TRANSCRIPT

Watershed Academy's Nitrogen and Phosphorus Webinar Series:

Tools for Developing State Nitrogen and Phosphorus Pollution Reduction Strategies

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Speakers

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Aaron Kornbluth

All right, apologies folks. It seems like we were experiencing some audio difficulties. Good afternoon again and thank you for joining today's webinar titled the Nitrogen and Phosphorus Webinar Series: Tools for Developing State Nitrogen and Phosphorus Pollution Reduction Strategies. This webinar is sponsored by the EPA's Watershed Academy and the Office of Wetlands, Oceans, and Watersheds also affectionately known as OWOW. I am Aaron Kornbluth, an ORISE fellow in OWOW and I will be moderating today's webinar. Thank you all for joining us. I will start by going over a few quick housekeeping items. The materials for today's webinar have been reviewed by EPA staff for technical accuracy. However, the views of the speakers and the speakers organizations are their own and do not necessarily reflect those of the EPA. Mention of any commercial enterprise, product, or publication does not mean EPA endorses them.

First, I will start by briefly summarizing a few of the features of today's webinar. We encourage you throughout the webinar to submit questions to our speakers. To ask a question type it into the questions box in the webinar control panel and click send. If your control panel is not showing click on the small orange box at the top right with the white arrow to expand it. If you have any technical issues like difficulty viewing webinar content please let us know by entering your question into the questions box and click send. We will do our best to respond as quickly as possible to your issues by posting an answer in that questions box.

At the close of the webinar we will provide a link to a certificate that you can print out in order to document the fact that you have participated in the webinar. Also, we are going to record and archive this webinar so you can access it in a few weeks after today's live presentation. The archived webinar will be posted on

EPA's Watershed Academy webinar page at www.epa.gov/watershedwebcasts. That has no spaces.

You may want to listen to other webcasts related to nutrient pollution. We have been doing a series of webcasts on this topic including webcasts on state and local policies to restrict the use of lawn fertilizers, nitrates and groundwater, harmful algal blooms in lakes, managing nutrients in the National Estuary Program and a webcast on the findings of the state's EPA Nutrient Innovations Task Group.

The purpose of today's webinar is to help states and others understand a few key tools that they can use to reduce the impact of a very serious and growing environmental problem. Over the last 50 years, the amount of nitrogen and phosphorus pollution entering our nation's waters has dramatically escalated. For example, fully 30% of US streams have high levels of nitrogen and phosphorus pollution. Also, reported drinking water violations for nitrates doubled in the last eight years. The webinar today will highlight tools that states can use in order to develop state nitrogen and phosphorus pollution reduction strategies. We will demonstrate EPA's new nitrogen and phosphorus pollution data access tool or NPDAT designed to help states develop those strategies. We will also demonstrate the new interactive SPARROW decision support system designed by the US Geological Survey. The decision support system can be used by water managers, researchers and others to map long-term average water quality conditions and source contributions by stream reach and catchment as well as to track nitrogen and phosphorus transport to downstream receiving waters like reservoirs and estuaries.

It is now my pleasure to welcome and introduce our three speakers. Our first speaker will be Denise Keehner, the Director of the Office of Wetlands, Oceans, and Watersheds at EPA in Washington, D.C. Denise is responsible for overseeing implementation of programs that promote a watershed approach to manage, protect, and restore the water resources and aquatic ecosystems of the nation's marine and fresh waters. These programs include wetlands regulation and restoration, regulation of ocean dumping vessel discharges, monitoring and assessment including the National Aquatic Research Surveys, nonpoint source pollution management, oversight of Total Maximum Daily Loads or TMDL, and building the capacity of state and local government in the watershed organization. Denise is a biologist by training but has spent the better part of her career at EPA managing people and leading programs to achieve improvements in public health and in environmental protection. Denise will provide an overview of nitrogen and phosphorus pollution issues and will discuss the nutrient frameworks that we are encouraging today to develop.

Our second speaker is Rosaura Conde, a biologist with the Watershed Branch of EPA's Office of Wetlands, Oceans and Watersheds. Rosaura works on issues pertaining to the identification of impaired waters and the development of TMDLs under section 303(d) of the Clean Water Act. Her work is focused on nutrients as a cause of impairment and watershed scale approaches to TMDL development. She is a Master's Degree in Environmental Policy and Planning and a Bachelor's Degree in Biology from Tufts University. Rosaura will demonstrate EPA's new nitrogen and phosphorus pollution data access tool.

Our third speaker today is Steve Preston, the Regional SPARROW Modeling Coordinator at the United States Geological Survey. Steve began his career with the USGS after completing his graduate studies in 1990. During the 90s, Steve served as project chief for various regional water quality studies including the efforts to develop the first regional SPARROW model for the Chesapeake Bay watershed. He currently serves under the USGS NAWQA Program as National Coordinator for SPARROW Model Development for six major river basins extending over most of the continental United States. Steve will demonstrate the new interactive SPARROW decision support system.

One final note before we get started with our first speaker. We promise to try to answer as many questions as possible throughout the webinar. However, due to the high number of participants not all questions may be answered. However, we posted the speakers contact information at the end of the webinar in case you would like to contact them after the webinar.

Now it is my pleasure to introduce our first speaker, Denise Keehner. Denise, take it away.

Denise Keehner

Thank you Aaron. This is my first webinar so I am going to ask that the attendees be very gentle with me. I offer an initial greeting of a good morning or good afternoon depending where you are in the country and as Aaron indicated my role today is to provide basically a brief overview of the nature and the magnitude of the nitrogen phosphorus pollution problem that is facing our nation and to underscore the importance of states moving forward to develop and implement nutrient reduction frameworks or nutrient reduction strategies to address these key pollutants. The tools that EPA and the US Geological Survey are going to be talking about today were designed in part to help advance the adoption of these types of strategies and frameworks by the states and we believe they are going to be quite useful and very helpful to states as states move forward to attempt to make additional progress in addressing these key pollutants.

Aaron indicated a little bit earlier, he took some of my steam away and that's okay, that the scope of the problem of nitrogen and phosphorus pollution is a national problem that is a serious problem that is not getting better. A lot of our water quality issues we have seen over the 40 years that the Clean Water Act has been in place we have seen great improvement. In the nutrient arena what we are seeing in nitrogen and phosphorus pollution is continued deterioration in water quality associated with pollution caused by nitrogen and phosphorus releases into our waters. We believe that nitrogen and phosphorus pollution is likely to become one of the more costly environmental and water quality problems that we are going to be facing over the next several decades. We are seeing through increases in development, increased agricultural production, increased waste water treatment, all trending in the direction of increasing the magnitude of the nitrogen and phosphorus pollution problem. We have seen evidence of algal blooms being on the rise. Hypoxic zones in our coastal areas increasing significantly. We are seeing cases of hazardous algal blooms which, of course, have a particular concern to human health and pet safety and livestock safety as well as the impact of nitrogen and phosphorus pollution on the ecology and aquatic systems. Interestingly enough, as Aaron also indicated, we have also seen in the drinking water arena a doubling of nitrate drinking water violations over an eight year period. So the short story on the nitrogen and phosphorus pollution problem is that it’s a national problem, it's getting worse, and it is increasing with increasing population growth.

So where is the nitrogen and phosphorus pollution coming from? There are at least six major sources or four important sources of nitrogen and phosphorus pollution to surface waters. The first is row crop agriculture, the second is pollution -- nitrogen and phosphorus pollution associated with agricultural livestock operations, the third is urban and suburban runoff -- storm water runoff, the fourth lawn fertilizers, the fifth municipal wastewater treatment systems, and the sixth atmospheric deposition particularly atmospheric deposition of nitrogen. It is important to recognize that in any particular watershed that there are varying certain resources are more dominant than other resources. In some cases point sources are particularly dominant cause of nitrogen and phosphorus pollution. In many cases however the nonpoint sources are the predominant source of nitrogen and phosphorus pollution in a particular watershed.

