polygons in this layer and I can see that it is overlapping with several different layers, so I'm going to click on this polygon, and it says that there's no information available.

43:12 If you remember all pre-loaded data layers come automatically enabled with pop-ups. This is not true for manually added data layers. So, if this happens, you'll need to go to the data layer, click on the ellipse next to it, and enable the pop-up. Then you can click on the feature again, and any additional attribute information will appear. Whether or not that's helpful information is to be determined.

43:46 Alright. We are heading into the last portion of our presentation in case you're feeling a little antsy. There are two last things that I want to show you. Two tools within the WRR that I think might be helpful in the work that you do. So, one is the **Print Map tool.** This is a tool that allows you to easily make maps and save layouts in the work that you're doing. Sometimes it can take a little bit of time to load so I'm just going to keep talking.

44:19 But all you really need to do is make sure the map on your screen looks how you want your map to look. So have any data layers turned on, have any points, polygons that you want to draw, any labels added. Make sure it looks like you want and then change the Title of this to be the title of what you want your map to be and then you can click *Print.* I already did this earlier, so this will create a map with whatever your desired title is. You'll see the map exactly as it appeared on your screen. There will be a legend down below for any data layers you have turned on and a scale. So, this is a really easy way to save your work, share your work, and communicate your work.

45:11 The other tool I want to show you is the **Location Details tool**. This tool, if you've never worked with it before, allows you to define an area of interest on your map and then run a series of internal and external reports on that area. I want to look at this panel and the memorize it real quick. You only have to hold it in your mind for two seconds. This is the general **Location Details tool.**

45:42 But if we click on the **More icon**, under **Add Data**, under **Tutorials**, under **Print Map**, we have **PennDOT/USACE Location Details**. And this is always a little bit sticky so if you're trying to use this and it doesn't move, sometimes you have to click, wait 2 seconds, click again and eventually it will work.

46:03 So now this should look identical to the previous Location Details panel we were in. That was this icon in the middle and this one we found under the **More icon** just to kind of orient you. The only difference here is the name at the top which we can see this has been specialized for PennDOT and USACE. Everything else is the same though. I'm not going to talk too much about how to use this. Again, we have tutorials and fact sheets for that.

46:35 But all you have to do is define an area of interest on the map. Sometimes it takes just a moment to register that area. We're trying to improve the WRR, but patience is sometimes a virtue. I'm going to add a buffer of 100 feet.

46:53 And from here I can click on this **NEPAssist widget**, which will open a new tab and connect me with information from the EPA's NEPAssist tool. So, I'll get a National Report here, there are demographic reports with information pulled from the EPA's EJScreen tool. And you also get access to the USFWS IPaC Report which if you click the gray button will take you to the IPaC website and give you information on any endangered species, migratory birds, or wetlands in the area.

47:32 If I go back to the WRR, I also have an option to click **Report**. Now this report was specialized for PennDOT and USACE but if you can see the data layers on your screen, it's very old. We don't have the *Modeled Restorable Wetlands layer*. We don't have the *Modeled Primary Wetlands layer.* We don't have *PADUS, Hydric Soils,* or *Conservation Easements.* There's a lot of things that we could add to this report to update it and make it more current for you and hopefully more applicable. So, this is another thing to keep in the back of your mind, this is another way we could tailor this tool to help you in the work that you do.

48:22 But from here, what I'd like to show if you click on this document **Create Report icon**. It will create a report. There will be a map at the top. I ran this earlier that's why there's no data layers turned on, but normally there would be. You maybe familiar with this. There's a summary of the data layers surveyed, the number of the results, and the area. And then there's a little bit of a breakdown of those results, but I don't find it very helpful. And the reason I want to show you this is because I also want to show you a report that we created for Virginia's WRR.

49:01 Where we worked with them to figure out what potential data layers they might be interested in and then within those data layers we looked at the attribute tables and we said, '*What is the information that you want in a report at your fingertips kind of instantly?'* So here we were able to pull a couple of different permitting layers. You can get the name, the number, any classifications. You're getting the HUC 12 and HUC 8 information. You get what county you're in and ecoregion. If we go down there's TMDL information and here we're getting habitat quality and water quality from 2001 to 2016.

49:48 So, the reason I'm showing this is so you can have a picture in your mind of what is possible. We have a sad report right here that doesn't give you a lot of information and it's containing mostly old, outdated layers. But there is a lot that we can do to improve this so that it hopefully makes your job easier.

50:11 With that, I think I have gone a little bit overtime so I'm going to wrap up and go ahead and open it up for questions.