The map shown here comes from EPA's 2006 Wadeable Streams Assessment which was one of the first statistically based summaries of the conditions of waters nationally. We selected sampling locations based on the statistical design so that this type of survey allows us to extrapolate nationally and draw conclusions generally about the state of our nation's waters and in this case the state of our nation's wadeable streams and small rivers. This survey found that nutrient problems are widespread across the United States. That 30% of

streams in the United States back in 2006 which is when the study was completed have high levels of nutrients. It also found that 25% of streams also have high levels of sediments – sedimentation. That's important because that is associated also with higher elevated levels of phosphorus. This map essentially illustrates the concentration of nitrogen at sampling sites across the United States and as you can see some areas; those that are highlighted in the orange circles are particular hotspots for high nitrogen concentrations.

In 2010, we published the first National Lakes Assessment that like the Rivers and Streams Assessment was a statistically based sampling design which again allows us to extrapolate nationally. Nitrogen and phosphorus, of course, are linked indicators that jointly influence the occurrence of algae and the growth of algae in lakes. The levels of these indicators vary regionally though poor biological health is two and a half times more likely in lakes with high nutrient levels. Nationally, according to the National Lakes study, 20% of lakes had high total nitrogen concentrations and about 20% of lakes had high total phosphorus concentrations. These are important studies because they indicate to us that widespread nature of the nitrogen phosphorus pollution problem not just in wadeable streams and small rivers but also in lakes nationally. The other thing that is really important about these studies is because we repeat these studies on a cyclical basis we have the ability to see how things are changing over time.

I want to turn next to the issue of how many waters nationally have been listed under the 303(d) program as impaired for nutrient related impairments. Waters that don't meet water quality standards for particular pollutants are added to what is called section 303(d) list under the Clean Water Act. It is the impaired waters list. This allows once the water is listed as impaired on the 303(d) list what is triggered by that is the development of plans then to address sources and the impacts of that pollution. Over the past two decades, states and EPA have identified over 15,000 nutrient related impairments across the United States and of course, nutrient related impairments include impairments that are associated with elevated phosphorus or nitrogen levels, issues of dissolved oxygen and organic enrichment, elevated ammonia levels, algal blooms -- growth, and also noxious aquatic plants.

This slide shows by state, the number of nutrient related impairments with the green areas, interestingly, being a larger number of nutrient related impairments and the purple and the blue in the direction of a smaller number of nutrient related impairments. Again, underscoring the importance of recognizing the nationwide problem that we have with nutrient related pollution.

So I mentioned that we have 15,000 nutrient related impairments nationally. How in many TMDLs do we have so far? Well as of the spring of this year we

have 8,000 nutrient related Total Maximum Daily Loads that have been developed for essentially the plans to reduce nutrient related pollution in the waters that were listed as impaired.

In March of 2011, our Acting Assistant Administrator, Nancy Stoner, for the Office of Water issued a new memorandum or guidance document to regions and states about the need for us to do more collectively and do more sooner to address nitrogen and phosphorus pollution. In this memo, EPA essentially called upon the states and tribes to develop frameworks to assess and prioritize watersheds, to set load reduction targets and establish priorities at the sub-watershed level so we could focus efforts for nutrient pollution reduction to create accountability and transparency processes to make sure we report out to the public how we are doing and dealing with nitrogen and phosphorus pollution what progress is being made. Whether we are meeting our targets or not -- our load reduction targets and then finally the memo also underscored the continued importance of states working toward the development of numeric nutrient criteria.

To be more specific I would like to go through the eight elements of the framework memo and talk a little bit about what specifically EPA has asked the states to do. First, EPA has asked a state prioritize a watershed on a statewide basis for nutrient loading reductions. We would like to see states estimate nitrogen and phosphorus loadings that are delivered to waters in all the major watersheds across the state at a HUC8 or so or smaller level. We would like to see the states identify watersheds that individually or collectively account for substantial portions of urban and/or agricultural contribution of nitrogen and phosphorus to waters. We would like states to identify targeted or priority HUC 12 or small watersheds for targeted nitrogen and phosphorus load reduction activities and that should actually reflect an evaluation of the receiving water problems, the public and private drinking water supply impacts, nutrient loadings, opportunities to address high risk nutrient problems or other types of factors so the whole focus here is on recognizing that within a state there are lots of areas that potentially have nutrient related problems. We are trying to move the states in the direction of identifying and setting priorities for watersheds on the statewide basis for load reductions. The second element in the strategy is to set watershed load reduction goals based on the best available information that you have. There is a recognition that there is not perfect information everywhere. That should not stop us and it should not stop states from moving forward to set watershed load reduction goals based on what the available information is telling you.

The third element is to ensure that the effectiveness of point source permits in these targeted or priority sub-watersheds. The reality is that most states are operating with narrative water quality criteria around phosphorus and nitrogen

and that those narrative of criteria have to be interpreted in order to put permit limits into NPDES permits where there is a reasonable potential for nitrogen and phosphorus to contribute or cause impairments. So the third element in the framework memo is to put an emphasis on the need for states to make sure that point source permits have limitations on them.

The fourth area is a focus on asking states to take a close look at agricultural contributions to work collaboratively with conservation programs, to look at animal feeding operations, to ensure that state point source permits are put in place for AFOs where that is appropriate. Essentially to deal with the agricultural contribution of nitrogen and phosphorus to water quality.

The fifth is to ask states to take a look at stormwater runoff and septic systems and do what can be done in that area. Again, the idea of these frameworks is to identify what the priority watersheds are, what the priority sources are, and to move forward to implement load reduction strategies and practices while numeric nutrient criteria are still under development.

The sixth element is the development of accountability and verification measures. What we envision here is that folks would -- states would continue to put in place systems for seeing how effective the practices are being – occurring and then also to report out on these effectiveness of those strategies and the implementation of those practices in a very public way and a very open and transparent way.

And then finally after the public reporting piece which is the seventh element, the final element in the strategy memo is an encouragement for states to continue their work to develop numeric nutrient water quality criteria. There is a recognition that is a very intensive efforts to get those numeric nutrient criteria in place for all waters in a state, but it is important for the overall effectiveness and efficiency of the program and the achievement of the long-term environmental results to have numeric nutrient criteria in place but there's a recognition in this framework that will take some time still and while that is happening what -- we would like to see states move forward and get those load reductions sooner rather than later.

The nitrogen and phosphorus data access tool and USGS's decision support system we see as tools that can really help states move forward to develop these strategies and these frameworks for reducing nitrogen and phosphorus loading.

To sort of close out the overview part of this webinar today I would just like to underscore a couple of things. One is that the nutrient framework that EPA memo that EPA issued in March is essentially intended to be a planning tool to

initiate dialogue with states, tribes, and other partners and stakeholders on how the best approach to achieve meaningful near-term and long-term reductions in nitrogen and phosphorus loading. The most important thing I think in the framework is this emphasis on identifying sooner rather than later what the priority watersheds are and what the priorities are in terms of focused efforts for nitrogen and phosphorous load reduction. And finally, underscoring that while this work is going on, while these collaborative efforts are underway to put together essentially action items to be implemented for load reductions that states need to continue their efforts to develop numeric nutrient criteria because those criteria are going to be important over the longer term for the effective and efficient functioning of the Clean Water Act programs.

Aaron Kornbluth

Denise, thank you for your excellent presentation. We will move on to Rosaura soon but before we do I would like to ask a few quick poll questions for all of you out there. Once you answer you will be able to view the results of the poll. So the first poll question is: I work for ___? Please click on the radio button that best describes for whom you work: state and/or federal government, local government, a tribal entity, a watershed groups, a university or other. While we are waiting I would like to announce EPA's new nutrient pollution website which you can visit at www.epa.gov/nutrientpollution and that has no spaces. This site includes general information about the nutrient pollution for those new to the subject. A section targeted to states developing numeric nutrient criteria, information to the public on what EPA and states are doing about nutrient pollution and much more. The site also includes a link to information about hypoxia and algal blooms as well as a glossary of terms associated with nutrient pollution and the effects on the environment. Okay, it looks like fully 92% of you have voted. Thank you. And we have the approximate -- we have the results of the poll. They are 49% currently working for state and/or federal government, 16% for local government, 2% for a tribal entity, 5% for a watershed group, and 28% of you fall into the other category. Okay, thank you.

Now this second poll: how many of you are participating in the webinar at your individual location? Please click on the radio button that best describes how many people are actually watching the webinar with you from your location. The choices are just me, 2-5, 6-10, 11-20, or over 20. We are pleased to announce that the National Water Quality Monitoring Council will be hosting the eighth National Monitoring Conference in Portland, OR from April 30th through May 4th, 2012. This year's conference is titled: Water: One Resource, Shared Effort, Common Future. This national forum provides an exceptional opportunity for water stakeholders from all areas to exchange information and technology related to water monitoring, assessment, research, protection, restoration and management as well as to develop new skills and professional networks. The

conference themes will cover water management and science needs and more details as well as registration information can be found on the webpage http://acwi.gov/monitoring/conference/2012/index.html. All right, now we have the poll from the second question. The results are 79% of you are watching the webinar individually, 16% of you are in groups of 2-5. 4% of you are in groups of 6-10 and we have nobody who is in a group that is in a larger viewing audience.

All right, thank you for participating in those polls and now I would like to pose a few of the questions that are questioners have posted online to Denise Keehner.

So going back to the discussion about the EPA framework memo can you tell us what is new about this memo and what are the differences from previous EPA statements?

Denise Keehner
Well, I guess the way I think about it is EPA for I would say going on 15 years or so has been working fairly -- in a focused way with states to try and move states forward in the development of numeric nutrient criteria as what I would consider to be sort of the first order of business to better address and manage the nitrogen and phosphorus pollution related issues. I think with the issuance of this memo there is a recognition that there still is work that needs to be done of some duration in many states to have the data and the analysis that are necessary to put those standards in place and that we don't want to delay taking action based on the available information we have to reduce these loadings while that work continues. I think there is a general recognition across most states that there are a number of their waters that are significantly and adversely impacted by nitrogen and phosphorus pollution and that there are things they can see right now on the landscape as well as associated with point sources that could be done to reduce those loadings while this work continues. I think this memo is essentially recognition that -- and an admonition for us as a nation to get on with the job of actually reducing loadings while the work continues to develop these standards.

Aaron Kornbluth
Thank you. And another question related to the framework: are states expressing interest in the framework and perhaps can you elaborate a little bit upon why a state would want to adopt this framework?

Denise Keehner
I would say it's a bit of a mixed bag in terms of how much of a groundswell of support there has been across the United States for jumping up and saying yes, I want to develop this framework and I want to be first out of the box. What I would say to the states is that our best defense around challenges about whether EPA is doing all that it can do within the construct of the Clean Water Act to

advance the reduction in nitrogen and phosphorus pollution, the best defense against that is us being able to point to the states and show a plan that are being implemented that are actually resulting in real reductions in nitrogen and phosphorus loadings while criteria are under development. I think if you think about the history of EPA's efforts in this area we have had multiple target dates and deadlines that we have established for states to move forward and get numeric nutrient criteria in place to have plans to meet those schedules, to meet those targets, and there have been a lot of progress, but few states have made it over the finish line in the accordance with the timeline and the schedules that EPA had thought or expected or hoped that they would meet. So we are at a place where this is a significant environmental problem. We are now over a decade into trying to advance the development of numeric nutrient criteria. We believe that our best defense with regard to criticisms from the outside that the EPA needs to do more is to be able to point to states that have taken the initiative, put frameworks and plans in place and are making real load reductions.

Aaron Kornbluth
Thank you, Denise. In the interest of time I see that a number if you have written in questions. We appreciate those. But in the interest of time I believe we will move onto our next presenter and I will hand the floor over to Rosaura.

Rosaura Conde
Thank you, Aaron. Well I'm here to introduce you guys to the first of the two tools that we will be exploring today. This is the nitrogen and phosphorus pollution data access tool which EPA recently released in July of this year so this our kind of -- it has been out there for a little bit and we are really trying to get out with it to the public which is why we are also using this webinar to provide access to and give you all an overview of what is available through this tool. So if you have not been on the website yet this webinar presentation should give you a pretty good overview of what data is available, how to view it, and how to download it. What I have displaying right now on my screen is a very small screen capture but it really just -- what I am trying to portray here is that these are the three parts of our tool. The first one is the webpage and I will go in the same order in my presentation. I will go through the webpage, the data viewer and the data download page. And I will just point out that the purpose of the tool is really to provide states, partners and other stakeholders with the data they need to really get going on the development of this nutrient and nitrogen and phosphorus pollution reduction strategy.

As Denise had alluded earlier, the genesis of this effort here in EPA is the March 16th Nancy Stoner memo which really indicates to the states that they should voluntarily start developing these priorities. So the tool itself, the way we view it, is that it would provide the information that a state might find useful or

other partners might find useful to start developing those priorities.

So what I will do now is that we will be doing kind of a live webinar so I will be working through the pages and you have the link in this page here so you could also come back to it later. So excuse me for a minute. All right, so this is our page here. And this is the homepage for the nitrogen and phosphorus pollution data access tool. Here initially you will see the link to the memo, to the memo that we were referencing before and kind of the purpose of the tool. You will find also a link to the viewer aspect of the tool which I will go to next and there is also a viewer tool over here in the quick links and there is a facts sheet and tutorial that we hope will be useful to you as you start trying to play around and use the tool.

Now what I am displaying now is the whole list of the layers that are currently available and those that we are expecting to have coming soon. And we also have some that are newly added and the time that went out live in July. I will go through each one of these layers in more detail I just want to make sure that you are aware that in this homepage you can find a small description of each one of these layers before you kind of launch into the viewer aspect of the tool and the downloads so you can better understand what data is available here and I would just – everyone that is trying to find out more about the data sets they could start here and look at the information that we have provided here because the data sets are -- have been limited to kind of the nitrogen and phosphorus kind of scope of the data that would be the focus of our tool here.

All right, so with that I will just go then to the data access tool and when you go there this is how it will come up for you. It works pretty much similar to kind of MapQuest or some other map mechanisms where you can view data, you can zoom into an area, you can enter an address or a ZIP code or a HUC in this case since we are working with watershed units you can enter that as well. And you can also provide feedback which we very much appreciate or ask questions here. You can print your screen and there are other features here that are similar to what you would find in any other viewer. Now what we have here on the right are the two areas of the tools. The viewer, this would get you to access the various players that we have available and view them in the map. The lower pane down here is for the data download and we will go into that in a little bit more detail later, but I just want to make sure you are aware that this is the way that you would go to a data download from the viewer.

All right. So. Okay, now you will notice -- the first thing that you'll notice is that the way that the map comes up it comes up with the HUC 8. That is the layer that is currently being displayed. That the Hydrologic Unit Code. The reason why we made this tool kind of HUC 8 oriented it comes from that same memo

that we've been referencing. That idea from the memo was that you would within a state or area of interest you would identify HUC 8 watersheds that you would like to prioritize your nutrient reduction efforts towards. Now later on in the memo it goes on say that you would then within those HUC 8s try to develop more refined strategies and really pin down at a smaller scale so you will see that some of the layers that we are displaying are also targeted to that lower scale.

Now if you click on any one of the HUC 8 while that layer is active you will get a summary information of all of the layers that we have available so if you were to scroll down you would get a little bit of a snippet of everything that we have available for that HUC 8 so that you have a sense of the information that we have available there for that particular area. So if you were interested in a very particular area within your state you could go directly that way and able to get a sense of what data we have available for that HUC.

Now the layers that we have available most of them are national in scale. The only one that we have that is not national in scale at this time is the first one that I will go through right now which is the SPARROW modeling results. And SPARROW stands for Spatially Referenced Regressions and Watershed Attributes and we will have Steve Preston is actually going to be joining us a little later for his presentation which will go into a lot more depth of what SPARROW does and what goes into those models. But what I want to point out for you here is that we have information from a previous trial run that was done in 1992 where it was done only for the Mississippi River Basin and I will turn off the HUC 8 units so you can appreciate that a little bit better. So that's the area for which we have SPARROW modeling results. We are and I am actually going to cover in a little bit trying to incorporate the new SPARROW data results from 2002 model run and for that we have a broader extent of information but still not quite national but we are going to be going through that in a little bit. So for this data set what you will find is we have on the right here you have four different radio buttons and you can only display one of these at the same time because they kind of overlap on each other and what you will find is you have for nitrogen you have two layers. One is the incremental yield which is kind of for that particular watershed how much loading is coming out of that watershed. The delivered incremental yield is the one that will give you a sense for how much is traveling or being delivered down to the mouth of this watershed which in this case would be the Gulf of Mexico. And the same thing is true then for the phosphorus. So we have two other links here. One for phosphorus incremental yield and one for the P delivered incremental yield or the phosphorus incremental yield.

And all right. So now say you were working within the Mississippi River Basin with the data that we have. You would then be able to click on any one of the HUC 8s here and you would -- for any one of these layers you are going to get

some little snippet of information of what we have available when you click on that area. And here you would get for the Illinois watershed where I am in right now you have information not only for the layer that is currently displayed which in this case is the P delivered incremental yield but you also have kind of the information that applies to the other three SPARROW layers that we have available for that same HUC 8.

And also it's worth mentioning that this layer details over here that comes up and down you can minimize that and make bigger this data boxes here but this would provide you with your legend for any one of the layers that you are currently visualizing. So this one -- this SPARROW layer works like lower load is lighter color and higher load is a darker brown color. And here you would also be able to access the metadata for any one of the layers that you have active and you are able to toggle a little bit with that transparency so that would make it easier for you to view.

Okay, so I will move on from the SPARROW I'll just -- if you double-click on any one of these radio buttons they will disappear so you can start working with the rest. Now, you will notice up here that for the map layers because we're working at a smaller scale the tools being developed for kind of within state planning we -- the other layers won't display until you are at a smaller scale or you zoom into that map so you will need to zoom in quite a bit too then start seeing that these layers are active over here. Now the one that becomes active at this scale here is the NARS values for NMP values for streams and lakes. And now the NARS values for streams and lakes that this layer is trying to convey is the -- kind of if you are looking at a specific area and you are looking at monitoring data it is kind of hard to identify well what am I comparing this to and one of the tools that we are providing or the data sets that we are providing here for this purpose is to allow the user then to use these values that have been developed for the National Aquatic Research Service for both streams and lakes and really what they will see here is the values have been identified from the distribution that was used to fight for these studies so that basically what they did was they compiled all this information from specific sites within an eco-region and they draw -- they have drawn a distribution and the lower-level -- what you are seeing here are those thresholds that divide that distribution and a higher distribution would be at the higher end would be the more pristine ones and at the lower end would be kind of the lesser pristine water bodies. So that can give you kind of an indication. This is not kind of we are telling you you have to go and by these numbers, but it gives you an indication to compare against your monitoring data or other information you might have available.

Now I will interject a little bit. One of the layers that we are kind of looking towards developing in the near future is the eco-regional criteria values that have

been developed or recommended eco-regional criteria values that EPA recommended back in 2000 and we are looking to incorporate those into the tools so stay tuned for those but in the meantime this is what you have access to here.

And so the layer for the lakes is going to work the same way and you probably want to turn off the other one so that they do not an overlap of the difference here is that depending on the water body type the eco-regions were drawn slightly different so you might find that even within the same area you are not working within the same eco-region for both lakes and streams.

All right, so then I will move on then to zoom in a little bit more and see what else comes up here. We start getting -- at the extent now you get all of the layers active and what I am going to do is that I will assume quite a bit of monitoring data kind of -- it is better to view it when it is on a smaller scale here. And what we have available while that is loading here the monitoring data that is available. We have two sources of monitoring data. One is the EPA STORET sites and those are information that has been entered by states and the public into our data sets or our database and these two data sets what is different about them is they are being pulled directly. This is data that is coming live from what is in the database right now so at any time you're active in this monitoring site you are getting a live feed of data and that's why it takes a little bit longer but hopefully that is better for the user. And the other type of monitoring sites that we have here are the National – the NWIS or the National Water Information System. And those are USGS monitoring sites and that is information that USGS collects on a regular basis. It is not used or inputted it is information that agency itself is collecting and distributing and making public. So you have those two types of data. The way it displays here is you get the blue kind of droplets if you store it with the information and the black droplet is the NWIS information and when you click on any one of these you will get a slight identifier that then you could use when I go to the download area you will be able to download the information and you can identify -- use the site identifier to find the information that is available for that monitoring site. Now it is worth mentioning that this data set is limited to information -- so these are monitoring stations that have nutrient data or nitrogen and phosphorus or other related kind of Chlorophyll a or other related parameters. It is also data -- sites that have data from 1995 to present so if you wanted to look back further we do provide you a way to go and define your own kind of scope of time and other parameters, but for what we are displaying in the tool it is just kind of recent data 1995 -- as defined by 1995 or present.

All right, so now I am moving on to then the specifities that are likely to discharge and NP to water. So is this is another kind of what we have worked through now are the loading so that helps you to identify watersheds. Then we moved on to the monitoring sites which you then can use to assess -- get a sense for the

condition of the water bodies within your particular area of interest. You can use the NARS values to then compare and kind of figure out whether or not it's in the high, medium, or low scale. Now the rest of the data layers that I'm going to go through now are slightly different in that they are other information that you could use to prioritize or to start doing some actions or putting some plans in place and implementing your reductions. Now the first one here are the facilities that are likely to discharge N or P to a water body. And here what we have done is we have looked through this information that is available for point sources and we have identified those that have SIG codes are identifiers for what they do and the activity that happens in that site and we have identified those that may have a linkage to nutrients or may have been permitted in the past for nutrient or nitrogen and phosphorus. And we have also identified those that actually do have permits for nitrogen and phosphorus or have voluntary requirements in place for nitrogen or phosphorus and this data is all coming from discharge monitoring reports and it is also coming from the data sets that the EPA has with all the permitted facilities.

Now I will just click on one of these to give you a sense for what data is available there. You will have -- when you click on any one of these you will have a permit number which you can then use to link to your data download and understand what other data might be available within the download or that permit number. You will get that SIG code that I mentioned that was used to identify a subset of all the permitted facilities that might have nitrogen or phosphorus that slips into the water. Then you -- for this one you have -- it does have a nitrogen limit and it does not have one for phosphorus. It has monitoring requirements for phosphorus and there is discharge monitoring data for both nitrogen and phosphorus. And this link down here will take you to that discharge monitoring report. So for this part of -- this facility in particular so we will drop you right where the facility is and where that discharge monitoring report and other information you could collect for that. So maybe what I will do real quick is opps, sorry. I won't do that then. You should be able to link to that and for some reason I'm not right now.

So moving on to -- we have gone now to point sources now for an indication of what you have in terms of nonpoint sources or other uses in the area which included the National Land Cover Datasets from 2006. This is data that also USGS has published and it's the most recent that is available and here you will find again in the later details you have the scale for the different types of uses that are displayed here. Now what we have provided the user within our interface here is a way to summarize for a HUC 8 what are those uses that are in the watershed so if you have your -- I'm sorry if you have your HUC 8 layer active when you are looking at this you can see a summary of the information that is available within that HUC 8 so we have aggregated open area for providing

percentages for this HUC like what percentage of that HUC is open area? What is open space? What percentage is pasture? And so on and so forth so you can have a summary for this HUC 8 what your land uses are.

All right, so moving along then the next two layers that I have available here I will display them together because they do work nicely together. The waters that have been identified by space to have nitrogen or phosphorus impairments under 303(d) so these are waters that have been identified as having higher levels of nitrogen or phosphorus or exhibiting some another type of indicator of impairment that may be an algal bloom or low levels of dissolved oxygen that may be linked to nutrients. So that is -- those are the squiggly lines that you will see here. This is for your impaired waters and here you will get an indication of when that water was lifted. Within which state and also more details by going here and it will take you to the page where we have more information for that particular water body in terms of impairment for that water body. And right now I am that's displaying any of the TMDLs ones, but the TMDLS do the same thing. They show up as yellow squiggly lines. And I guess in this area they aren't any.

But it just shows in the same way in the display boxes exactly the same. And then again TMDLs as Denise had mentioned earlier those are the plans that have been put in place already for to address those impairments. Those may kind of help -- oh there is a squiggly line there. There is a TMDL. In this area. So those are the plans that are already in place so someone is trying to make -- achieve some reductions within that area they might go to this TMDL as a resource for identifying where the loads are coming from or which other sources are within that watershed and to move forward to try to implement those TMDLs so they are a great tool to start at any one of these places.

Okay, now the last layer and this one is new. This is the one we were referring to earlier as being recently added and it is this sources of drinking water. And we have two layers for the sources of drinking water. One is reflective of the source water sources -- I mean surface water sources and the other one shows the groundwater sources to drinking water. And this layer is displayed as a HUC 12 scale so this one of those that is in a smaller scale than the others. It is not displaying specific locations of the sources because it is a security risk for us to display this specific sources or the location of those sources but what we are displaying here is a density of how many sources of surface water in this case and in groundwater in the next one are within any one of the HUC 12s you are looking at. So that and the darker colors would indicate a higher density. The lighter color would indicate a lower density. The same thing for the groundwater sources of drinking water here. And they are over here. Now the ones that you see that are blank, there is no information that we have for any groundwater, surface water sources within that area so that's why they are displaying blank.

All right. So now what I will do is that I will go through the data downloads real quick so you can get a sense for what is available there as well and I will turn off all of these so they are not distracting from what we are doing here.

Sorry. Okay. So here is the data download and as I mentioned earlier we have monitoring sites that we are being pulled live so if you are accessing the tool, if you are viewing the site you can also download the data live for any one of this HUC 8 and what you will get is that you will have all of this middle points that are on any one of these or the monitoring stations that are within any one HUC 8 in your download. And the way that we treated that interface is that if you want to add a HUC 8 that you are interested and so say I am interested in this one right here, I went here and I added, I clicked on add, I click on the HUC 8 that I'm interested in and then it will start displaying here and you can select multiple too like if I wanted this one to see how it started to add it there. Now once you have selected the HUCs that you want the monitoring data for and you will then be prompted or you can scroll down here to which format you want that data. Do you want it in Excel? Do you want it as a CSV? Or do you want it as a geospatial file? And so you would click on any one of the buttons to then initiate that download and you can also -- the files come out separate so you won't get -- STORET within the same file. You have to go to STORET first or go to NWIS and you will get separate downloads for each one of those. And this link down here is the one I was referring to where if you want to look at data or stations that have information for nitrogen and phosphorus that are earlier than 1995 or you want to define your own query you can go to either the STORET link here or the NWIS and this will take you directly to the mini portal that we are using to draw the information from so that's a neat tool for someone looking for more specific information.

Now for all the other data layers since they are static in nature we have those in a separate page here. And this is your data download for everything else. Again, same as before. You have the attributes being provided as Excel and CSV, the geo-spatial data also provided here. The metadata provided as a PDF and then there is also a link to an external website that would provide you with more information about that program in particular or other relevant information to that data set. And I definitely would encourage you to look at the metadata if you are going to be using these files because it will provide a lot more detail than what you have in your home page and give you a better sense for what you are seeing. There is a lot of information that we are displaying in the viewer so all of the information that we are displaying in the viewer is available for download and there are some of these that have additional data that is incorporated in the download that we weren't able to display in the viewer, but we are trying to give you a taste of what is available so that then you can go here and know what you

are downloading.

And so here you will have all the data sets. The only one additional here that we did not go through is the one on CAFOs. This one. Yes, The NPDES Concentrated Animal Feeding Operations summary and this one is not available geospatially. That is why they are not displaying it in the map. It is not available yet geospatially although we are starting to work towards having something incorporated into our viewer that is geospatial for the CAFOs so stay tuned but right now you are able to download the information for updates so you would get density by state and other information general to any one state.

Alright, so I will exit this and what I will do very quickly now is that I will go through the information that you will be able to get soon from our page and this is kind of our first view at the data that we have available. Now as I mentioned before, there is a new data set that has been released for SPARROW and we are -- the data set that was released or that information was published back in October so we have been working really fast and furious trying to incorporate that data into our geospatial so we can make it available to everyone. And we will surely maybe within the next week they will be displayed on our public page but what I want to do here is show you what we have that we have developed. What we will provide the user is a synthesis of the results of the various -- the 12 models that have been calibrated independently through using SPARROW. In these models, as you can see there is a lot more coverage then what we had previously. The new ones are trying to cover most of the nation and I think there are plans to cover that little area over here in the Southwest that is not yet covered but those results have not been published yet. But -- so right now I'm displaying the phosphorus incremental yield because these are separate models we are not able to display the delivered yields, but you are able to get a lot more information on the SPARROW layers and we will show you how you can get there. So for this one what we are showing here is the Major River Basin or in this case that is one whole model that was done for the whole area and you have a few like basic information about the information that went into linking that model and what you can access from our tool here is you can access the decision support system which Steve is going to be discussing in a little bit and there you will be able to really tweak that model in particular and really get into some of the specifics of the model and you are also -- we are also pointing you to the paper that provides this synthesis and has more information on that synthesis and that paper will be -- it is one that was published in this October and released and that link here will take you to that.

All right, so what I will do -- and also -- you might also -- here is the layer details again so the darker the color the larger incremental yields for that particular watershed in the viewer here.

Now what I will show you real quick is also as I mentioned before so we were at the national scale we were showing the synthesis of all these models nationally and we point you to that model at a lower scale you would be able to click on a watershed and these are at a much smaller scale and you will be able to get more specific information about that watershed within that information that was published for the synthesis of the tool. So let's see, so for any one of these you will be able then to get a little bit more individual information for that. And also again, it links you to the SPARROW decision support tool for more. And again, the data download page what we have done we will still be providing the 1992 data both for viewing and for download. So what we have done here as we separated it out so the user can hopefully follow with us that these are two model runs of the same and they are displaying different information but they are still -- we think they are both very relevant to the planning process and it is worth displaying both and providing both for download. So you will have the same option to download, shape files, Excel table, and we will provide that data and other so stay tuned for that one.

And with that I will just wrap it up real quick. What I wanted to make sure that you are tracking now that we have kind of introduce you and given you a taste of the NPDAT and we want you to -- if you are interested and you find that this information is something that you might want to use in the future we are updating the data sets. We are updated the ones that are already there so they are kind of the TMDLs and the listing information. We are going to be updating those on a periodical basis and we are going to be updating the permitted facilities which also change over time. And we are just grabbing the snapshot for every one of these so we will provide those updates and we will provide also -- we will add the SPARROW incremental data and we will be making some other updates throughout I have already alluded to the CAFO layer that we are looking to include here and the eco-regional criteria. So if you are interested in tracking these updates and being notified of when the information goes public on our website we will be following up this webinar with an e-mail to our distribution list of the people that participated in this webinar today to let you know how you can be notified so we will give you information on how to keep up with our updates in our page so it's evident to you, the user community, when our updates are happening. And again, as I mentioned before this is a pretty recent tool. We are very much open to suggestions on better display and better information. We really want to develop kind of a user community for this so if you are interested in that please do give us your information. So with that I will just wrap this up and I think I guess we will open it up for questions soon.

Aaron Kornbluth
Yes, that sounds like the next step, Rosaura. Thank you very much for your

presentation. We have indeed had a lot of questions coming in. And it seems like we are doing pretty well on time so I will ask you a couple. How can states use the data in NPDAT with layers that they, the states, have already developed?

Rosaura Conde
All right, so the data in NPDAT basically what you're doing is you are only viewing it there. When you go to the data download which I am conveniently displaying right here. When you go to the data download you will be able to depending on how you are doing analysis if you are just comparing different values on Excel and Excel would be sufficient then you could do that type of analysis. We are also providing you with a shape file or geographic file or the information file where you can display the same information that we are displaying on our page. You can create those same layers and you can mix them up with other layers that you have available. We are really providing you with everything that we have so if you have for instance, a data set that has more impaired waters or if you have your own for your state or you have your own permanent facilities you can do some analysis with your own file and the ones that you find useful for what we are providing in here so there are two kinds of use by an experienced user, someone that might have some GIS experience within your data or community and to develop this analysis and you can do some simple analysis also with Excel and I found it really useful to do that too.

Aaron Kornbluth
Okay, thank you. We have another question. Are the TMDLs shown in the tool only those that are set by EPA or do they reflect the state TMDLs as well?

Rosaura Conde
Good question. The TMDLs that are displayed are the ones that states have reported to EPA and the ones that EPA has developed so it would include both. It would include any EPA approved or established TMDL or nitrogen or phosphorus or other related parameters such as chlorophyll or algal bloom and others. And what you will see that is different thought is that the information that is being displayed is only that for which we have geospatial data. So if the TMDL has been submitted and approved and entered into her system and it did not have geospatial data linked to it we can't really display it. However, if you go to our data download and download the table or the Excel spreadsheet for instance, for that data layer you will have two tabs. One that will have just those that are geospatially -- georeferenced at that time so one point in time kind of pools and you will have another tab that has all of the TMDLs for any state that has been done for nitrogen and phosphorus or other related pollutants regardless of whether or not they are geospatially referenced in kind of more reference for the user but you would not be able to geospatially display those that's the only thing. That's why we are providing.

Aaron Kornbluth
Thank you. On a similar note related to the actual display of the data is there a way in the tool to clip out the HUCs of interest so that a person could create a presentation using the tool?

Rosaura Conde
There is. Well let's see, we -- you really -- spatially you can select various HUCs and you can kind of zoom into an area and do a presentation just for that area that you could keep it zoomed in and do your presentation and activate the layers and such. However, there is not one way where you can really just clip it out from the viewer itself. However, if you go -- if you are a more experienced user and we are providing -- when you download any one of these files you will get a national file but if you have your HUC number, the number that you are interested in you can narrow that data set to just those HUCs you are interested in and you could do mapping on a separate software or a GIS users to just display those HUCs. So there is a way you can limit the data to just those HUC's but it does take a few steps here and there. There is not one way directly in the viewer that you can just isolate those HUC's from the others.

Aaron Kornbluth
Okay. Thank you. I think we have time for one more question and that question is the data that is posted in NPDAT from USGS, EPA, and other groups has this data been QAQC'd before uploading it into the tool in order to meet EPA or other standard methods?

Rosaura Conde
Yes, this data has been QAQC'd to the extent that each one of the sources like if you -- because we are pulling from existing data sets that are publicly available to the extent that those data sets have been QAQC'd which they would have that information in those sites that's kind why we are providing you with metadata and also the website link to get that more information but they have been QA'd to that extent. The extent that they went in and they have been QA'd by that group and so we are just kind of reserving that data without really altering it anymore except just to select for nitrogen and phosphorus. So any QA requirements that went into the data prior to entering any one of the data sets that we are pointing to is the data QA process that has gone into these data sets that we are displaying in NPDAT

Aaron Kornbluth
Okay, thank you very much, Rosaura. And with that I am going to turn it over to Steve Preston. Steve, take it away.

Steve Preston
Okay. Can everybody see my screen?

Aaron Kornbluth
Can indeed, thank you.

Steve Preston
Okay, well thanks, Aaron. And thanks everybody for participating today. What I'm going to talk about are recent efforts that the USGS National Water Quality Assessment Program has done to develop a set of computer models that will help identify watersheds that contribute the largest amounts of nutrients to streams as well as track those nutrients as they move downstream. To provide access to those models we have developed a new online system, a decision support system that will allow anyone to map the amounts and sources of nutrients and actually test strategies for reducing nutrient inputs to streams. The models and the new online system should help develop nutrient reduction strategies in a number of ways, but three important ways include identifying and prioritizing areas for nutrient reductions, identifying the major sources of nutrients, and testing the long-term benefits of potential nutrient reduction strategies. So what I will do today is provide a brief overview of the new models that we have developed and then actually do a live demo of the new online decision support system.

Okay, the USGS is currently evaluating the status and trends of water quality in eight large regions that cover the full extent of the coterminous US. As part of that effort we have developed water quality models for seven of those regions. Those include nutrient models both total nitrogen and total phosphorus for six regions of the country including the Northeast, Southeast, upper Midwest, lower Midwest, Missouri River Basin, and the Pacific Northwest. In the arid Southwest we've developed a salinity model to help protect water supplies there and in California we have an effort underway to develop nutrient models although that effort is still in progress. So what I will do is talk a little bit about the new nutrient models but I would like to emphasize that we have not only these models in the decision support system but we also have a number of previously developed models including national models and all those can be used in the same way in the DSS.

Okay, so our modeling approach known as SPARROW which stands for Spatially Referenced Regressions on Watershed Attributes. To develop a SPARROW model we start with monitoring data and we use those measurements to quantify annual stream loads at as many sites as possible. Those stream loads are related to geographic data that describe nutrient sources such as fertilizer or wastewater discharge and landscape characteristics that affect nutrient delivery

such as soil type and slope. The monitoring and geographic data are linked using a digital stream network that provides conductivity upstream and downstream and the model is then calibrated to best represent the monitored stream loads. Once calibrated, the model can be used to predict the annual nutrient load in every stream in the region considered. For most of the regional models that includes estimated nutrient loads for 8,000-13,000 streams depending on the region. For each of those streams the models can be used to estimate annual loads, yields, or concentrations. Many of the data sets we use for the regional models were either newly developed or were significantly expanded. For example, we put a significant effort into the development of a national database of point source discharges starting with PCS, but significantly refining a lot of the information that we found there. We also developed some new data sets describing land characteristics such as natural sources of phosphorus. And we believe that all of the data we compile, we believe that this is the largest integration of data that has ever been done to assess nutrient loading.

Having said that there is still a need to continually improve the base of information to support the development of nutrient reduction strategies. We used existing data sets wherever possible and that is a cost effective approach. But many of the data sets were developed by other agencies for other objectives and our models are constrained by the characteristics of those data sets. For example, when the models were developed they were based on the most current information available which was 2002 land use fertilizer, manure information. We believe that time period is still relevant to conditions today and we can make the case for that. But it is not as current as we would all like and so in the future there's a need to improve the efficiency of developing key data sets like these.

Just to emphasize the importance of monitoring data to this type of modeling, monitoring data are the eyes of the water quality models and the predictions will reflect what the monitoring data represent. For that reason we put significant effort into locating and incorporating as much monitoring information as possible including data from any federal state or local monitoring program. The result of that effort is that we are able to gather enough data to calculate stream loads for 2,700 sites located throughout the six regions and those stream loads for the basis for developing the models. In order to develop a large water quality database like this we initially accessed the national water quality databases like the USGS National Water Information System and EPA STORET but we then made numerous direct contacts with regional, state, and local monitoring agencies to obtain data not included in those national databases. What we found in doing that is there are multiple obstacles to compiling water quality data nationally including inconsistent reporting to national databases and inefficiencies in the way some agencies collect monitoring information.

We just -- I wanted to make the point that those types of limitations in our collective monitoring efforts combined with shrinking resources could significantly limit our future ability to develop larger scale models like the ones I'm about to describe. For example, our initial investigations have indicated that about 40% of these sites would not be available if we were to start this effort again for this time period.

Okay, as an example of the types of predictions that the regional models can produce the map on the left illustrates the regional model estimates of nitrogen yield from stream catchments and in each of the regions. That includes separate yield estimates for the catchments of more than 240,000 regions located throughout the six regions.

The map on the right illustrates the regional model estimates of the largest nutrient source type in each stream catchment. Each shade represents a different source type and that is indicated by the legend on the lower left. Together the two maps provide a picture both of where nitrogen input to streams is most intense as well as what the predominant source of those inputs is likely to be. In the most extensive area of high nitrogen yield like the upper Midwest agriculture is the largest source. Atmospheric deposition is the largest source in many areas of the country but mainly in areas with an absence of other sources types such as northern Minnesota, along the Appalachian ridge and in northern New England. And urban sources, point sources and urban runoff tend to be locally dominant in major urban areas of the country and the yields from those areas can be quite high as well.

So that gives you an indication of the types of predictions the models provide. All of those results can be accessed through the new online system which we refer to as the SPARROW decision support system. This is a web-based software system which is new and we believe innovative in that it provides open access both to the modeling results and to the use of the models. Since anyone can access the system it provides no cost of court for developing nutrient reduction strategies for any watershed throughout most of the country. The system provides three main types of information that enable the user to map the loads yields of concentrations of nutrients in any watershed, evaluate the relations between upstream sources of nutrients and downstream loads, and test nutrient control strategies for effectiveness in reducing loads to downstream waters.

This slide is one example of a display from the decision support system. And it illustrates nitrogen yields for the upper Midwest Region. I will provide more details on that and show other examples in the demonstration.

Before I do that I will just provide these URLs for more information. The general SPARROW website provides more background on the modeling system in general and includes detailed documentation of the modeling system as well as a number of previous applications of the SPARROW modeling system. The second URL is for a page that describes the new regional models including access both to the publications that provide the details of those models as well as access to the decision support system itself. And the last URL is for directly accessing the decision support system.

So with that I will go ahead and launch the webpage to start the demo. And hopefully it will come up quickly. Okay. To start this is the regional modeling webpage which contains a number of types of information prior to getting into the DSS. On the right here is the number of types of documentation to provide background of the regional models and the DSS. There is a press release here that was recently completed. There is a video of a recently done Congressional briefing on the models and the decision support system. Some stakeholder quotes to see how people have been using the system, a fact sheet providing an overview, FAQs, and the models and the decision support system were published as a featured collection in the Journal of the American Water Resources Association. All of those articles are available through the AWRA website and all are open access so they are readily available for anyone to look at. For information on the specific models themselves you can go to the map and click on any of the regions on the map to get more information about the models in those regions and access to the papers that describe them as well. And then at the top, just to make people aware, we have a number of webinars planned over this week and next week to give more details about the regional models and also other demos of the DSS. So if anybody wants to participate in those you can go to this link and register for those as well.

And then this is the link for the decision support system itself and I will go ahead and launch that. Okay, when you first open the decision support system this is the page that you come to. Over here at the top and on the right are a variety of types of information that describe SPARROW and the system and provide background on all of that. Also, here are a number of tutorial videos that will help you get started with the decision support system. They are pretty readily accessible and they give you a lot of detail about how to use it so it's a good place to start if you are coming in fresh. And then over on the left is a list of models that are available in the system. It is a fairly long list and you may want to search through those using the search tools here. If you have a particular area of interest you can go to that area and what the system will do is pick all of the models that overlap the area of interest.

For today I am going to focus on the Southeast and so I will pick Georgia. And

that cuts me down to these models here. And then you can whittle it down further by looking at particular constituents. I am going to pick nitrogen for this demo. And what you see here are two models. The national nitrogen model is here which is developed for the 1992 time period and then the new regional model for the 2002 time period is here as well. And so I am going to launch that model. And what the system will do is bring up this page. The information about the model is included in this box right here. For this particular model it also will allow you to pick specific watersheds to immediately zoom right into. And then also there are some scenarios for nutrient reduction strategies that are already set up to provide an example and you can access those directly also.

So to get into the model you can click this button. And the model will come up in this way. I am going to start by describing the tabs across the top here. The system has three types of functionality which I mentioned previously. The first functionality basically is for evaluating model results and for controlling what the map displays. The second one is for looking at the relations between upstream sources and downstream loads. The third one is for actually testing nutrient reduction strategies for effectiveness.

I will get into the details of all of those in a second, but I will just finish walking across here. These are navigational tools, these tabs. The first one is for finding a particular stream reach. There is a capacity to export data for a particular region that you are looking at. There is a capacity to save a session so if you go through a bunch of steps and you want to save that you can do that and then reload it once you come back in. There are a number of layers which you can provide as background for the predictions. I will show a specific example of that coming up but you can implement those as well.

All of the information, background information that I went through on the initial page is also located here including the videos so if you get to this stage and want to review how to do things you can access that here. And this button right here is an important one because it will hide the header and the footer and give you more room to work with. And then also there are some other navigational tools here. There is a zoom feature which I will zoom in a little bit. This is for moving, dragging the map, identifying, zooming in, zooming out, and for resetting to the original spatial extent.

Okay, so the steps to actually display model results are basically in a series. These three steps here. And the first thing you can do is select the data series which is the quantity that you want to illustrate in a map. These are the types of quantities here. All of those are described if you click on this location here to get a description of each one. I noticed in Rosaura's presentation that people were asking about incremental yields. Those shields are essentially ones that are for

each catchment independent of anything upstream so they provide an indication of the relative amount of nutrients coming from each particular catchment. And then delivered incremental yields are the same except they are weighted by how much loss occurs with getting to an outlet downstream and I will give an example of that coming up to get a little more detail.

So initially I'm going to start with the total load data series. This second feature allows you to base the -- I'm sorry, illustrate the predictions based on particular sources. So you can do it for all sources combined or you can show the maps for loads due to these particular source types that occur in the model. And then this last box provides a way of -- provides different features for mapping. Before I get into that I will go ahead and illustrate the total loads. Right now those are based on reaches and so the reach will show up here in a second. Hopefully. There they go. And so basically you highlight each of the reaches according to the size of the load. And what you see here is a dendritic pattern because the load is larger with larger streams. You can also display this in the forms of catchments rather than the reaches. The system is operating a little bit slowly here. And that helps you to be able to see things a little bit more clearly.

And then we have -- you can display calibration sites that went into actually building the model. You can highlight reaches so that you can see how flow occurs throughout the region. We had a regional briefing this morning for the Southeast and I suspect a lot of people are accessing the system that's why it is going slow. And you can reduce the visibility on that to try and make it not so dark there. You can also display HUC 8s. I won't do that just to save time. And then the system will bin these automatically if this box is checked but you can also edit those to come up with different patterns, however you would like to display the results. For now I will keep it on auto binning and I will leave off the calibration sites and just to illustrate this map is for and I will zoom in just a little bit here, this map is for all sources combined. You can do it for individual sources. I'm sorry. Let me back up just a second here.

And I am going to put things in terms of incremental yield. And so what this map shows are where the highest contributions of nutrients are to individual streams to get an idea of where nutrients are being generated at the highest rates throughout the region. So that is for all sources combined. I will shift now to look at fertilizer alone. And there you can get an idea of where fertilizer is most important.

Okay, that gives you an idea of the types of information you can do just by looking at the model results. One thing I should mention too is that you can put the individual sources in terms of either absolute mass or you can do it in terms of percent of the total yield from each catchment. And those provide a little bit

different perspective when you do it that way.

Now let me move to the next capability which is looking at downstream tracking of nutrients. To do this you need to specify an outlet because usually this is focused on some downstream receiving water body. And so initially what you have to do is specify that outlet and you can search for that in a number of ways. If you know the reach ID or the reach name you can put those in. If there is a HUC that defines that you can use to help find a reach you can specify that in search. What I am going to do is use an estuary and select the Apalachicola. And when you do that, you can then find all of the reaches that drain to that bay. And they come up in descending order of basin size and so the first few will be the most downstream ones. And I happen to know that I want this particular reach and so I am going to select that and then you can use this tab to define that as the downstream outlet of interest. And so you can actually show that outlet on the map. And when you do that you can get a variety of types of input about that reach. Basic information about it. Model source inputs, and in this particular drainage by itself atmospheric deposition is the only source and then predicted values give you the total loads with the inputs of all the sources upstream and then the incremental load which is for that particular reach alone. And then you can also display the same information in graphical form.

Once you have that reach defined you can then go back to your map controls under the display results tab. And if you go to the data series now there are some new data series that are available once you have a downstream outlet defined and the first one I will select is delivery fraction.

I will zoom out a little bit. And so now what that shows is the amount of delivery that occurs from all of the reaches. The ones toward the lower end of the drainage have the highest delivery rates and that is because it is a travel time thing. It has got less travel time and less potential for natural attenuation. And in contrast, the upper part of the basin where there's more travel time has the lowest delivery rate because there is more potential for natural attenuation. So that one is fairly static data series. But then the incremental delivered yield gives you a little bit more information. Let me change the sources to all again.

And so this shows how much of the yield from each of those individual drainages actually gets to the outlet. It gives is an indication of where the nutrients are coming from that affect Apalachicola Bay. The ones in the lower end of the drainage are high and that's because they have a high delivery rate but there is also these up around -- in the upper end of the basin where there's a low delivery rate but also affect Apalachicola Bay. And those are generally urban inputs from Atlanta and those inputs are high enough that even with the low delivery rate they still make it all the way downstream.

Okay. So I am going to shift now to the third capability and this one is for actually evaluating scenarios. And for this one again you have to specify where you want to simulate changes. You can do it for any portion of this drainage or you can do it for the entire drainage. It is really however you want to develop the scenario that you are interested in. But start with -- I am going to again go to the outlet of the Apalachicola drainage. Okay, and that is not the one I was looking for. But -- it will be up here in just a minute. Okay. This should be the one. Okay, and that is the one. And once you get the reach identify that you are interested in there are a number of ways to pick reaches in which there could be a change. There are -- you can pick groups defined by HUCs or just a single reach. What I will do is select the entire drainage and say all reaches upstream. And I will need to define this as a group. And then add all of those reaches to the group. Then once you have all of that defined, you can right click on this group and click the button that says edit apply changes. And I am going to start out with just an example scenario of saying we will reduce waste water discharge by 25%. Okay. Sorry about that. I will get back to where I was here in a second. Sorry it is so slow. It is not typically like this, but -- okay, so once you get to this point everything is specified and you again need to go back to display results. And there is a new option here which is specify change from the original. And once you do that it now shows percent change for incremental delivered yield throughout that drainage. What you see here are the changes to individual drainages because we have incremental yield. If the goal is to reduce loads to the outlet the data series that would be relevant would be total load. Because that accumulates things as you go downstream. And this gives you an indication of what that scenario would show. What we see here is that you have fairly significant reductions upstream where the point sources are but that it gets much smaller as you get to the outlet and we are about 5% when you get to the outlet because of the natural attenuation and the other sources that come into play along the way.

I will try another edit real quick. And we change also impervious surface area. That gives a little more reduction but still only about 7%. And then one more if we reduce fertilizer inputs by 25%.

Aaron Kornbluth
Steve, I just wanted to a very quick time check.

Steve Preston
Yeah, I am going to quit right after this Aaron. I apologize for the length and the slowness.

Aaron Kornbluth
No worries, Steve. Thank you.

Steve Preston
Okay. I think that is still going. It's still going.

Aaron Kornbluth
Perhaps, Steve, while we are waiting for that to load I might ask you one or two questions that we received.

Steve Preston
Sure.

Aaron Kornbluth
Okay. For nonpoint manure nutrient sources, what information is used to determine usage and potential loads?

Steve Preston
Yeah, the base information is from ag census data that was data developed by Bob Kellogg. We have a variety of measures of that and it depends on the region which version of the manure was used. In some cases estimates of confined manure were better predictors of stream load and then others just total manure was. So that is the basic information.

Aaron Kornbluth
Okay, thank you. And one more quick question. For downstream tracking, how do the models differentiate attenuation for each upstream source? It seems that one would have to know the attenuation rate for each form of the nutrient present in each source? Is this known well enough to model with confidence?

Steve Preston
The way the attenuation rates are determined is through the basic way that the model is put together which is that everything is based on mass balance. The load estimates is what everything is calibrated to. We have a certain amount of input that we quantify from things like fertilizer, wastewater discharge, all of that in order to meet the stream load estimates there have to be losses and those are estimated based on that mass balance approach.

Aaron Kornbluth
Okay, thank you.

Steve Preston
Sure. And I think that is about probably what we will be able to do Aaron. I'm not sure why the system is not responding more quickly but the bottom line of the last scenario is after we reduce those three source types by 25% we got a 14%

reduction in the outlet and the main point is that it probably takes a multipronged approach probably in most watersheds to really achieve significant reductions downstream so that was the main gist of that.

Aaron Kornbluth
Steve, thank you very much for your presentation.

And I just want to remind folks that if they do have additional questions for our speakers here on the slide you can see that we are providing their e-mail addresses. We also want to let you know that the Watershed Academy will be back in 2012 with more webcasts. So again, please check out our website at www.epa.gov/watershedwebcasts.

Also, don't forget to download the certificate that shows that you participated in today's webinar. You can simply type the link that appears on this slide into your browsers address bar in order to customize it and print out a copy. We do have a few minutes and actually it looks like we just about hit the end and unfortunately we don't have time to answer any additional questions but we would appreciate future feedback as we work to improve these Watershed Academy webinars. At this time I would like to conclude the webinar. I'd like to thank our three speakers, Denise, Rosaura, and Steve for presenting today and of course thanks to all of you out there who joined us. That will end our webinar for today. Thank you.